



June 14, 2005
NSBRI-RFP-05-02

National Space Biomedical Research Institute
One Baylor Plaza, NA-425
Houston, TX 77030

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

GRADUATE EDUCATION PROGRAM

A Request for Proposals for the
National Space Biomedical Research Institute

Letter of Intent Due:
Proposals Due:

August 3, 2005
September 14, 2005

NATIONAL SPACE BIOMEDICAL RESEARCH INSTITUTE

Request for Proposals

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

Graduate Education Program

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NATIONAL SPACE BIOMEDICAL RESEARCH INSTITUTE

Request for Proposals

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

Graduate Education Program

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1.0 OPPORTUNITY

The National Space Biomedical Research Institute (NSBRI) invites proposals for the support of education and public outreach activities related to the research mission of ensuring safe and productive long-term human exploration of space. The purpose of this Request for Proposals (RFP) is to solicit proposals for a Graduate Education Program in space life sciences.

The mechanism of support for these activities will be an NSBRI sub-agreement 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. The progress of funded programs will be reviewed annually.

1.1 Who May Apply

Proposals will be accepted only from U.S. citizens, permanent residents, or persons with pre-existing visas obtained through their sponsoring institution. Proposals may include partners from all categories of organizations, schools and school districts, colleges and universities, public and private, for-profit and non-profit, and eligible agencies of the Federal government. Proposers are encouraged to build collaborative relationships with secondary and post-secondary educational institutions, including other colleges and universities offering undergraduate and graduate science education, as well as with other relevant organizations (e.g., industry partners, professional societies) in order to improve student education and public understanding of space biomedical research.

2.0 BACKGROUND

2.1 NSBRI Objectives

The NSBRI is a non-profit organization competitively selected by NASA in 1997 to lead a national effort for accomplishing the integrated, biomedical research necessary to support long-term human presence, development and exploration of space and to enhance life on Earth by applying the

resultant advances in human knowledge and technology acquired through living and working in space. The overall aims and objectives of NSBRI are to:

- Integrate the knowledge base relevant to the biomedical response of humans in space, understand and quantify the risk levels associated with this knowledge base, and recommend acceptable risk levels for long-duration missions. Risk levels in this context relate to present and future medical risk to the human participants as a result of deleterious effects of space flight, as well as to the subsequent risk to overall mission success.
- Develop and manage the implementation of an integrated research plan that will develop the required knowledge and technologies (across all biomedical and associated technological disciplines) to enable long-duration human space flight, including specific countermeasures where required.
- Implement a “best value” research program for the available resources.
- Demonstrate an understanding of the space medicine environment through an integrated on-site presence at the Lyndon B. Johnson Space Center (JSC); feed back this knowledge to the discipline research teams.
- Facilitate science community access to the NASA space infrastructure associated with biomedical research.
- Develop and provide a science management process that will support the overall human in space biomedical research program.
- Ensure the dissemination of advances in knowledge resulting from this program to the scientific community.
- Promote and provide active collaboration with for-profit entities to ensure that developed technologies are transferred to the private sector.
- Conduct education and public outreach programs consistent with NSBRI’s mission and in support of NASA’s education and public outreach objectives.

More information concerning the Institute, including the full Revised Strategic Plan, is available at <http://www.nsbri.org/About/StrategicPlan.pdf>.

2.2 Institute Infrastructure

The NSBRI is governed by a consortium of twelve institutions: Baylor College of Medicine, Brookhaven National Laboratory, Harvard Medical School, The Johns Hopkins University School of Medicine and 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. NSBRI is headquartered in Houston at Baylor College of Medicine. **This RFP is an open solicitation and consortium membership is not a requirement for proposal submission.**

2.3 Current NSBRI Education and Public Outreach Program

The nation's educational needs are encompassed by the President's challenge to "leave no child behind" and by the 21st century workplace requirement to create a more scientifically literate society, in accordance with the National Science Education Standards. NASA also has articulated goals with respect to its Exploration Systems Mission Directorate (ESMD) and educational efforts relevant to the mission. The NSBRI Education and Public Outreach Program has responded by establishing the following goals:

- Transfer and communicate the knowledge gained from the biomedical advances achieved by NSBRI research teams to the classroom and the public.
- Develop education and training programs designed to produce the next generation of space biomedical researchers.
- Facilitate, on a broad scale, the excitement of space research and exploration.

