

# BRIGHAM RESEARCH CORES AND RESOURCES FAIR

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## ANIMAL METABOLIC CORE

The Metabolic Core houses a Comprehensive Laboratory Animal Monitoring System (CLAMS) for continuous assessment of metabolic performance via indirect calorimetry. The CLAMS system records multiple parameters, including energy expenditure, fuel utilization, food intake, ambulatory activity, and core body temperature. Our chambers can maintain housing temperatures from thermoneutrality (30-34°C) to cold (4°C), and the light cycle can be modified. Our system is equipped with individual voluntary wheel running and continuous monitoring. We operate a bomb calorimeter (Parr Instruments) and can measure the energy content of food and fecal material. Glucose and insulin tolerance testing is provided. In addition, we provide experimental design, data analysis, and scientific interpretation guidance.

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## BIOBANK GENOMICS CORE

The Biobank Genomics Core at MGB-PPM, performs sequencing, genotyping, and gene expression (array and sequencing). The core has the Illumina NovaSeq and NextSeq platforms and performs both clinical grade CLIA genome and exome sequencing for clinical and research projects. The BGC also offers RNASeq, microRNAseq, 16s rRNA microbial profiling, and Covid-19 sequencing, which are automated on robots for high-throughput and consistent performance. In addition, bioinformatics services are available for all our NGS workflows. The core also supports genotyping projects using the iScan for Illumina high throughput array based genotyping, methylation studies, as well as expression profiling.

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## BIOMEMS CORE

Today, many challenging biomedical problems cannot be approached with the current technology toolbox. New technologies, including microfluidics, push these limits for clinical medicine, life sciences, and technology applications. Leading with these efforts, the MGH BioMEMS Core (BMC) focuses on translational activities that advance the biomedical research of Mass General-Brigham investigators. BMC also provides an environment attractive for industry partners interested in prototype testing and early scale-up efforts.

BMC provides:

- consulting to biomedical investigators interested in microfluidic tools
- training in microfluidic-specific techniques
- access to microfabrication infrastructure to trained users,
- microfabrication services for Bio-MEMS device users

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## BONE DENSITY AND BODY COMPOSITION RESEARCH CORE

The Brigham and Women's Hospital's (BWH) Bone Density and Body Composition Research Core is part of the Skeletal Health and Osteoporosis Center and Bone Density Unit at 221 Longwood Avenue. This research core uses dual energy x-ray absorptiometry (DXA) to provide high quality measures of bone mineral density (BMD, VFA and TBS) and body composition (fat, lean tissue, and visceral adiposity). Dr. Meryl S. LeBoff, the Director of this research core and Chief of the Calcium and Bone Section, and the staff have been performing clinical research scans for over 30 years and are committed to maintaining the highest standards of quality control to advance interdisciplinary health sciences research.

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## BRIGHAM IGNITE

Brigham Ignite is an early-stage innovation acceleration program for innovators at Brigham and Women's Hospital. Our program is focused on advancing discoveries with clinical and commercial potential while guiding researchers through the development process. We provide a team of experts in the areas of Licensing, Product Development, Intellectual Property, and Commercialization that will help you take your first steps onto the path of translation. There are two levels of funding available to program applicants. All award recipients, through both the Seed and Development programs, receive support from a program manager with industry experience to identify and refine objectives, develop plans, and manage projects to a successful exit. To date, we have made five awards, and additional funding decisions are ongoing.

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## BRIGHAM RESEARCH ASSAY CORE LABORATORY

The BRAC Laboratory provides a comprehensive menu of high-quality research assays to the research community at competitive costs. We are a CDC and CLIA certified laboratory and is accredited by the Joint Commission. We seek to meet the needs of its investigators with new and relevant technologies, and evolving research support. The BRAC lab offers analysis by LC/MS/MS, Equilibrium Dialysis, RIA, ELISA, or Chemiluminescence of over 70 high-sensitive assays, including uncommon assays such as Ghrelin, Free Testosterone, GDF-8, GDF-11, DABK, and DAKD. We can also develop new assays upon request and offer a variety of services such as sample storage, PBMC Isolation and DNA Extraction.

