Resources Available to Graduate Students and Postdoctoral Scholars
Within the Division of Biology and Medicine, Brown University

Table 1: Support for BioMed Graduate Students, Spring 2011

<table>
<thead>
<tr>
<th></th>
<th>Govt</th>
<th>Non-Govt</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Grant</td>
<td>37</td>
<td>0</td>
<td>37 (13%)</td>
</tr>
<tr>
<td>Research Grant</td>
<td>49</td>
<td>12</td>
<td>61 (22%)</td>
</tr>
<tr>
<td>Individual Fellowship</td>
<td>38</td>
<td>6</td>
<td>44 (16%)</td>
</tr>
<tr>
<td>Other Federal Training Support Programs</td>
<td>18/8/2</td>
<td>0</td>
<td>28 (10%)</td>
</tr>
<tr>
<td>University Support</td>
<td>0</td>
<td>108</td>
<td>108 (39%)</td>
</tr>
<tr>
<td></td>
<td>152</td>
<td>126</td>
<td>278</td>
</tr>
</tbody>
</table>

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Administrative Resources

Brown University’s Division of Biology and Medicine

Comprising the Program in Biology, Warren Alpert Medical School, and the Program in Public Health, the Division is home to five basic biology departments offering undergraduate and graduate courses, 14 clinical departments, and two hybrid departments (with both clinical and campus-based faculty). The Division of Biology and Medicine is the administrative home for faculty whose primary roles are in research, education, or clinical care in the domains of biology, medical science, and public health. This organizational structure encourages multidisciplinary instruction and research, a hallmark of education at Brown. Faculty within the Division and its teaching hospital partners attract $200 million in external research funding per year.

Support for Graduate Students in the Division of Biology and Medicine

All predoctoral students offered admission to graduate programs are guaranteed five years of financial support contingent upon making satisfactory progress toward the degree. This support includes stipend, health insurance, and remission of tuition and fees. Support comes from a combination of resources including Division Fellowships, Predoctoral Training Grants, Research Grants, Teaching Assistantships and individual fellowships. Current available predoctoral support is shown in Table 1. In addition, a R25 grant from NHLBI (PI Dr Sharon Rounds) supports minority undergraduate summer research training. An Initiative to Maximize Student Development (IMSD) R25 grant from NIGMS (PI Dr Andrew Campbell) supports underrepresented minority graduate education (shown above). At this time, 13% of our PhD students are supported as trainees via federal training grants, with another 10% supported by other federal training mechanisms. Additionally, 22% of our PhD candidates are supported by faculty-held research grants, over two thirds of which are federally funded awards. These research grants are not individually listed in this application, however one criteria of eligibility for faculty to serve as a research mentor is external research funding.

The Office of Graduate & Postdoctoral Studies

Created in 2006 to focus on and enhance the training environment for the roughly 280 graduate students and 110 postdocs within the Division of Biology and Medicine. In creating this office, the Dean of Medicine and Biological Sciences, made a commitment not only to growth in the overall numbers of our trainees, but also to increasing the diversity of this group and enriching trainees' preparation as scholars within the university setting and in their future career paths. Elizabeth O. Harrington, PhD serves as Associate Dean for Graduate &

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Postdoctoral Studies. Her office, located in the Arnold Laboratory, 97 Waterman St., oversees admissions, recruitment, tracking, support, and professional development for students and postdocs in the Division of Biology and Medicine. Graduate Programs within the Division of Biology and Medicine are interdisciplinary in nature, and include faculty from other departments both within the division and outside it. Numerous departments have faculty involved in graduate training including, but not limited to Chemistry, Engineering, Sociology, Cognitive, Linguistic & Psychological Sciences, Applied Math, and Computer Sciences. Our graduate students benefit from this training environment and a strong extramural research-funding base. Each Graduate Program within the Division has its own administrative offices, support staff, and dedicated space for students, along with computer and internet access in the vicinity of the faculty research laboratories. There are further student computer clusters and associated hardware (printers and scanners) and fully supported software at the Libraries and CIT (Computing Information Technology) center. Each student is assigned dedicated space.

**Career Development Center**
http://careerdevelopment.brown.edu/undergrads/index.php
Located at 167 Angell St. This Center assists graduate student professional development by helping with curriculum vitae and interview preparation, and is staffed with graduate-student-dedicated personnel.

**Sheridan Center for Advanced Teaching and Learning**
http://www.brown.edu/Administration/Sheridan_Center/
Located at 96 Waterman St. This key resource, available to all students and faculty, is directed by Kathy Takayama, PhD. Among other offerings, the Center provides assistance in syllabus development and conducts seminars and workshops leading to three Certificate levels. Many graduate students partake in training offered here as part of their professional development.