These goals are accomplished through coordinated and integrated activities that support a continuous pipeline of educational opportunities designed to foster the development of future generations of space scientists, engineers and technologists. NSBRI Education and Public Outreach programs seek open involvement of a diverse scientific community, industry and the public. They add value to the educational programs of NASA by supporting directly the strategic approaches of ESMD to advance the development of new exploration capabilities, supporting technology and foundation research. Moreover, they are aligned with the Vision for Space Exploration. This document is available at http://www.nasa.gov/pdf/55584main_vision_space_exploration-hi-res.pdf.

The current NSBRI Education and Public Outreach Program consists of projects at the K-20+ level that develop and disseminate curricular materials, design and implement teacher professional development programs, promote educational access and awareness in bioastronautics research and facilitate increased scientific literacy. NSBRI also supports graduate education projects, a summer internship initiative and a postdoctoral fellowship program, all to facilitate the career development of students in science, engineering and medicine. The Institute has a visiting scientist program and works in partnership with medical schools to support continuing medical education. It sponsors professional workshops, conferences and seminars related to its research program and also communicates information on NASA and Institute activities and achievements through widespread outreach endeavors in public forums.

Further information is available at <http://www.nsbri.org/Education/index.html>.

3.0 SOLICITATION FOCUS

3.1 General Information

This RFP solicits proposals for an opportunity within the NSBRI Education and Public Outreach Program graduate education initiative. This is an open solicitation and all eligible applicants may submit.

3.2 Program Activities: Graduate Education Program

A renewed national commitment to space exploration and discovery underscores the need for educational programs that can meet workforce demands for science, engineering and technology development within NASA, academia and industry. To support the goals of: a) improving the capacity of higher education for space research and exploration; and b) promoting development of the next generation of scientific leadership in space exploration, NSBRI seeks to develop a Graduate Education Program that will broaden students' academic and career skills in space life sciences at an accredited, degree-granting US institution offering the Doctor of Philosophy (Ph.D.) or equivalent degree in the biomedical sciences, engineering or other fields related to space life sciences. NSBRI encourages the leveraging of existing academic programs and infrastructure in innovative ways to develop a cost-effective approach that will prepare students for entry level careers at NASA, NSBRI consortium member institutions, private industry partners in the space initiative, and/or other public or private organizations involved in NASA's space exploration endeavors.

In considering a Graduate Education Program in space life sciences, the programmatic structure and curriculum should be tailored to the strengths and expertise of the parent institution and its faculty. Proposed graduate initiatives should also adhere to instructional concepts and principles: a) shown to be effective through educational research; and/or b) identified as relevant through consensus documents developed by leaders in higher education. **Models that add NSBRI research emphases to existing college courses are highly encouraged.** The intent of this program is to broaden existing, successful curricula to provide students greater opportunities and knowledge about space life sciences career pathways.

To achieve this objective, NSBRI is soliciting proposals for projects designed to promote innovative preparation of doctoral-level science, engineering and/or technology professionals for entry-level research, teaching and/or industry positions that further NASA's and NSBRI's mission. This 5- to 6-year educational initiative requires implementation of a Graduate Education Program with a focus on space life sciences. Eligible applicants need not have had Phase I support to be eligible for this Graduate Education Program, and Phase I awardees should feel free to re-tool plans articulated in their Phase I proposals and program efforts to enhance the relevance of their efforts to the priorities and requirements outlined in this RFP.

Proposals should indicate how NSBRI participation in planning and oversight of the Graduate Education Program will be ensured through use of an advisory committee, steering committee or other body that includes participation of NSBRI- and NASA-sponsored scientists. Information about research funded by NSBRI can be found at <http://www.nsbri.org>. Information about peer-

reviewed projects funded by NASA Human System Research and Technology from funding year 1995 to present can be found at: http://taskbook.nasaprs.com/peer_review/index.cfm.