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## BWH CENTER FOR CLINICAL INVESTIGATIONS

The Center for Clinical Investigation (CCI) is the home for clinical research at Brigham and Women's Hospital. The CCI provides outpatient and inpatient clinical facilities. We support both adult and newborn research services for research investigators or industry collaborators translating promising clinical research ideas into successful protocols. Our mission is to maximize BWH's ability to conduct clinical research as effectively and accurately as possible. We provide a full range of research support, facilities, and services to meet the demands of investigators through the protocol start up, implementation, data analysis, and reporting phases of clinical research activities

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## CANARY NATURAL LANGUAGE PROCESSING PLATFORM

Canary is a free / open-source platform for development of natural language processing (NLP) tools. It is a GUI-based software that is oriented towards researchers, clinicians and analysts without computer science background to empower them to create their own NLP tools. Canary supports many advanced NLP features, such as extraction of concept-value pairs (e.g. left ventricular ejection fraction) and identification of concepts distributed across multiple sentences; all RPDR file formats are supported. Canary has been downloaded by hundreds of users across the world and has been used in a number of research studies, including several at BWH and MGH.

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## CENTER FOR ADVANCED MOLECULAR DIAGNOSTICS TRANSLATIONAL BIOMARKER CORE

BWH's Center for Advanced Molecular Diagnostics (CAMD) is a CLIA-certified clinical molecular and cytogenetics diagnostics laboratory offering a wide range of high quality, innovative genetic cancer diagnostic services. Within CAMD, the Translational Biomarker Core (TBC, formerly the CAMD Research Core) provides the same clinical grade sample preparation and diagnostic testing services on a fee for service basis to support both local and global research communities. Studies performed in partnership with TBC span grant-funded academic research to active academic and industry sponsored clinical trials.

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## DIGITAL INNOVATION HUB

Founded in 2013, the Brigham Digital Innovation Hub, or iHub, functions as the center for digital health at Brigham and Women's Hospital. Our vision is to advance the digital transformation in health care through technology and innovation. We empower individuals to think boldly, unlocking new potentials, while making progress towards a healthier world for our patients, clinicians, employees— for all. Our mission is to enable Brigham innovators in their pursuit of digitally-enabled ideas, to convene stakeholders to create impact and value, to lead the digital transformation of our integrated health system by supporting strategic initiatives and digital product developments. To promote patient-centered, efficient, and safe care through use, development, evaluation and commercialization of digital health.

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## GENOMICS AND BIOINFORMATICS HUB

The Genomics and Bioinformatics Hub at Brigham and Women's Hospital provides bioinformatics collaborations, services and trainings to researchers in and out of Brigham. We assist researchers for grant writing, next-generation sequencing (NGS) experimental design and data analysis, including bulk and single-cell RNA-seq data analysis, ATAC-seq, (ChIP)-seq, Hi-C, CAGE data analysis et.al. We also have two next-generation sequencing (NGS) machines free for researchers at Brigham to use, they are Illumina NextSeq sequencer and 10X Genomics Chromium.

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## HARVARD CATALYST BIOSTATISTICS CONSULTING PROGRAM

The Harvard Catalyst Biostatistical Consulting Program, funded by the National Institutes of Health, supports Harvard postdoctoral and faculty investigators undertaking clinical and translational research. Drawing on a team of highly skilled biostatisticians from the Harvard academic medical and hospital community, the program offers consultations and expertise on a range of relevant areas to researchers as they launch new clinical and translation projects. The program also promotes the development and mentoring of Harvard Catalyst biostatisticians, as well as biostatistical training for clinical investigators.

Statistical services focus on clinical and translational projects in the early stages of development. Typical consultations are between 1-3 hours, rarely exceed 10 hours, and include the following:

- Grant submission/resubmission
- IRB submission
- Protocol review
- Design for non-grant project/feasibility consultation
- Analysis planning and advice
- Assistance with response to a manuscript/journal reviewer

**Walk-In Office Hours** - Harvard Catalyst Biostatistical Consulting Program and the Center for Clinical Investigation at BWH offer weekly consultations virtually during COVID 19 pandemic. No reservation is required, and it is free. Biostatisticians will answer your statistical questions, guide you to more in-depth support, and will be available for both short- and long-term collaborations.

