
BIOMED CORE RESEARCH FACILITY EQUIPMENT (updated October, 2021)

The Division of Biology and Medicine at Brown University operates eleven core facilities that contain a significant equipment infrastructure and are supported by dedicated, expert personnel. In addition, investigators have linked access to core research facilities, services, and instrumentation across Rhode Island through the [CoresRI](#) online directory. Typically these services and resources are provided on a fee for service basis.

CoresRI.org. Rhode Island universities, colleges and academic medical centers across the state collaborated to develop the CoresRI.org website (www.CoreRI.org); a directory of core research facilities, services and instrumentation in Rhode Island. Development of CoresRI grew out of a need to maximize awareness and optimize utilization of these important core facility resources within the state. Besides encouraging equipment sharing and reducing duplication of services, CoresRI.org fosters collaborations and enables investigators to better assess future shared equipment needs. The CoresRI directory catalogues instruments (specific makes, models, and uses), services, resources, locations, and contact personnel. Through the directory, researchers can easily search for instruments and services and directly link to the core facility's website for more detailed information. The site currently lists over 953 instruments, services or resources located within 148 facilities at 19 institutions and 84 centers.

Bioimaging Facility. This facility has two separate building locations, one of them being at the Laboratories for Molecular Medicine and one at the Sidney Frank Hall for Life Sciences. The facility has a PhD-level director and an MS-level microscopist manager. Instrumentation includes a Thermo Apreo Volume Scope (VS) SEM for serial block-face imaging, a Philips 410 transmission electron microscope with a goniometer stage, low-dose imaging equipment, and ATM digital imaging system. The facility also houses an FV1000 Olympus multiphoton laser scanning microscope, an Olympus FV3000 confocal imaging microscope, Zeiss LSM880, LSM800, and LSM710 confocal laser scanning microscopes, two Nikon Ti2-E high-content analysis fluorescence microscopes, two Zeiss Axiovert 200M fluorescence microscopes with DIC, phase contrast, and a stage heater for live imaging, a Zeiss Lumar fluorescence stereomicroscope, and an Olympus VS200 Research Slide Scanner. The facility provides operational oversight of the Opera Phenix high content screening system in the Center for Alternatives in Animal Testing at the Laboratories for Molecular Medicine. The facility also maintains equipment for sample preparation, including a critical point dryer, sputter coater, glow discharge unit, and a Leica EM UC7 ultrathin microtome. MetaMorph software is available for image analysis. Training in microscopy, image analysis, and ultrathin sectioning is provided at both sites.

Drosophila Media Prep Facility. This facility is located at the Biomedical Center and is overseen by the Director of the Multidisciplinary Teaching Laboratories and staffed by a full-time technical assistant. The Facility provides investigators with high quality media for Drosophila research and genetic stock maintenance. To provide large and small quantities of media, this centralized kitchen is equipped with a food-service quality Cleveland Range Kettle MKET-12-T. Media is pumped into trays of vials or plastic bottles using a Gilson Fly Food Dispenser. Used glass vials are returned to the facility where they are sterilized in a Steris autoclave and washed in a Northwestern Systems G403 electric heat glassware washer.

Flow Cytometry. This facility, located at the Biomedical Center, is directed by a PhD-level investigator and staffed by a full-time manager. The primary instrument is a Becton Dickinson FACSAria III, a 5-laser, 20-parameter instrument with analytical and sorting capabilities for up to four populations, bead-based immunoassays, and DNA cell cycle analysis. The five lasers are blue 488nm, yellow/green 561nm, red 633nm, violet 407nm and UV 375nm. A fixed-alignment cuvette flow cell provides excellent fluorescence sensitivity. The facility houses a 3-laser, 15-parameter BD FACSCelesta with blue 488nm, violet 407nm, and yellow/green 561nm lasers and equipped with a high throughput system for analysis of samples from 96 well plates. The facility also houses a four laser Cytex Aurora with blue 488nm, red 640nm, violet 405nm and UV 355nm lasers. This instrument can analyze up to 54 channel, 57 parameters and is equipped with an auto sampler loader. Consultation is available. A computer workstation with FlowJo software is provided for facility users.

Genomics Core Facility. This facility is located at the Laboratories of Molecular Medicine and staffed by a full-time PhD-level director. It provides investigators access to a variety of advanced instrumentation and training. DNA sequencing services are provided using an Illumina NextSeq 550 Sequencing System. Instrumentation housed in the facility includes a Nanostring nCounter® SPRINT™ Profiler, an Affymetrix Gene Chip Workstation,

two ABI ViiA™ 7 Real-Time PCR Systems, a BIO-RAD QX200 Droplet Digital PCR, an Advanced Analytical Fragment Analyzer, a Cytation 5 Plate Reader, a Synergy H1 Hybrid Multimode (H1MM) Microplate Reader, a Covaris S220 Ultra-Sonicator, an Agilent 2100 Bioanalyzer, a LI-COR Odyssey Infrared Imaging System, a Countess Cell Counter, an AXON GenePix 4000B Scanner, a Beckman Optima Max Ultracentrifuge, and a Nanodrop ND 1000.

Magnetic Resonance Imaging (MRI) Facility. The Brown University MRI Research Facility, located at Sidney Frank Hall, occupies a 3,000-square-foot research suite. This facility is directed by a PhD-level investigator, managed by two PhD-level Associate Directors, and staffed by a registered radiography technologist specialized in magnetic resonance imaging. The facility provides infrastructure and support to facilitate research and educational activities using magnetic resonance imaging technology. The centerpiece of the facility is a state-of-the-art Siemens 3 Tesla PRISMA scanner. The scanner is equipped with 64 receiver channels for significant gains in signal-to-noise ratio and acquisition speed. The MRF is affiliated with the University's Robert J. and Nancy D. Carney Institute for Brain Science and is a resource available to Brown researchers and those at Brown-affiliated hospitals. Ongoing research includes studies of brain structure and function in normal and clinical populations as well as studies of other body systems, non-invasive animal imaging and materials science.