3.3 Proposal Preparation

Graduate Education proposals should describe mechanisms by which education and training in space life sciences will be incorporated into existing curricula. Applicants should identify participating colleges, departments, divisions, faculty and current resources (e.g., existing courses and learning materials and ongoing research) within applicant institutions that can be utilized to support and implement a graduate education program. A description of the capacity for interdisciplinary activities should be included. Proposals should describe course content, types of learning materials and methods utilized to deliver coursework presently in place, existing program requirements for dissertation research projects and interdisciplinary instruction available for coursework and dissertation research activities. Proposals also should reflect awareness of current research and/or expert consensus regarding current needs for structuring and operation of graduate education programs. Among the organizations that have published reports focusing on graduate education are the Council of Graduate Schools (CGS) and Association of American Colleges and Universities (AACU) (<http://www.cgsnet.org/>). Other reports are available through the Building Engineering and Science Talent (BEST) project based in San Diego, California (<http://www.bestworkforce.org>).

The didactic portion of the proposed program should be organized for delivery in modular formats (equivalent to graduate level courses), either for graduate credit or enrichment, with module topics selected from the following NSBRI-approved list. Applicants will be expected to address a minimum of six to eight modules relevant to the discipline(s) through which learning options are offered. Regarding timing, it is expected that three modules will be ready for use by fall 2006, with at least three additional modules ready for use by fall 2007. Additional modules may be added in ensuing years to further strengthen the program. The modules, built around the proposing organization's current content and incorporating topical content as suggested below, should be of sufficient quality and relevancy to encourage selection and use by other students at the institution in addition to those selected as NSBRI graduate education program participants, and extended use of the materials is encouraged. Curriculum products, including instructional modules, developed with NSBRI funding will be used and distributed in broad scale to further NSBRI education and outreach goals. The approved modules and potential didactic instructional topics that might be addressed through the instructional program are listed below. The list provided is only a representation of some topics for each discipline. Other topics that the Principal Investigator deems relevant may be included in the proposal.

- **Space Physiology**—Human physiology and space-related changes in human conditions
 - Basic thermodynamics and effects of pressure
 - Cancer biology
 - Hematology, immunology and infection
 - Genetics (focus on predispositions)
 - Biological effects of stress
 - Microbiology
 - Chronobiology and sleep disorders

- Muscle system (skeletal muscle alterations)
 - Skeletal system (bone physiology and structure, bone loss, joint structure)
 - Cardiology
 - Neuroscience
 - Reproductive biology
 - Human sensory and balance system (motion sickness)
 - Fluid regulation systems of the body
 - Respiratory
 - Gastrointestinal system
 - Sensory-motor adaptation (motion sickness, operational tasks)
 - Countermeasures (impact of microgravity)
- **Human Behavior in Harsh Environments**—Space-related human behavioral challenges
 - Cognition, human behavior and performance
 - Psychology (social psychology)
 - Anthropology and human factors
 - Mechanisms of human adaptation
 - Psychiatry
 - Stress-reduction strategies
 - Ethics
- **Space Medicine (Exploration Medical Capabilities)**—Clinical health issues that will confront space travelers
 - Pharmacology (pharmacokinetics, pharmacodynamics)
 - Biochemistry
 - Environmental control system
 - Microbial contamination
 - Mental health
 - Healthcare opportunities and organizational framework
 - Emergency and continuing medical care
 - Pain management
 - Minimal and noninvasive strategies
 - Process of screening, selection, and training (diagnosis and treatment)
 - Stress-reduction strategies
 - Rehabilitation methods
- **Space Radiation**—The impact of various forms of radiation on the space traveler’s health
 - Radiation (electromagnetic, ionizing, galactic cosmic, solar particle)
 - Radiation exposure (sievert)
 - Oncology
 - Genetic and mutagenic effects of radiation
 - Mitigation
- **Nutrition, Physical Fitness and Rehabilitation**—Nutritional maintenance and proactive nutritional intervention in countering adverse effects during space exploration

