



NATIONAL SPACE BIOMEDICAL RESEARCH INSTITUTE

*Special Program Announcement
for
NSBRI Consortium Institutions*

**An Opportunity to Participate in the
Education and Public Outreach Program of the
National Space Biomedical Research Institute**

***EXPANSION OF EDUCATION AND PUBLIC OUTREACH
ACTIVITIES***

**June 19, 2000
NSBRI 00-02**

**Letter of Intent Due:
Proposal Due:**

**August 11, 2000
September 15, 2000**

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NATIONAL SPACE BIOMEDICAL RESEARCH INSTITUTE

Program Announcement

An Opportunity to Participate in the Education and Public Outreach Program of the National Space Biomedical Research Institute

Expansion of Education and Public Outreach Activities

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1.0 OPPORTUNITY

The National Space Biomedical Research Institute (NSBRI), a private, non-profit organization, invites applications from its consortium institutions for the support of education and public outreach activities related to space biomedical research in general, and to the NSBRI's twelve research areas in particular:

- bone loss;
- cardiovascular alterations;
- human performance factors, sleep and chronobiology;
- immunology, infection and hematology;
- integrated human function;
- muscle alterations and atrophy;
- neurobehavioral and psychosocial factors;
- neurovestibular adaptation;
- nutrition, physical fitness and rehabilitation;
- radiation effects;
- smart medical systems; and
- technology development.

The purpose of this announcement is to solicit proposals from persons wishing to serve as members of the NSBRI's Education and Public Outreach Team. This team will pursue a coordinated program of activity focusing on the mission of communicating the significance and excitement of space life sciences to local, national and international audiences, while transferring and disseminating the biomedical knowledge gained through the NSBRI's research program from the laboratory to the classroom and home.

Applications will be accepted only from the twelve institutional members of the NSBRI's consortium: Baylor College of Medicine, Brookhaven National Laboratory, Harvard Medical School, The Johns Hopkins University School of Medicine and the Applied Physics Laboratory, Massachusetts Institute of Technology, Morehouse School of Medicine, Mount Sinai School of Medicine, Rice University, Texas A&M University, the University of Arkansas for Medical Sciences, the University of Pennsylvania Health System, and the University of Washington. However, applications may include partners from all categories of organizations, public and private, for-profit and non-profit, and eligible agencies of the Federal government. Applicants are encouraged to build collaborative relationships with other colleges and universities, schools

and school districts, museums and other interested organizations to improve student (K-College) and public understanding of space biomedical research.

The mechanism of support for these activities shall be an NSBRI subagreement with funds provided by the National Aeronautics and Space Administration (NASA) through a cooperative agreement (Cooperative Agreement NCC 9-58 with NASA's Lyndon B. Johnson Space Center). Annual renewal awards are subject to an independent, external review.

2.0 BACKGROUND

The NSBRI is responsible for the development of countermeasures against the deleterious effects of long-duration space flight and performs fundamental and applied space biomedical research directed towards this specific goal. Its mission is to lead a world-class, national effort in integrated, critical path space biomedical research that supports NASA's Human Exploration and Development of Space (HEDS) Strategic Plan by focusing on the enabling of long-term human presence in, development of, and exploration of space. This is accomplished by:

- designing, testing and validating effective countermeasures to address the biological and environmental impediments to long-term human space flight;
- defining the molecular, cellular, organ-level, integrated responses and mechanistic relationships that ultimately determine these impediments, where such activity fosters the development of novel countermeasures;
- establishing biomedical support technologies to maximize human performance in space, reduce biomedical hazards to an acceptable level, and deliver quality medical care;
- transferring and disseminating the biomedical advances in knowledge and technology acquired through living and working in space to the general benefit of mankind, including the treatment of patients suffering from gravity- and radiation-related conditions on Earth; and
- ensuring open involvement of the scientific community, industry and the public at large in the Institute's activities and fostering a robust collaboration with NASA, particularly through NASA's Lyndon B. Johnson Space Center.

The NSBRI was established in April 1997 following competitive selection by NASA. Primary support for the NSBRI's activities is furnished by NASA through a cooperative agreement although funds to support Institute activities also come from several sources, including the institutions involved in carrying out the NSBRI's programs. The cooperative agreement award is for a five and one-half year base period, lasting until September 30, 2002, and three five-year optional extensions. Base funding was initially set at approximately \$10 million annually but has begun to increase and is currently approximately \$14 million (FY 2000). NASA has notified the Institute that it would like the NSBRI to expand its activities significantly and that it hopes to provide additional funds to support planned program growth beginning in FY 2001. This solicitation is being issued in anticipation of a substantial increase in the NSBRI's core research budget beginning in October 2000, an increase that will require appropriate budgetary authorization and approval by the U.S. Congress. Prospective investigators should be aware that the implementation of the plan described in this announcement is contingent upon such favorable Congressional action.