**Office Hours:** Tuesdays, 1:00pm-2:00pm

**Availability:** Anyone with a Harvard Medical School affiliation.

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## INVESTIGATIONAL DRUG SERVICE

The Brigham and Women's Hospital Investigational Drug Service (IDS) is division of the Department of Pharmacy Services and is devoted to the coordination of human drug research activities at Brigham and Women's Hospital. This includes developing procedures to ensure timely and safe drug dispensing, maintaining inventory of investigational drugs, blinding and randomizing drug studies, serving as an information resource regarding investigational drugs and study protocols, meeting with principle investigators and study groups, participating in protocols as co-investigators and reviewing protocols as members of the Mass General Brigham Human Research Committee. IDS acts as an informational resource for other Brigham and Women Hospital pharmacists and clinicians to assist in answering questions and solving dispensing issues with foreign drugs, orphan drugs, continued use of non-FDA approved agents from other institutions and emergency use investigational medications.

In an effort to comply with state, federal, accrediting bodies, and study sponsors; the BWH investigational drug services can support the following scenarios:

- Investigational new drugs being studied under an IND
- FDA approved drugs being studied under an IND or with IND exemption
- Drugs being studied under an Emergency IND

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## LMA CYTOF ANTIBODY CORE

Utilizing a 42 metal catalogue, we have developed panels for both human & mouse immune cell subsets, along with other cell classifications. With over 450 unique conjugations, any user can create their own panel from our inventory. Metal cross-talk & antibody sensitivity knowledge is used to carefully design each panel. Following design & conjugation, all antibodies are validated on the CyTOF with a standard staining procedure. If a marker is desired that is not available in the current inventory, one can make a request. These custom conjugations allow the user to collaborate with us to find the best metal choice to fit their panel & potentially the core inventory. Through this centralized resource, collaborations & panel expansion is readily accomplished.

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## MOUSE BEHAVIOR CORE

The Mouse Behavior Core (MBC) provides facilities, equipment, and training to characterize a range of mouse behaviors including cognitive function, sensory and motor responses, social interaction and anxiety. We offer consultation services for the design and analysis of behavioral studies, training in the operation of equipment for investigators who perform their own studies, and full-service including studies and data analyses performed by the MBC staff. The MBC staff promote the highest standards of mouse behavior research.

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## NEUROTECHNOLOGY STUDIO

The NeuroTechnology Studio (NTS) is a dynamic and fast-expanding core facility, founded in 2017 in an effort to unify brain researchers across departments and disciplines within the Brigham and Women's Hospital (BWH) and other local institutions. The core has acquired major imaging instruments including: Zeiss LSM880+AiryScan confocal microscope, GE INCELL Analyzer 2200, Leica DMI8 widefield microscope, Thorlab Multiphoton Mesoscope, and Bruker Ultima 2pPlus multi-photon microscope. The NTS also supports molecular profiling and functional phenotyping, and hosts instruments including Agilent Seahorse (cellular metabolic function), Illumina NextSeq550 and 10X genomics chromium controller.

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## PATIENT-REPORTED OUTCOME, VALUE AND EXPERIENCE (PROVE) CENTER

The Patient-Reported Outcome, Value and Experience (PROVE) Center focuses on studying what matters most to patients, by understanding patient and caregiver preferences and values, to promote and operationalize high-value and patient-centered care at MassGeneral Brigham, and globally. Our mission is to expand the collection, analysis and utilization of patient-reported outcome measures (PROMs). We are a team of clinicians, psychometricians, and data scientists who collaborate with healthcare professionals, researchers, patients, and decision-makers to amplify the patient's and caregiver's voice in treatment planning, organization, and delivery, as well as reimbursement. The PROVE Center PROMs Research Launch Pad provides a consultant service to help clinicians and researchers seeking support for PROM-related research projects.

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## PHYSIOLOGICAL NMR CORE LAB

Physiological NMR Core is equipped with 400MHz NMR, Langendorff system and Water HPLC system, and currently provides the following services:

- Real-time and simultaneous determination of cardiac energetics, intracellular pH, Glucose uptake rate, ATP and PCr synthesis rates with function in perfused organs with  $^{31}\text{P}$ -NMR
- Simultaneous determination of glycolysis and pentose phosphate pathway with  $^{13}\text{C}$ -NMR
- Track substrate utilization/metabolism with  $^{13}\text{C}$ -NMR
- Determine of intracellular Na content with  $^{23}\text{Na}$ -NMR
- Simultaneous determination of cellular redox potentials, energy metabolites and nucleotide catabolites in a single sample with HPLC
- Enzymatic determination of L2HG and D2HG



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