- General nutrition (density, food groups, changed nutritional needs, metabolic rate, consumption, micronutrients, weight control)
 - Nutrient absorption, changes in levels needed
 - Hydration (i.e. - protect from constipation)
 - Compensation for physiological changes (i.e. - foods rich in digestible calcium)
 - Defense against cell damage, radiation (antioxidants, supplements, protective chemicals)
 - Psychological (appealing and interesting combinations, palatability, defense against loss of appetite)
 - Crop growth/food generation
 - Long-term storage of foods/packing/wastes
 - Contamination
 - Cultural differences
 - Pre-flight/post-flight requirements (i.e. - increase iron after flight)
 - Rehabilitation strategies after injury, exercise regimens
- **Materials Science and Engineering**—Development and use of new materials and/or repurposing of existing materials crucial to support life in spacecraft and planetary environments
 - Habitats and laboratories
 - Generation of energy
 - Human health (space radiation countermeasures)
 - Life support systems (atmospheric generating and recycling systems)
 - Waste recycling
 - Food production and processing
 - Novel medical systems
 - Extravehicular activities
- **Bioengineering, Astronautics**—Technology applications in advancing safe and healthy operations in the space environment
 - Cellular and molecular applications
 - Biotechnology and tissue engineering
 - Medicine, including smart medical systems
 - Sensor networks and monitors/instruments
 - Pharmaceutical
 - Safety
 - Hygienics
 - Performance
 - Robotics
 - Communications
 - Space human factors and human/machine interface
 - Life support systems (long-term recycling, generation, atmosphere, thermal balance, food production and processing, agriculture, spacesuits)
 - Environmental control and monitoring
 - Life support

- **Nanotechnology**--Creation of miniaturized and atomic scale material for use in space medicine
 - Life-detection systems
 - Crew health and safety
 - Vehicle health
 - Active materials (swarms) with biological purposes
 - Data storage and analysis systems
 - High-strength, long-life, and reliable material

The successful Graduate Education Program proposal will include at least six to eight modules covering topical areas suggested in the list above. The proposer's plan for modular instruction should summarize:

- a. the broad learning goal for the module;
- b. specific and measurable objectives to be realized by student learners;
- c. the types of learning experiences (e.g., lectures, laboratory sessions, other applied learning) that will engage students in a manner designed to ensure realization of learning objectives;
- d. the nature of learning support (e.g., academic advising, instructional oversight, faculty mentoring) to be provided;
- e. the strategy, data collection and criteria used to assess the attainment of learning objectives at the learner level; and
- f. the process and tools to be used in evaluating the effectiveness of the module in advancing the goal of producing qualified scientists and in making modular and/or programmatic adjustments that further the goals of the Graduate Education Program initiative.

In addition to learning modules that provide both didactic and applied learning experiences for participating students, the application should describe other opportunities to apply acquired knowledge and skills through appropriate laboratory activities, research and engineering clerkships or internships and/or learning-service requirements (e.g., assisting in undergraduate course development or instruction, working with elementary or secondary teachers to improve science education in local schools). Each proposal must include a description of an 8-10 week applied learning experience at one or more laboratories at NASA Centers and/or NSBRI-funded principal investigator laboratories. These experiences should be described in sufficient detail to allow for clear understanding of their relevance to the proposed learning program and to students' acquisition of knowledge and skills essential to a doctoral level scientist or engineer. Completion of such a learning experience will be required to earn certification as an NSBRI Pre-doctoral Fellow.

Every proposal should also describe briefly how students recruited into a Graduate Education Program will be involved in activities that promote public awareness of the benefits of NASA and NSBRI and their activities. This requirement is included to ensure that students can relate their work and the larger NASA and NSBRI missions and activities to the public good. It also is included to foster students' acquisition of communication skills that will be essential to the next generation of science and engineering leaders.

It is expected that Graduate Education Program proposals will provide a detailed program plan and include letters of commitment/collaboration from all participating faculty, as well as a

statement of institutional commitment to implementation of the program (all uploaded as Appendices). It is the intent of this solicitation to acquire innovative and feasible plans that will enhance graduate training leading to the Ph.D. degree. **Support for the Graduate Education Program will require a significant commitment on behalf of the sponsoring institution(s) and the participating faculty.**

Note: See *Section 4.3 Specific Instructions, Part 2 Proposal Text* for more information about the format of the Proposal Text.