**Writing Center**
http://www.brown.edu/Student_Services/Writing_Center/
A free academic support service for all members of the Brown Community. The Center is staffed by graduate students from a variety of academic disciplines. Staff members are experienced writers and teachers who participate in ongoing training in composition theory and practice. In addition to holding one-on-one conferences, Writing Center Associates offer various workshops on writing for interested groups. Writing Center conferences generally last an hour. Writing Center Associates are prepared to discuss all stages of the writing process, from finding a topic up through revision and editing strategies. Associates can help writers deal with writer's block, audience awareness, argumentation, organization, grammar, research skills, the conventions of academic writing, and issues of clarity and style.

**Watson Center for Information Technology**
http://www.brown.edu/cis/about/index.php
Located at 115 Waterman St. Brown University holds an extensive list of site licenses for computing including compilers, numerical libraries, mathematical problem-solving environments, visualization software, statistical packages, and productivity software. For Unix platforms: Mathematica, Matlab, NAG ASLI Software Suite, Portland Group Inc. (PGI) Compilers, Splus, Tecplot. For Mac and Windows platforms: Mathematica 6.0, MatLab r2008b, NVivo 8, S-Plus 8, SAS 9.13, SPSS 17, Stata SE 10.0. Students have access to several computer teaching labs that are equipped with either internet connected dual boot Macintosh computers or Sun workstations for programming/instruction on multiple platforms.

**BioMed Computing Services**
http://biomed.brown.edu/cso
In addition to the Brown campus-wide resources of the Center for Information Technology, a Division Computing Services Office supports instructional, administrative, and research-based technology needs for both campus and hospital-based faculty and staff. The office assists with trouble-shooting computer problems, installation of software and hardware, computer configuration management, the purchase of new equipment, network planning, and configuration, and all Division information technology management and planning.

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Facilities Planning and Operations
http://biomed.brown.edu/facilities/
This is a core service group that supports all matters pertaining to physical facilities within the Division of Biology and Medicine. It comprises three main components: Planning, Design and Construction, Facility Services, and Support Operations. The Support Operations group encompasses Stores Operations, Machine Shop, Copy Centers, Mail Services and Information Centers. Stores Operations offers over 900 stocked research supply items at two sites, provides laboratory gases and services for the research operations, and coordinates the shipping and receiving services for all of the Division’s facilities. The Machine Shop, staffed by our Senior Instrument Maker, provides consultation and technical services ranging from equipment repair to full design and fabrication services. The Division’s Mail Services, Copy Centers, and Information Centers provide the necessary administrative support to the Division’s operations.

Environmental Health and Safety Office
http://brown.edu/Administration/EHS/
Brown University employs an Institutional Safety Officer, conducts safety training of new personnel including graduate students conducting research and oversees procedures for review and approval of any research involving hazardous substances.

Research Buildings (back to top)
Sidney Frank Life Sciences Building
Located at 185 Meeting St., this building has 73,733 square feet of useable space, with 66% of that devoted to research. Opened in November 2006, the building consolidated most of the Division of Biology and Medicine’s wet lab research space in one city block. The building contains 34 labs and 51 lab modules. This building houses the Magnetic Resonance Imaging (MRI) facility and one of the two Leduc Bioimaging Facilities. In addition, it houses a large common area, conference rooms, and the 99-seat Markewitz Auditorium for classes and lectures. Faculty in the Neuroscience and Molecular and Cellular Biology Departments are located in the Sidney Frank Building.

The Laboratories for Molecular Medicine (LMM)
Located at 70 Ship St, this building has 69,002 square feet of useable space, 63% of which is devoted to research in genetics, genomics, proteomics, structural biology, pharmacology, and pathology. The open floor plan of the facility promotes collaboration among scientists and benefits trainees. These partnerships provide the context in which biomedical research will ultimately translate into the tools for clinical care. The facility is within a few blocks of the new Warren Alpert Medical School building (in construction), as well as the major research buildings of Woman & Infants Hospital and Rhode Island Hospital, which house other Brown faculty and research centers affiliated with the Division. This building houses the Genomics, Transgenics, Proteomics, Bioimaging, and Molecular Pathology Facilities. Faculty in Molecular Pathology and Laboratory Medicine, Molecular and Cellular Biology, and Molecular Pharmacology, Physiology and Biotechnology Departments are located in the Laboratories for Molecular Medicine.

