



National Institute of General Medical Sciences

Biomedical Technology Research Centers

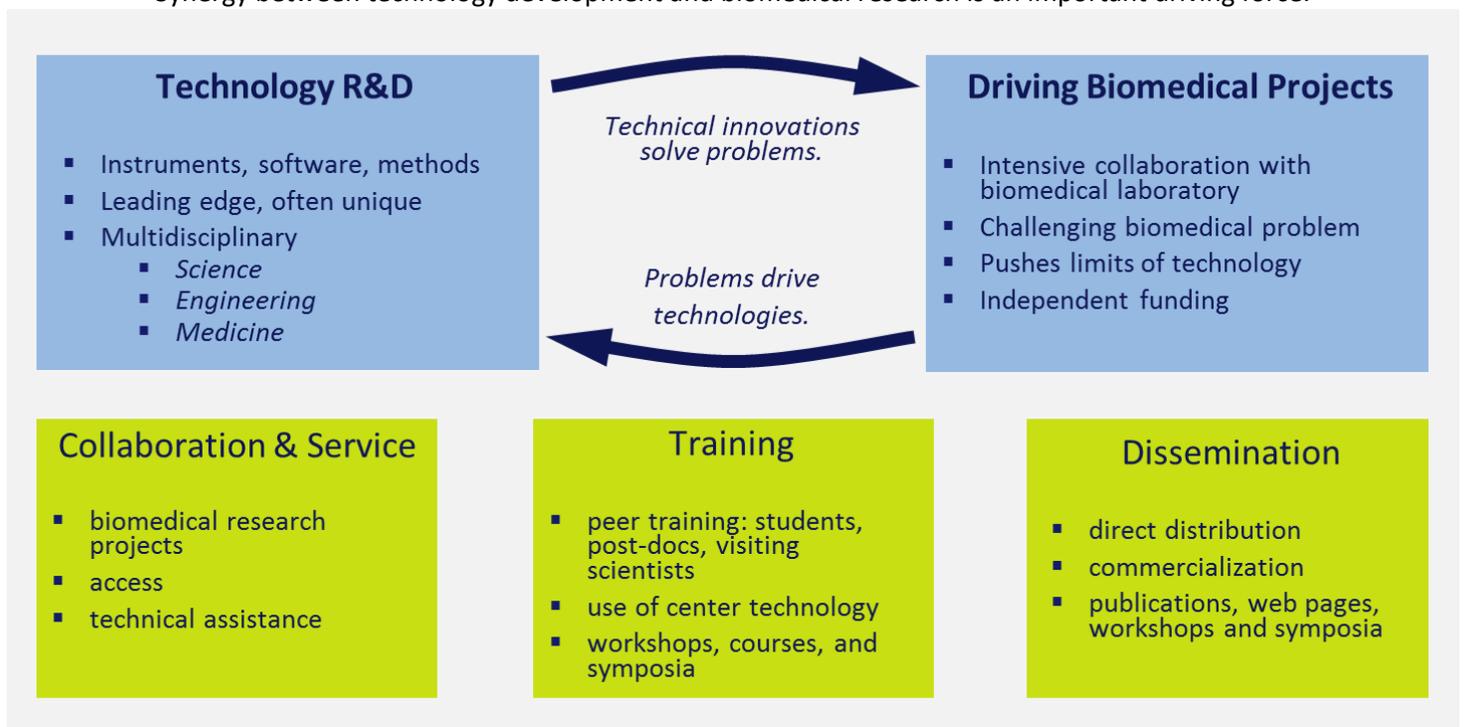
The Biomedical Technology Research Centers (BTRCs) create critical, often unique technology and methods at the forefront of their respective fields and apply them to a broad range of basic, translational and clinical research. This occurs through a synergistic interaction of technical and biomedical expertise, both within the centers and in intensive collaborations with other leading laboratories.

The centers serve a unique purpose in the broad context of NIH-funded research. They represent a critical mass of technological and intellectual capacity with a strong focus on service and training for outside investigators, as well as providing access to and dissemination of technologies, methods and software. Their goal is to promote the widespread and routine application of the cutting-edge technologies they develop across the full spectrum from bench to bedside.

- Multidisciplinary and collaborative, a catalyst for integrating diverse research efforts
- National reach: often one-of-a-kind, providing scarce or expensive resources
- Scope: from basic discovery to clinical research
- Scale: from molecule to organism
- State-of-the-art resources for NIH-funded researchers, including:
 - Technological infrastructure
 - Experimental and computational resources
 - Expertise

Five Components of a BTRC

Synergy between technology development and biomedical research is an important driving force.



Investigator Access to Biomedical Technology Research Centers

A primary mission of the BTRC program is to help the research community use the technologies it is developing. Through BTRCs, researchers can access advanced instrumentation, software and support. Potential interactions include long-term collaboration, routine analysis or consultation. BTRCs also provide hands-on laboratory training, short courses, workshops and online resources.

Each year, nearly 7,000 biomedical investigators use the BTRCs or collaborate on research projects at these centers. Investigators who are eligible to use the resources include those whose projects are supported by NIH, other federal government agencies or the private sector. However, priority is given to NIH-supported researchers.

Investigators interested in working with a BTRC should consult the NIGMS web site: www.nigms.nih.gov.