3.4 Student Selection and Participation

Each proposal should describe the process and criteria that will be used to select students for the NSBRI Graduate Education Program. The selection methodology should reflect a focus on identifying high achieving students who have the potential for making substantial contributions to their respective disciplines and/or assuming leadership roles in space life sciences or engineering. As such, it is recommended that students have at least one year of successful scholarly achievement in a life science or engineering field at their respective institutions prior to selection to the NSBRI Graduate Education Program.

NSBRI will not stipulate the number of students who should participate in the Graduate Education Program. Once the program becomes operational, it is expected that at least two doctoral students will be participating at any point in time, and larger numbers of participants are encouraged. Allowing for developmental activities and recruitment and selection needs, at least two students should be identified for participation in the NSBRI program by the fall of 2006.

In addition to describing the initial student selection process and criteria, applicant organizations should include an attrition plan indicating how highly qualified students will be brought into the program to replace students who complete their studies or who discontinue participation for other reasons. This feature will ensure that there always will be a sufficient number of students who warrant NSBRI's continued investment in graduate education activities at the institution.

The length of student participation should be sufficient to ensure adequate exposure to didactic and practical learning options, but also should reflect an effort to move students along a career pathway. In most cases, it is expected that students will participate for at least two years, but not more than four years. The duration of participation should be consistent with training requirements for the science and/or engineering discipline(s) through which the program(s) is/are offered. Graduate Education Program participants will be expected to conduct their dissertation research on a topic or issue relevant to space life sciences or engineering and to acknowledge support from NSBRI in their published research results.

4.0 APPLICATION PROCEDURES

4.1 Submission Requirements

All proposals responding to this RFP must be submitted through NSBRI's Internet-based Electronic Proposal Submission System (EPSS). All specific proposal forms necessary can be found in electronic format in the Downloadable Templates section of the system. EPSS has been designed to enable investigators to collaborate on the development of a proposal, to retain complete privacy throughout the proposal development process and to allow fast and accurate proposal submission.

To facilitate planning for the review process, proposers are requested to submit a letter of intent which **must be prepared and electronically submitted through EPSS.** To assure that the letter of intent is submitted by **August 3, 2005**, go to the Web site <http://myportal.nsbri.org/> and register to obtain a personal account on the system. After entering contact information, investigators receive, via email, a username and password for EPSS. **To submit a letter of intent, proposers should begin by creating a new proposal.** The Principal Investigator (PI) will enter the proposal title, which can be changed at a later date prior to submission, and select the NSBRI Education and Public Outreach Program and RFP number. The PI will then be prompted to enter a proposal description to complete the letter of intent. The above Web address serves as the entry point for proposal development and modification. All information entered, with the exception of that required for the letter of intent, remains private until electronic submission is completed. Please note that letters of intent are requested, but not required, for submission of a proposal. Failure to submit a letter of intent will not impact the selection process. Letters of intent cannot be submitted after the deadline stated in this RFP.

Proposal information required includes Basic Investigator and Institutional Information, Project Description, Performance Sites, Key Personnel, Investigator Budgets with Justifications, Other Support, Biographical Sketches, Facility Resources and Proposal Text. **Further details and guidelines can be found in the online instructions through EPSS.**

A proposal overview screen guides proposers through the process of completing the required information. EPSS offers a collaborative work environment for the PI and Co-Investigators to view and submit various portions of the proposal. For example, the PI can enter or upload all information for the proposal. Co-Investigators can view most proposal information but are permitted to enter only their specific personal information and their assigned project and budgetary information. All investigators can allow an administrative support person to act on their behalf, to assist in the entry of proposal information; however, electronic submission can only be performed by the PI. EPSS also contains an Investigator Profile section, which stores biographical sketches and other support information, for each investigator registered in the system. This information can be used by authorized proposing investigators, eliminating the duplicate entry of such information in multiple proposals.

Proposals must be submitted electronically by 5:00 p.m. EDT, Wednesday, September 14, 2005.