2.1 Current Education and Public Outreach Program

Sharing the excitement of space research and exploration is a primary goal of the NSBRI's current Education and Public Outreach Team. Through training programs, collegiate-level courses, school curriculum materials, electronic media and informational pieces, the link between space health and Earth health is transferred to teachers, students and the public at large.

Drawing on the educational expertise of Baylor College of Medicine, Morehouse School of Medicine and Texas A&M University, the team designs innovative materials aimed at promoting scientific literacy and attracting more students into science, engineering and medicine. In addition to producing print materials, the team places all guides and texts developed through this program on the NSBRI Web site. Curriculum materials target elementary, high school and college students. Additional information concerning the current program may be obtained by contacting the individuals listed in Table 1.

The Education and Public Outreach Team is exploring new ways to reach the public, from placing video interviews with NSBRI researchers on the Web site to developing a public radio series entitled "Biomedical Science for Space Travelers." Current projects include the following.

Elementary School Materials

- *From Outerspace to Innerspace: Learning About the Human Body* – Development and dissemination of an activity-based poster for elementary students that links NSBRI research areas to related Earth-based medical conditions.
- *Sleep and Daily Rhythms* – This represents the first in a series of educational units, developed by Baylor, for grades 4-6 highlighting each of the NSBRI's research areas. The next unit will address the areas of Muscles and Bones.

Middle School/High School Materials

- *The Brain in Space: A Teacher's Guide* - This middle school/high school neuroscience teacher's guide, developed previously for NASA, has been placed on the NSBRI Web site to increase its accessibility to teachers. Morehouse produced this guide during the Neurolab shuttle mission.
- *Human Physiology in Space* – This high school supplementary text, produced in 1994, has been modified slightly and placed on the NSBRI Web site. The book focuses on the differences between human physiology on Earth and in space, and uses actual space laboratory experiments to guide a student's learning experience. A limited number of the original, printed Teacher's and Student's Manuals are also available through the NSBRI.

College Programs

- Human Body in Space College Course - This course, a pilot at Spelman College, gives students an appreciation of the historic science challenges of space flight, knowledge of the space environment and an understanding of the biological adaptations related to a weightless environment. It will serve as the basis for designing an NSBRI national curriculum on the human body in space.

- Summer Research Program - This program encourages women and minority-group students to pursue careers in science. Students are selected from a national applicant pool to spend a research-intensive summer doing biomedical science at Morehouse School of Medicine.

Professional Development

- Teacher Academy – This program, initiated by Texas A&M, prepares science teachers to lead their peers in implementing classroom activities that emphasize the understanding of medical issues associated with long-duration space exploration and the similarities to human disease on Earth. Academy Fellows assist with the development, implementation and field testing of new NSBRI materials in their classrooms.

Table 1. Current NSBRI Institutional Leaders for Education and Public Outreach

<p>Morehouse School of Medicine (Lead)</p> <p>Marlene Y. MacLeish, Ed.D. NSBRI Education and Public Outreach Team Leader Morehouse School of Medicine 720 Westview Drive, SW Atlanta, GA 30310 404-756-5706 404-752-1043 FAX macleim@msm.edu</p>	<p>Baylor College of Medicine</p> <p>William A. Thomson, Ph.D. Professor and Head Center for Educational Outreach Baylor College of Medicine One Baylor Plaza 1709 Dryden, Ste. 545 Houston, TX 77030 713-798-8200 713-798-8201 FAX wthomson@bcm.tmc.edu</p>
<p>Texas A&M University</p> <p>George Jessup, Ph.D. Coordinator, College & Computer Educational Support Texas A&M University College of Education College Station, TX 77843-4222 409-862-2099 409-845-6129 FAX gjessup@tamu.edu</p>	

3.0 PROGRAM NEEDS

3.1 General Information

As stated above, the NSBRI's Education and Public Outreach Team's mission is to communicate the significance and excitement of space life sciences to local, national and international audiences, while transferring and disseminating the biomedical knowledge gained through the NSBRI's research program from the laboratory to the classroom and home. Among the most important Team goals are:

- promoting excellence and innovation in America's science education system;
- attracting young people to related fields in science, engineering and medicine;
- increasing scientific literacy among teachers, students and their families, and the general public; and
- engendering public awareness and appreciation of the opportunities and benefits provided by space life sciences research and by the NSBRI's own biomedical research.

It is expected that all proposals will be clearly related to the Team's mission and will satisfy one or more of the Team's goals.

