Beth Israel Deaconess Medical Center (BIDMC) maintains 18 institutional core research facilities, available to BIDMC investigators as well as to scientists from the Longwood Medical Area and beyond. The shared scientific services provided through the BIDMC Cores enable researchers to advance their work in an efficient and cost-effective manner, while at the same time encouraging and promoting cross-departmental collaborations among investigators.

For general information about the BIDMC Research Program, visit our site, bidmc.org/research.

### Berenson-Allen Center for Noninvasive Brain Stimulation

For equipment inquiries contact: Andrea Vatulas, (617) 667-0884; avatulas@bidmc.harvard.edu

- **Equipment and Softwares:**
  - Leica Ultracut E Ultramicrotomes (2)
  - Leica Ultracut UCT Ultramicrotome with FC-S and Cryo Attachment
  - JEM-1400 Transmission Electron Microscope with EM tomography capability
  - Bal-Tec MED 020 Vacuum Evaporator
  - Wohlwend High Pressure Freezer

### Bioinformatics & Systems Biology Core

Contact: Manoj K. Bhasin, PhD, (617) 667-0009; mbhasin@bidmc.harvard.edu

- **Equipment and Softwares:**
  - Computational Resources: Main computer cluster provides access to ~900 CPU cores, 12TB of total RAM and the 600TB of storage space. For memory intensive tasks, two separate dedicated high-memory clusters (additional 156 CPU cores total) are available with 2x 128GB of usable RAM.
  - Softwares: SEQUEST, GEXPAS, Ingenuity IPA, Mascot, MATLAB, ProteinPilot, R/Bioconductor, GeneGo, Cytoscape and >200 open source bioinformatics software packages for NGS, Proteomics and systems biology analysis.

- **Workflows:**
  - RNA-Seq: mRNA expression/alternate splicing/isoforms/novel transcripts or gene/ Gene fusion/ detection of RNA editing
  - Non-coding- and Linc- RNA sequencing analysis and annotation
  - Variant discovery/allele analysis (CNV/SNP)
  - Analysis of epigenomics, ChIP-Seq and DNA Methylation data
  - Comprehensive analysis of Microbiome sequencing data
  - Single cell mRNA-Seq data analysis
  - Integrated analysis of transcriptome, miRNA, epigenome and proteomics data
  - Functional Genomics analysis of data including pathway and functional enrichment analysis
  - Predicticr development and biomarkers discovery
  - Immunogenicity, epitopes and subcellular localization prediction

### Genomics and Proteomics Core

Contact: Simon Dillon (Proteomics), (617) 667-0884; sdillon1@bidmc.harvard.edu

- **Equipment and Softwares:**
  - SOMAscan aptamer arrays for 1310 protein biomarker measurement
  - Agilent SureScan Microarray Scanner (model D)
  - Affymetrix GeneChip Fluidics, ArrayStation and Scanner
  - Affymetrix GeneTitan
  - Dionex Ultimate Plus nanoflow LC system with Probot
  - Agilent 1100/1200 HPLC
  - AB Sciex MALDI-TOF/TOF 4800Plus mass spectrometer
  - BioTEK Synergy MX multimode microplate reader
  - Biomek FX Robot
  - StepOne Plus 96 well Real Time PCR System

### Histology and Microscopy ( Morphology) Core

Contact: Susan J. Hagen, (617) 667-5308; shagen@bidmc.harvard.edu

- **Equipment and Softwares:**
  - Zeiss Lightsheet Z1Microscope
  - Zeiss ELVRA Super-resolution Microscope System (SIM and PALM)
  - Zeiss B80 (inverted platform) System with Fast Airyscan
  - Zeiss LSM 780 Confocal System
  - Zeiss LSM 510 Confocal System
  - Zeiss Axioimager M1 microscope with color and B/W CCD cameras

### Clinical Research Center

For equipment inquiries contact: Michelle Beck, (617) 667-4269; mbeck1@bidmc.harvard.edu

- **Equipment and Softwares:**
  - Dell T7500 High Capacity computers (2)
  - Volocity Image Analysis software
  - Image J software
  - Serial EM software
  - IMOD software
  - Chimera Software

### Flow Cytometry Core

Contact: Vasilis Toxavidis, (617) 735-4191; vtoxavid@bidmc.harvard.edu

- **Equipment and Softwares:**
  - BD FACSaria II 5 Laser
  - BD FACScan
  - BD LSR II 4 Laser
  - BD LSR II 5 Laser
  - Beckman Coulter MoFlo XDP
  - Propel Avalon
  - High Throughput Sampler/plate reader (BD HTS)
  - Beckman Coulter Gallios
  - Nexelomt Celigo
  - Miltenyi AutoMACS Magnetic Separator
  - Luminex Magpix
  - Beckman Coulter Astrios EQ

### Instrumentation available via collaboration with the Harvard Center for Biological Imaging, Harvard Cambridge Campus

- **Equipment and Softwares:**
  - Zeiss LSM510 Meta Live-Cell Confocal System with a Life Imaging Services environmental enclosure and Brick and Cube environmental control devices
  - Eppendorf FemtoJet Microinjector
  - Zeiss Axioimager M1 microscope with color and B/W CCD cameras