Within **one week** of submission using EPSS, the applicant **must** mail a signed copy of the printed cover page generated by the system to the following address:

National Space Biomedical Research Institute

NSBRI-RFP-05-02
One Baylor Plaza, NA-425
Houston, TX 77030-3498
713-798-7412

Proposals without a signed cover page received within one week of the deadline may be returned to the proposer without review.

Please direct any questions concerning this application procedure to the NSBRI by sending your inquiry to contact_us@www.nsbri.org, by calling 713-798-7412, or by faxing your questions to 713-798-7413. Technical requirements to operate EPSS are Internet Explorer 4.0+ or Netscape 4.03+ for Windows, Macintosh or Unix. EPSS is best viewed using Internet Explorer 6.0.

4.2 General Instructions for Responding to NSBRI Request for Proposals

(1) Proposals received in response to an NSBRI RFP will be used only for evaluation purposes. The NSBRI does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to an announcement to be used as the basis of a solicitation or in negotiation with other organizations, nor is a pre-award synopsis published for individual purposes.

(2) A solicited proposal that results in an NSBRI award becomes part of the record of that transaction and may be available to the public on specific request. However, information or materials that the NSBRI and awardee mutually agree to be part of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act.

(3) RFPs contain programmatic information and certain requirements which apply only to proposals prepared in response to that particular RFP. These instructions contain the general proposal preparation information which applies to responses to all RFPs.

(4) A cooperative subagreement will be used to accomplish an effort funded in response to an RFP and the terms of such subagreement will govern the relationship. The NSBRI will coordinate the implementation of the award instrument. Contracts resulting from RFPs are subject to the Federal Acquisition Regulation (FAR) and the NASA FAR Supplement. Any resulting grants or cooperative agreements will be awarded and administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1).

(5) NSBRI has a mandatory format for responses to an RFP. All proposals must be submitted utilizing the NSBRI's Electronic Proposal Submission System. For further information, please refer to Submission Requirements, Section 4.1.

(6) To be considered for award, a submission must, at a minimum, present a specific project within areas delineated by the RFP; contain sufficient technical information to permit meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities

or services; and not significantly duplicate a more specific current or pending NSBRI or NASA solicitation.

4.3 Specific Instructions

The following information is needed to permit consideration of proposals in an objective manner. RFPs will generally specify topics for which additional information or greater detail is desirable.

(1) **Restriction on Use and Disclosure of Proposal Information.** Information contained in proposals is used for evaluation purposes only. Proposers should, in order to maximize protection of trade secrets or other information that is confidential or privileged, place the following notice at the beginning of the proposal plan (which is in addition to the specified page limits) and specify the information subject to the notice by inserting an appropriate identification in the notice. In any event, information contained in proposals will be protected to the extent permitted by law, but the NSBRI assumes no liability for use and disclosure of information not made subject to the notice.

Notice

Restriction on Use and Disclosure of Proposal Information

The information (data) contained in [insert page numbers or other identification] of this proposal constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the NSBRI in confidence with the understanding that it will not, without permission of the applicant, be used or disclosed other than for evaluation purposes, provided, however, that in the event that a contract (or other agreement) is awarded on the basis of this proposal, governmental agencies shall have the right to use and disclose this information (data) to the extent provided in the contract (or other agreement). This restriction does not limit a governmental agency's right to use or disclose this information (data) if obtained from another source without restriction. The obligations in this section shall not apply with respect to any information which:

- (a) is disclosed in a printed publication available to the public, is described in a patent anywhere in the world, is otherwise in the public domain at the time of disclosure, or becomes publicly known through no wrongful act on the part of NSBRI;
- (b) is known to NSBRI or becomes known to NSBRI through disclosure by sources other than the applicant having the right to disclose such information;
- (c) is disclosed pursuant to the requirement of a governmental agency or any law requiring disclosure thereof;
- (d) is generally disclosed to third parties by the applicant without similar restriction on such third parties; or

(e) is approved for release by written authorization of the applicant.