Molecular Pathology Facility. This facility, located at the Laboratories for Molecular Medicine, is supervised by an MD-PhD-level pathologist and staffed by a full-time manager and research assistant. The facility provides access to histopathological, immunohistochemical and immunocytological technologies. Processing, embedding, sectioning, and staining of specimens is provided. The instrumentation includes a Leica EG1160 embedding center, a Leica CM3050S cryostat, a Micron HM355 rotary microtome for paraffin sections, a Leica RM2265 rotary microtome for thick and semi-thin plastic sections and paraffin sections, a Leica ASP300 S Automated Vacuum Tissue Processor, a ScanScope CS digital slide scanning system from Aperio Technologies, a Fujix Bas 1000 phosphor imager, a Nikon Eclipse TS100 inverted fluorescence microscope, a Nikon E800 microscope with a digital camera, a Leica VT1000S Vibratome for soft tissue sectioning, and an Arcturus PixCell II laser capture microdissection system.

Mouse Transgenics and Gene Targeting Facility. This facility, located at the Laboratories for Molecular Medicine, is directed by a PhD-level research investigator and employs a full-time facility manager and research technician. Services include provision of CRISPR technologies for genome modification and editing, pronuclear injection of DNA into fertilized eggs, injection of gene targeted embryonic stem cells into blastocysts, and embryo cryopreservation. The facility provides genotyping services and individual investigators are responsible husbandry and breeding of generated mouse strains. Facility instrumentation includes a Nikon SMZ1500 dissection microscope, a Nikon Eclipse TE200 inverted microscope equipped with Eppendorf Transferman NK2 micromanipulators and an Eppendorf FemtoJet microinjector, a Nikon Eclipse TS100 inverted microscope, a Nikon SMZ800 surgical microscope, a Neon Transfection System MPK5000S, a Bio-Cool Controlled Rate Freezer, a Piezo Impact Drive, a NanoDrop Lite UV-Vis Spectrophotometer with printer, and a CBS V1500AB isothermal liquid nitrogen storage system.

Proteomics Core Facility. The proteomics facility, located at the Laboratories for Molecular Medicine, is directed and staffed by a PhD level scientist. Facility instrumentation includes a Thermo Scientific Q Exactive™ Hybrid Quadrupole-Orbitrap Mass Spectrometer, a Jasco J-815 Circular Dichroism Spectropolarimeter, MicroCal VP Differential Scanning Calorimeter, a MicroCal Isothermal Titration Calorimetry (iTC) 200, HORIBA Jobin Yvon FluoroMax-4 Spectrofluorometer, a GE AktaPrime Plus Protein Purifier, an Eksigent 2D+ ultra-high pressure liquid chromatography system (UHPLC), an Agilent 1200 HPLC, and a Minifors fermentor.

Rhode Island Biobank. The Rhode Island Biobank, located in the Biomedical Center and Laboratories for Molecular Medicine, is a human tissue and fluid sample cryogenic storage facility for investigators located at Brown University and the affiliated hospitals of the Warren Alpert Medical School. This facility, staffed by a research technician, provides a secure, state of the art biorepository to store human biological samples. Facility equipment includes four (4) -80°C freezers, three (3) 4°C refrigerators, and two (2) Taylor Warton liquid nitrogen freezers each capable of holding 40,000 1ml samples. The facility offers consultation regarding best practices in biobanking and biospecimen inventory management.

Structural Biology Facility. The facility, located at the Laboratories for Molecular Medicine, is directed and managed by two PhD-level scientists. The facility houses instruments for NMR spectroscopy and X-ray crystallography. The facility instrumentation includes a Bruker 850 MHz AVANCE III ASCEND spectrometer equipped with TCI HCN Z-gradient cryoprobe, 600MHz AVANCE III HD, and 500 MHz AVANCE II Ultrashield HD. The 850 MHz magnet additionally has a nitrogen liquefier extension and SampleMAIL automated delivery system for maximum ease of use. TXI HCN room-temperature probes are also available. Both spectrometers are operated by Linux workstations running TopSpin 3.1. For crystallographic research, the facility instrumentation includes a Rigaku MicroMax-003 Microfocus sealed tube X-ray generator system with a Homelab ACTOR Integrator for R-Axis IV++ System and a Right Port Saturn 944HG/AFC11 Homelab System. Linux workstations are available for crystallographic data reduction and structure determination (programs include HKL-3000, CCP4, and CNS).

X-ray Reconstruction of Moving Morphology (XROMM). This facility, located at the Biomedical Center, is directed by a PhD-level scientist and staffed by a research technician. XROMM is a 3D imaging technology for visualizing rapid skeletal movement in vivo. XROMM combines 3D models of bone morphology with movement data from biplanar X-ray video to create highly accurate re-animations of the 3D bones moving in 3D space. Rapid bone motion, such as during bird flight, frog jumping and human running, can be visualized and quantified with XROMM. Facility instrumentation includes mobile C-arm OEC 9400 Fluoroscopes and a biplanar X-ray room containing two Varian model G-1086 X-ray tubes, 2 EMD Technologies model EPS 45-80 pulsed X-ray generators, two Dunlee model TH9447QQXH590 image intensifiers (16 diameter), and 2 Phantom v10 high-speed digital video cameras. The facility also has a veterinary Animage Fidex CT Scanner, a CT scanner designed for animals in the size range from rats to dogs and a SKYSCAN 1276 in vivo micro-CT system for scanning small laboratory animals and biological samples.