Technology Areas

Computing and Informatics Technology Centers: These centers develop advanced methods and technologies for biomedical computing and informatics. This includes high-performance computing systems as well as software for complex data visualization and analysis, simulation and modeling of biological systems. The centers make their computing infrastructure and software freely available.

Imaging Technology Centers: These centers develop advanced imaging and associated analytical and computational technologies for the anatomic and functional analysis of organelles, cells and tissues. The technologies include a complementary variety of microscopies using electrons or X-rays as the source for tomography and correlative approaches. Mass spectrometry imaging is available to visualize the spatial distribution of compounds, biomarkers, metabolites, peptides or proteins by their molecular masses. Sample preparation is an important component of each of these centers.

Optical and Laser Technology Centers: These centers develop of advanced optical and laser technologies to probe the structure and dynamics of biological samples ranging in complexity from single molecules to cells. The centers apply innovative technologies to elucidate fundamental biological mechanisms such as ultrafast molecular motions and dynamic cellular processes.

Structural Biology Technology Centers: These centers develop technologies including spectroscopic techniques, synchrotron radiation and macromolecular microscopy for studying the structures of biomolecules predominantly ranging in size from peptides to very large macromolecular complexes. Detection, data analysis and automation are important components of most of these centers.

Systems Biology Technology Centers: These centers support the continued development of advanced biomedical, analytical and computational technologies capable of high throughput and applicable to complex samples and their integration into comprehensive interdisciplinary approaches to various aspects of systems biology.



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Review Criteria for Biomedical Technology Research Centers

A single, overall impact/priority score for the BTRC grant application will be assigned at the end of the discussion of the components. The overall score for the Center should not be the average of the individual scores, but rather should take into account the synergy of the individual components. The impact/priority score may be more or less than the average of the component scores. In determining this final score, the goals of the Center and the stage of development of the Center technology and community engagement should be taken into account.

A) Technological Research and Development Review Criteria

Is the Center technology dynamically evolving, state-of-the-art, an important area for research and development in its own right, and likely to advance the frontiers of biomedical research? Are alternative approaches to solving technological problems presented? What is the potential impact of the BTRC's technological goals? Is there synergy between a TR&D project and the DBP(s) in advancing the focal technology? How is this Center unique and useful to the community in the technological goals it is pursuing as well as in the cluster of driving biomedical projects to which the advanced technology is being applied? Is the Center technology already broadly available? Are the TR&D projects synergistic?

In renewal applications, is evidence provided of new meritorious efforts and significant progress during the past grant period?

B) Infrastructure

Is the technological infrastructure requested in this section necessary for the BTRC? Has the applicant chosen the most cost effective and appropriate infrastructure?

C) Driving Biomedical Projects

Is the Center staff continuously developing new, significant applications of the Center technology in the biomedical sciences through high quality Driving Biomedical Projects?

For DBPs that have already been peer-reviewed, does the DBP advance and motivate further technological research and development in the Center? Is the technology appropriate and will it have high impact on the science being explored in the DBP? In addition, for DBPs that have not been peer-reviewed, what is the level of scientific merit of the research proposed?

For renewal applications, does the BTRC have an appropriate balance between time and effort spent on DBPs and on Collaboration and Service projects? Are DBPs driving TR&D research and are Collaboration and Service projects making good use of the new technological advances? For this Center, is the balance right between continuing DBPs, DBPs that have finished, and DBPs that have turned into Collaboration and Service projects? Are new DBPs in important biomedical fields being actively sought to invigorate the Center?

D) Collaboration and Service

Is the BTRC available to outside users? Are the equipment and technology utilized for Collaboration and Service state-of-the-art? Do the equipment and technology meet significant biomedical research needs? Do the Collaboration and Service projects have a national geographical distribution? For Centers that do a substantial amount of service, are the plans for sharing costs by the users, including fee for service systems, appropriate?

E) Training

Are plans for providing opportunities for training appropriate? In renewal applications, have there been reasonable results accruing from these efforts to date?

F) Dissemination

Are the proposed dissemination plans adequate and appropriate? In Centers that are developing software, is the software portable when appropriate, well-documented, user-friendly, and readily available to the user community? Have there been efforts to make both non-expert and expert communities aware of the new technology?

In renewal applications, is the web site easy to find? Does the material on the web site provide useful information to the biomedical research community? Has there been reasonable and timely progress in this area?

G) Administrative and Management

Are the administrative and managerial aspects presented in the written proposal appropriate and adequate? In addition, if a site visit takes place, is the discrete space set aside for the Center and the laboratory facilities, including those available to visiting scientists, appropriate and adequate? In the case of a renewal application, is the usage of the instruments developed and supported by the Center appropriate and adequate? Are instruments in place and operational, and are staff members currently on site?

Is the institution's commitment to the Center appropriate and adequate? For example, are the allocated space, costs associated with alterations and renovations and purchase of instrumentation and computers, and salary support for some Center staff adequate?

Are the scientific and managerial credentials of the Principal Investigator and the credentials of other key professional and technical staff appropriate?

In renewals, is the role of the external advisory committee or in new applications plans for the committee and types of committee members appropriate? Do the members of this committee have sufficient breadth and ability to take an effective role in the review and guidance of the Resource operations? In renewal applications, is there evidence that the EAC is active? Are there plans for rotation of the members of this committee?

If other committees such as a local executive committee are proposed, are the composition and organizational plans for these committees adequately described? How they will benefit the Center?