(2) **Proposal Text**

(i) **Page Limitations-** Efforts should be made to keep proposals as brief as possible, concentrating on substantive material relevant for performance and evaluation of the project. **Proposals may not exceed twenty (20) pages in length, not including the list of literature cited.** All tables, graphs, figures, diagrams and charts must be included within the appropriate page limit. Proposers are encouraged to be succinct and are reminded that it is not necessary to use all the pages allowed for the Proposal Text. Full-sized images of material such as charts or graphs may be included in the Appendix; however, a legible image of each must also be included within the page limitations of the Proposal Text. (See the Proposal Appendix section of the online instructions for more information.)

All proposals for NSBRI funding must be self-contained within specified page limitations. Internet Web site addresses (URLs) may not be used to provide information necessary to the review. Reviewers are under no obligation to view the Internet sites. Moreover, reviewers are cautioned that they should not directly access an internet site as it could compromise their anonymity. **Page limits will be strictly enforced.** Proposals that exceed the limit or do not conform to the type size limitations (see below) will constitute grounds for the NSBRI to return the proposal without review.

(ii) **Page Formatting-** There is no template for the Proposal Text. The Proposal Text should be written and saved in one of the uploadable format file extensions (.doc, .ps or .pdf). The page margins for the Research Plan should not be less than **one inch on all sides.** The Research Plan document must contain a footer with the Principal Investigator's full name, current page number and total number of pages.

(iii) **Type Size Limitations-** Observe type size specifications throughout the Proposal Text and Appendices, or the proposal will be returned without review. Adherence to type size and line spacing requirements is necessary for several reasons. No proposals should have the advantage, by using small type, of providing more text in their proposals. Small type may also make it difficult for reviewers to read the proposal. The proposal must be clear, readily legible and conform to the following three requirements: 1.) The font of the letters must not be smaller than **10 point**; 2.) Type density must be no more than **15 characters per inch (cpi)**. For proportional spacing, the average for any representative section of text must not exceed 15 cpi; 3.) No more than **6 lines of type must be within a vertical inch.** Type requirements should be checked using a standard device for measuring type size, rather than relying on the font selected for a particular word processor. Figures, charts, tables, figure legends and footnotes may be smaller in size but must be readily legible. The type size used throughout the proposal must conform to all three requirements.

(iv) **Proposal Text Content**

(a) Up to two (2) pages of the Proposal Text narrative should be used to indicate research/expert consensus documents that support the rationale for the structure and process proposed by the applicant organization. Examples of literature that may be relevant to the proposed project include: *Preparing Future Faculty in the Sciences and Mathematics: A Guide for Change**; *Doctoral Education: Preparing for the Future⁺*; *A Bridge for All: Higher Education Design Principles to Broaden Participation in Science, Technology, Engineering and Mathematics.*^Δ However, the literature cited should be relevant to the type of training proposed and the role(s) (e.g., biomedical scientist, bio-engineer) that students will be prepared to fill. Necessary relevant detailed information (e.g., current graduate program booklets, reprints, bibliographic citations in an appropriate format) should be uploaded as Appendices.

(b) The main body of the proposal should provide details on both educational and organizational program requirements, the means by which the proposed graduate program will be integrated within existing institutional doctoral program(s), mechanisms for faculty and student support and evidence of institutional commitment for program implementation at all levels.

(c) Proposals must provide a plan for formative and summative evaluation. The plan must address issues related to the quality and effectiveness of program activities, particularly as they relate to program goals and objectives. The evaluation plan should include qualitative and quantitative strategies and a description of methods to be used for gathering, analyzing and reporting data. Use of an external evaluator is encouraged. The National Science Foundation has developed a useful resource, entitled *The 2002 User-Friendly Handbook for Project Evaluation*. This publication can be found at http://www.nsf.gov/pubs/2002/nsf02057/nsf02057_1.pdf.

(d) Applicants are encouraged to describe in their proposals existing partnerships with state and federal agencies, schools, school districts, undergraduate or graduate institutions which may provide unique opportunities for strengthening the Institute's Education and Public Outreach Program. Such partnerships are particularly valuable if they facilitate national awareness of educational and professional development programs related to program mission and goals and to NSBRI research accomplishments.

(e) Applicants are expected to demonstrate strong institutional commitment through direct and in-kind contributions (personnel time commitments, materials, space, resources, etc.).