121 South Main St:
The Program in Public Health research and training is located in this building. The facility includes 64,040 square feet of useable space devoted to research, administration and instruction, and houses the Center for Statistical Sciences, as well as 9 other nationally renowned public health research centers. The academic and research goals for the Public Health Program are focused in the Department of Community Health. Offering multi-disciplinary, comprehensive programs in population-based medicine and health, the department’s educational mission encompasses undergraduate, graduate, and medical education, and fellowship training. Education and research activities are structured into four sections: Behavioral and Social Sciences, Biostatistics, Epidemiology, and Health Services Research, Policy and Practice. Faculty trainers in Graduate programs in Biostatistics, Epidemiology, and Health Services Research are located here.
Biomedical Center
Located at 171 Meeting St, this seven story building consists of 67,118 square feet of useable space, 37% of which is devoted to research. It is part of the BioMed Complex, housing a total of 47,107 square feet of research space. The building is also located immediately adjacent to the Sidney Frank Life Sciences Building. This building houses research laboratories and the Flow Cytometry Facility. Faculty in Microbiology and Immunology, Ecology and Evolutionary Biology, and Molecular Pharmacology, Physiology and Biotechnology Departments are located in the Biomedical Center.

Plant Environmental Center
Located at 91 Waterman St, the Plant Environmental Center, supported by the Department of Ecology and Evolutionary Biology, is a growing facility devoted to plant biology research. Spread out over 3 research greenhouses encompassing 5,000 square feet, the space includes a teaching plant collection, a classroom laboratory, and research facilities. There is also a 2,000 square foot Conservatory, housing many different plant families. In addition to this space there are five E7/2 conviron plant growth chambers, and a 180-sq-ft. walk-in growth chamber, used by grad students and faculty.

Sciences Library
Located at 201 Thayer St. Brown faculty, students, and staff have access to both print and electronic resources at the Sciences Library. The print collection supports study and research in the fields of medicine, psychology, neural science, environmental science, biology, chemistry, geology, physics, engineering, computer science, and pure and applied mathematics.
- Access over 20,000 online journals, of which 60% are in science, technology, and medicine. On campus, these are available through Josiah, Brown’s online catalog (library.brown.edu/search) or from the subject list of e-journals (dl.lib.brown.edu/eresources/ejournals.php). From off-campus, users can gain access through “Off-Campus Access Service” at http://dl.lib.brown.edu/libweb/proxy.php
- The $4M Friedman Study Center is a 24/5 student study space featuring 27,000 square feet of study and social space on three levels of the Sciences Library. The Center is staffed by expert library and technology experts and has wireless connectivity, a café, seminar rooms to support group projects, individual study spaces, multimedia terminals and more
- One-on-one assistance, individual and group orientations, and in-depth training.
- Search PubMed, Biological Abstracts and other databases and link directly to journal articles via “LibX”
- Access interdisciplinary databases such as: Academic Search Premier, Lexis/Nexis and Web of Science (includes Science Citation Index).
- Access over 100,000 e-books: http://dl.lib.brown.edu/eresources/ebooks.php
- Interlibrary loan services

Research Facilities (not COREs) (back to top)
Biomolecular Nuclear Magnetic Resonance Facility
Located at the Laboratories of Molecular Medicine, the Biomolecular NMR Facility houses one Bruker NMR instrument operating at 500 MHz. The main use of this NMR instrument is high-resolution NMR spectroscopy of biomacromolecules. An AVANCEII 500 MHz spectrometer (DRU receiver) is equipped with four independent channels dedicated to 1H, 13C, 15N, and 2H (2H-TX board). Two automated tuning and matching probes are available for the 500 MHz instrument: a room temperature TXI HCN z-gradient probe and a TCI HCN z-gradient cryoprobe. The instrument is controlled via TopSpin 1.3 on a Linux-based computer.

Water Flume
The Department of Ecology and Evolutionary Biology was awarded a grant from the NSF to establish a core research facility for a 3,500-gallon water flume. Measuring 80 cm in width, 60 cm in height, and 440 cm in length, the flume is based on a re-circulating design with the flow loop arranged in a horizontal configuration. With its ability to regulate flow rate patterns up to 1 m/s, the flume offers researchers a wide array of simulated conditions. Principal investigators use the flume to replicate situations normally found in the field.
Centers and Institutes (partial) (back to top)
Full online listing of BioMed Institutes and Centers can be found at http://biomed.brown.edu/research/cip,
listing of Research Laboratories can be found at http://research.brown.edu/research/labs.php

Center for Alcohol and Addiction Studies
The center brings together more than 130 faculty and professional staff across eleven University departments
and eight affiliated hospitals to promote the identification, prevention, and effective treatment of alcohol and
other drug use problems in our society through research, education, training, and policy advocacy.

Center for Excellence in Women’s Health
The Center is dedicated to improving the health and health care for all women by working with academic and
community partners and collaborating with public and private health care providers throughout the state.

Center for Gerontology and Health Care Research
The Center for Gerontology and Health Care Research is a multi-disciplinary research center with a special
focus on the diverse health and social service needs of persons with chronic illnesses, especially older adults.

Center for the Study of Human Development
Child and Adolescent Development is the primary focus of the research and teaching of the faculty affiliated
with this multidisciplinary center.