3.2 Typical Program Activities

Proposals may include a wide range of activities related to the Education and Public Outreach Team's mission and goals. Typical activities could include, but are not limited to:

- creating and disseminating supplementary space life sciences educational materials for K-12 teachers and students;
- increasing students' overall scientific literacy through development and distribution of NSBRI-related materials for reading and language arts;
- providing educational opportunities and courses for undergraduate college students, professional development for teachers and administrators, and developing and disseminating graduate-level, space life sciences course materials; and
- producing and disseminating space life sciences educational and promotional resources for students, educators, families and the general public using a wide variety of printed and electronic media.

The following activities have been identified as important to the NSBRI and are provided to assist the applicant in developing a proposal that is focused on relevant activities. They are not complete and project proposals may include other activities fitting within the guidelines above.

Educational Materials Development

Past efforts have resulted in an array of print, audio, video and Web-based materials that have largely targeted upper elementary and secondary education. These materials focus primarily on the following research areas: cardiovascular alterations; human performance factors, sleep and chronobiology; immunology, infection and hematology; muscle alterations and atrophy; and neurovestibular adaptation. Continued development and refinement of materials developed for these areas are appropriate across all levels of public education. In addition, materials development projects focusing on the remaining seven NSBRI research areas (bone loss; integrated human function; neurobehavioral and psychosocial factors; nutrition, physical fitness and rehabilitation; radiation effects; smart medical systems; and technology development) are encour-

aged. Applications seeking to create educational resources—in any media, including distance education—for early elementary, middle school, secondary and undergraduate college students are encouraged.

Educational Materials Dissemination

Projects that disseminate existing or new NSBRI educational materials are encouraged. Such projects might include scientist/educator team professional development. These teams, in turn, would give presentations to elementary and secondary school teachers, university faculty and lay audiences.

Outreach

Plans for promoting educational outreach activities nationally and internationally are encouraged. Settings might include museums, youth clubs and Saturday science programs sponsored by local schools.

Teacher Fellowships (Scientist-Education Liaisons)

Innovative approaches are sought to develop and enhance a Teacher Fellows Program to produce teacher liaisons able to link NSBRI research scientists to the Education and Public Outreach Team. Applications that prepare teacher fellows to support the development, testing and dissemination of new and existing NSBRI educational materials are appropriate.

Teacher Professional Development

Projects that strengthen or extend current NSBRI activities related to teacher professional development, or that propose new and innovative approaches, are encouraged. All such projects should recruit and prepare teachers to utilize space life science materials and foster public awareness of NSBRI scientific and technological developments.

4.0 APPLICATION PROCEDURES

4.1 General Instructions

A complete proposal will consist of the following material, in the order listed.

1. Title Page (project name, sponsoring institution, project director with contact information and other participants with institutional affiliation);
2. Table of Contents;
3. Abstract (need(s) addressed, project goals/objectives, proposed activities, nature of partnerships involved, intended outcomes and evaluation plan);

4. Budget Information:
 - 4.1 Detailed Budget - Year 1;
 - 4.2 Detailed Budget - Entire Project Period (up to three years). Budgets should reflect realistic costs of performing proposed work.
5. Narrative:
 - 5.1 Background (including needs to be addressed);
 - 5.2 Objectives;
 - 5.3 Methodology (including plan for dissemination, if applicable);
 - 5.4 Evaluation Plan.
6. Appendix A: Biographical Information (Project Director followed by other participants, using NIH two-page CVs); and
7. Appendix B, C, ...: Any Other Supplementary Information.

Use 12-point font and one-inch margins all around, on all pages. The abstract is limited to two pages, double-spaced. The narrative is limited to 15 pages, single-spaced.

Submit the signed, original application and twenty-five exact photocopies in one package, to:

NATIONAL SPACE BIOMEDICAL RESEARCH INSTITUTE
REF: NSBRI 00-02
ONE BAYLOR PLAZA, NA-425
HOUSTON, TX 77030-3498.

Applications must be received before 5:00 p.m. CDT, Friday, September 15, 2000. FAXED proposals are not acceptable, neither are electronic mail (e-mail) responses.

4.2 Special Instructions

Letter of Intent – To facilitate planning for the review process, potential project directors are requested to advise the NSBRI of plans to submit a proposal responding to this announcement by sending a non-binding letter of intent to propose by August 11, 2000 to:

NATIONAL SPACE BIOMEDICAL RESEARCH INSTITUTE
REF: NSBRI 00-02 – Letter of Intent
ONE BAYLOR PLAZA, NA-425
HOUSTON, TX 77030-3498.

This letter should be limited to two pages or less and should contain the names and institutional addresses of the project director and all participants involved in the project, a descriptive title and a brief abstract of the proposed project.