### Image Processing

- **Equipment and Softwares:**
  - Zeiss LSM510 Meta Live-Cell Confocal System with Brick and Cube environmental control devices
  - Imaging, Harvard Cambridge Campus

- **Equipment and Softwares:**
  - Zeiss LSM510 Meta Live-Cell Confocal System with a Life Imaging Services environmental enclosure and Brick and Cube environmental control devices
  - Eppendorf FemtoJet Microinjector
  - Zeiss Axioimager M1 microscope with color and B/W CCD cameras

### Mass Spectrometry (phosphoproteomics, metabolomics and lipidomics) Core

Contact: John Asara, (617) 735-2651; jasara@bidmc.harvard.edu

- **Equipment and Softwares:**
  - Thermo QExactive Plus Orbitrap with 2D-HPLC
  - AB/SCIEX 5500 QTRAP triple quadrupole with
Preclinical Murine Pharmacogenetics Core
Contact: John (Seán) Clohessy, PhD, (617) 735-2147; jclohess@bidmc.harvard.edu
- QIAxcel: multipipette electrophoresis system
- Vevo 2100 Ultrasound system

SAIF - Small Animal Imaging Facility Core
Contact: Meaghan Fox, (617) 667-2508, mfox2@bidmc.harvard.edu
- PPT/ICT
- SPECT/ICT
- MRI
- Radioactive Chemistry HPLC Detection System
- Xenogen IVIS Bioluminescence
- Maestro Multispectral Fluorescence
- PAM Complete Portable Anesthesia Machines
- Tec 3 style Isoflurane Vaporizers
- Animal Blood lab instruments: TruPoint and Hemavet
- Cyclone Plus Autoradiography Phosphoimager
- Imaging Software: VivoQuant; Living Image; Maestro; Nuclide

Transgenic Core
For equipment inquiries contact: Joel Lawitts, PhD, (617) 632-0264; jlawitts@bidmc.harvard.edu

Blood Chemistry Core
Contact: David Gallo, dgallo@bidmc.harvard.edu
- IDEXX Catalyst Dx Chemistry Analyzer

Center for Advanced Orthopaedic Studies (CAOS) μCT Core
Contact: Daniel Brooks, djbrooks@bidmc.harvard.edu
- Two Scanco μCT 40 scanners

Center for Virology and Vaccine Research Flow Cytometry Core
Contact: Michelle Lifton, MT(ASCP), (617) 735-4512, mlifton@bidmc.harvard.edu
- BD FACSAria, 4 laser system capable of detecting up to 18 fluorescent markers. Dedicated staff train users and are available to run samples upon request.
- FACSCalibur, 2 laser system capable of detecting up to 4 fluorescent markers.
- ADVIA120 automated hematology instrument providing CBC with 5 part differential.

Glycomics Core
Contact: Sylvain Lehoux, slehoux@bidmc.harvard.edu
The Glycomics Core houses the following instrumentation:
- Anesthesia System
- Perkin Elmer contact Spot Array Printer
- Scienion non-contact Microarray Printer
- Molecular Devices ScanArray Pro microarray scanner
- Three Shimadzu HPLC systems with autosampler, fluorescence and UV detectors, and fraction collector
- Bruker UltraFlex II MALDI-TOF mass spectrometer
- Thermo Fusion Lumos LC-MS mass spectrometer
- Dionex ICS-3000 Ion Chromatography system

X-ray Crystallography Core
Contact: Gabriel Birrane, (617) 667-0025; crystallography@bidmc.harvard.edu
The laboratory houses instrumentation consisting of:
- Micromax 007 X-ray generator
- R-Axis HTC detector
- Osmic VanMax HF confocal optics
- X-Stream 2000 cryogenic device for data collection at 100K
- Two Olympus microscopes are available for inspecting and photographing crystal trays
- Two incubators (4ºC - 25ºC) are available for crystallization experiments
- An Art Robbins Instruments CrysCam for plate imaging
- A TTP Labtech Mosquito Crystallization robot
- Malvern VP-ITC

Zebrafish Core Facility
Contact: Nadine Budrow, (617) 667-8943; nbudrow@bidmc.harvard.edu
- 3000 tank Aquatic Habitats recirculating water system (1, 5, 10L tanks), including nursery area
- Stand-alone isolation/quarantine units
- Labconco steam scrubber dishwashers
- Narishige microinjectors
- Leica stereomicroscopes
- Vevo800 high-frequency ultrasound machine
- Variable temperature incubators
- Vibration-stabilized microinjection stations
- YSI 5200 water quality monitors
- PT4 TGP monitors

BIDMC DEPARTMENTAL CORES

Beth Israel Deaconess Medical Center is home to a preeminent academic research program where scientific discoveries are helping to transform medical care. Key research areas include vascular biology, molecular imaging, transplantation, signal transduction, cancer biology, metabolic disease and obesity, neurobiology, AIDS, inflammation and cardiology/cardiac surgery. BIDMC consistently ranks in the top four in National Institutes of Health (NIH) funding among independent hospitals nationwide.