International Health Institute (IHI)
International Health Institute was founded in 1988 to promote, develop, and coordinate the international health
activities of Brown University, its faculty, and its students by applying an interdisciplinary approach to the
development of research, education, and training.

Center for Computational Molecular Biology (CCMB)
The Center for Computational Molecular Biology sponsors research at the intersection of computer science,
biology and related disciplines, particularly in the areas of genomics and proteomics research.

Center for Statistical Sciences (CSS)
The Center provides a focus of statistical expertise for the Brown research community and to foster research
and statistical education at Brown. CSS faculty expertise covers a broad range of areas in applied statistics,
including statistical methods for the assessment of diagnostic technology; design and analysis of clinical trials;
statistical methods for health services and outcomes research; longitudinal data analysis; meta-analysis;
statistical methods for psychiatry and the behavioral sciences; analysis of observational studies; and statistical
methods for genomics and proteomics. In addition to research in statistical theory and methods, Center faculty
and staff are involved in a variety of interdisciplinary projects both within and outside of Brown.

Center for Advanced Scientific Computation and Visualization (CCV)
The Center houses a supercomputing and immersive virtual reality laboratory. The laboratory includes the linux
cluster, the main powerhouse supercomputer; the IBM SP Cluster, a 148-processor Scalable POWERparallel
cluster; and the CAVE, ‘CAVE Automatic Virtual Environment’ which is an 8’ cube projecting on 3 walls and the
floor, Intersense and Polhemus sensors are used to provide tracking, and CrystalEyes shutter-LCD glasses
are used for stereo (3D) viewing capabilities.

Brown Institute for Brain Science (BIBS)
BIBS was designed to promote collaborative theoretical and experimental study of the brain from the molecular
to the behavioral and cognitive level. It unites faculty who study the fundamental mechanisms of nervous
system function and those who seek to create devices with brain-like functions that can assist mankind. The
faculty are also committed to translating fundamental knowledge for the diagnosis and treatment of the
devastating effects of disease and trauma of the nervous system.
Center for Vision Research (CVR)
The Center for Vision Research, part of Brown’s interdisciplinary Institute for Brain Science, promotes and facilitates research on biological vision, computational aspects of machine vision, visual disorders, and the brain mechanisms underlying vision. The CVR provides in-depth training in vision research to postdoctoral fellows, medical residents, graduate students, and undergraduates, and serves as a unifying organization spanning traditional departments, as well helping to bridge the gap between basic research and clinical practice.

Center for Biomedical Engineering
The Center for Biomedical Engineering provides students and faculty with the tools they need to conduct research in biomedical engineering, a dynamic field based upon the application of the tools of engineering to the subject matter of biology.

Ties with Other Institutions (back to top)
Rhode Island Hospital
  Hallett Center for Diabetes and Endocrinology
  The Hallett Center, located at Rhode Island Hospital, pursues clinical and basic research on diabetes and other endocrine diseases that will increase our understanding of causal mechanisms and define new approaches to treatment.
  Liver Research Center
  The Liver Research Center is a 13,000 square foot facility emphasizing molecular biology of liver diseases. Fellows may participate in many of the established studies, i.e. genomics and pathogenesis of HCC.

Marine Biological Laboratories
Located in Woods Hole, Massachusetts (approximately 70 miles from the Brown University campus), this research institution hosts year-round research programs in cellular, developmental, and reproductive biology; molecular biology and evolution; neurobiology and sensory physiology; ecology; global infectious diseases; and marine biotechnology and aquaculture. In the summer months, distinguished scientists from around the world gather to do research at the MBL. The MBL includes the WM Keck Ecological and Evolutionary Genetics Facility at the Josephine Bay Paul Center, which is equipped for high-throughput DNA template production and sequencing. The facility operates two Applied Biosystems 3730XL capillary sequencers (96- or 384-well plate format) and contains additional support instrumentation including a colony picker, thermocyclers, centrifuges, and microarrays. The facility also operates a Roche 454 GS20 instrument for massively parallel pyrosequencing.

University of Rhode Island
The Rhode Island Genomics and Sequencing Center
This Center facilitates interdisciplinary genomics research for RI EPSCoR institutions. The Center has a multitude of equipment for training and research. The Applied Biosystems 3130xl Genetic Analyzer is a fully automated fluorescence-based genetic analysis system. The Center includes a refrigerated centrifuge, a thermal speedvac centrifuge, and an Eppendorf epMotion 5075 VAC automated pipetting workstation. The Center offers access to an Omnilog Phenotype microarray system and two real time PCR systems (Stratagene Mx3005P and Roche LC-480), as well as a QIAGEN BioRobot 8000 Gene Expression- a series of molecular biology workstations designed for high-throughput, walk away nucleic acid purification. Imaging services are also available using a Zeiss Axioplan 2 microscope equipped with a PASCAL laser-scanning confocal module and an AxioCam high-resolution digital camera.