Partnerships – Applicants are encouraged to describe in their proposals existing partnerships with state and federal agencies, schools, school districts and/or undergraduate institutions that will enhance dissemination of the NSBRI materials and provide additional special opportunities for strengthening the Education and Public Outreach Team. Such partnerships will be especially

valuable if they will assist in promoting use of NSBRI educational materials and professional development programs on a national level.

Institutional Commitment – Applicants are expected to demonstrate strong institutional commitment through direct and in-kind contributions (personnel time commitments, materials, space, resources, etc.). It is anticipated that funding requested covers only a portion of actual project costs, and that applying institutions will cover the remaining costs. A minimum institutional commitment amounts to 10% of the NSBRI funding requested.

Duration of Proposed Project – Proposals may be submitted for a maximum duration of three years funding, with an assumed starting date of November 1, 2000.

Total Annual Cost – It is expected that the average annual total (direct + indirect) cost of selected projects will be between \$100,000 and \$150,000. In general, the annual total cost of a single project may not exceed \$300,000.

Special Travel and Reporting Requirements – Project directors selected in response to this announcement will be expected to attend two, two-day team meetings each year at a location to be determined and one annual three- to four-day general investigator workshop/retreat in the Houston, Texas area. Budgets should reflect the costs associated with these meetings. Project directors will be expected to provide an annual progress report.

5.0 COMPETITIVE PROCESS

5.1 Review and Selection Process

Applications will be evaluated for merit according to the criteria below and for the likelihood that the proposed project will have a significant impact on achieving the goals stated in this announcement. An initial review will be carried out by an appropriate panel of experts convened under the auspices of NSBRI's independent Board of Scientific Counselors. As part of this review, all applications will receive a written critique and be discussed by the panel. Only those applications deemed to have high merit will be assigned a numerical score. Applicants will receive a copy of the panel's comments and score as soon as they are available. Those proposals deemed to be in the competitive range will receive a second-level review by NSBRI's management to determine relevancy of the proposed project to the NSBRI's education and outreach mission. Applicants should be aware that some meritorious proposals may not be selected for funding. Selection will be based on merit, relevancy, availability of funds, balance among the various types of programs and populations served, and geographical distribution. Consideration will be given to reaching underrepresented groups, including women and minorities.

5.2 Evaluation and Award Criteria

Applications will be reviewed for completeness, clarity and responsiveness to this announcement. In addition, each application will be reviewed based upon the following specific criteria.

1. Significance

- The likelihood that the proposed project will result in systemic change or improvement.

- The likelihood of increasing student interest in the space life sciences through development and dissemination of novel and current materials.
 - The importance or magnitude of the results or outcomes likely to be attained by the proposed project, especially improvements in science instruction and student achievement in science.
 - The extent to which the proposed project involves the development or demonstration of promising new strategies or materials.
2. Quality of the Project Design
- The extent to which the goals, objectives and outcomes to be achieved by the proposed project are clearly specified and measurable.
 - The extent to which the project is part of a comprehensive effort to foster and communicate the NSBRI's research findings into educational and outreach products and activities.
 - The extent to which the proposed activities constitute a coherent, sustained program to further the goals of the Education and Public Outreach Team.
3. Adequacy of Resources
- The adequacy of support, including facilities, equipment, supplies and other resources, from the lead organization and the consortium.
 - The relevance and demonstrated commitment of each partner in the proposed project to the implementation and success of the project.
 - The extent to which the costs are reasonable in relation to the objectives, design and potential significance of the proposed project.
4. Quality of the Management Plan
- The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines and benchmarks for accomplishing project tasks.
 - The narrative should provide a clear description of who will do what, when, where, why and with what anticipated results. The management plan should include the percentage of staff time, and this should be reflected in both the budget and narrative sections.
5. Quality of the Project Evaluation Plan
- The extent to which the methods of evaluation are thorough, feasible and appropriate for the goals, objectives and outcomes of the proposed project.
 - The extent to which the methods of evaluation include the use of objective performance measures that are clearly related to the intended outcomes of the project and will produce quantitative and qualitative data.
6. Quality of the Project Personnel
- Qualifications including education and experience of key personnel.
 - Previous experience working with teachers, materials development or in formal science settings.

6.0 SCHEDULE

The following schedule is planned for the expansion of the NSBRI's education and public outreach activities:

Letter of Intent Due:	August 11, 2000
Proposal Due:	September 15, 2000
Selection Announcement:	October 2000
Funding Initiation:	November 2000

Laurence R. Young, Sc.D.
Director
NSBRI

Ronald J. White, Ph.D.
Associate Director
NSBRI

Bobby R. Alford, M.D.
Chairman of the Board and CEO
NSBRI

June 19, 2000
Date