Note: See Sections 3.3 *Proposal Preparation* and 3.4 *Student Selection and Participation* in this RFP for additional information about the anticipated content of the Proposal Text.

* Report available at: <http://www.preparing-faculty.org/PFFWeb.PFF3Manual.htm>

⁺ Report available at: <http://www.cgsnet.org/pdf/doctoraledpreparing.pdf>

^Δ Report available at: http://www.bestworkforce.org/PDFdocs/BEST_BridgeforAll_HighEdFINAL.pdf

(3) **Security.** Proposals should not contain security classified material. If the project requires access to, or may generate, classified information, the submitter will be required to comply with Government security regulations.

(4) **Duration of Proposed Project.** Graduate education proposals will be funded for a maximum length of six years. The anticipated start date for the Graduate Education Program will be January 2006.

(5) **Total Annual Costs.** Annual total costs may not exceed \$400,000. Higher costs are anticipated during years one and two in conjunction with module development with costs declining in years three through six as the program becomes fully integrated into the institutional setting. Once initial program activities are completed in years 1 and 2, NSBRI anticipates that no more than 20% of direct costs will be used in program administration, with 80% committed to: a) direct student support (e.g., stipends, travel to domestic professional meetings); and b) curriculum development, support services (e.g., mentoring oversight, arranging internships) and evaluation (e.g., database construction, statistical analyses). Proposers requesting funding that appears not to conform to this standard may be asked to provide additional justification for expenses not linked directly to student support or implementation of the Graduate Education Program.

(6) **Withdrawal.** Proposals may be withdrawn by the proposer at any time before award. Proposers are requested to notify the NSBRI in writing if the proposal is accepted for funding by another organization, or if other circumstances arise which dictate termination of evaluation of the project.

(7) **Women and Minorities.** Proposals must address plans to include gender equity, members of minority groups, and their subgroups, as appropriate for the goals of the Education and Public Outreach Program.

4.4 Special Considerations

Cost Sharing or Matching – NSBRI awards require a cost-sharing arrangement with all institutions of higher education, hospitals, other non-profit organizations and commercial organizations consisting of an augmentation of at least 10% of the total annual award. This contribution should not be identified in the submitted project budget but will be requested at the time the institutional award is made.

Special Travel and Reporting Requirements – Project Principal Investigators selected in response to this RFP will be expected to attend two, two-day team meetings each year at a location to be determined and one biennial three- to four-day general investigator workshop/retreat in the Houston, Texas area. Budgets should include estimated costs associated with attending these meetings. The budget also should reflect reasonable costs for travel and housing of graduate students who participate in summer internships or other activities conducted at NASA facilities or NSBRI institutions, as well as travel to appropriate domestic meetings of professional organizations to present on their research and disseminate information about the Graduate Education Program.

PIs will be expected to interact with NSBRI throughout the funding period in the development and evaluation of modules and activities. NSBRI reserves the right to review and request revisions of all materials developed under this solicitation.

Principal Investigators will be expected to provide an annual progress report each year. Continued project funding will be contingent upon submission of this report and documentation of appropriate progress.

5.0 COMPETITIVE PROCESS

5.1 Review and Selection Process

Proposals will be evaluated for merit and for relevance toward achieving the goals stated in this RFP. All proposals will undergo peer review by an independent panel of experts. All proposals will be assigned a numerical score and the Principal Investigator will receive a copy of the panel's comments with the assigned score. A set of selection recommendations will be developed by the NSBRI External Advisory Council based on the merit review scores, programmatic relevance and costs. The most important element in the evaluation process is the merit review, which carries the highest weight in final evaluation and selection. The other factors are approximately equal in weight to each other. Deficiencies in any one of these factors may prevent selection of a proposal. Final selections for funding proposals will be made by the NSBRI Director.

5.2 Evaluation Criteria

Proposals will be evaluated on the basis of merit, program relevance and cost as follows.

1) Merit:

- Is there documentation of incorporation of empirically grounded and/or consensus generated findings regarding implementation of doctoral education initiatives appropriate to 21st century needs in science and engineering?
- Is a process for recruitment of appropriately qualified candidates into a Graduate Education Program outlined in sufficient detail to suggest that a pool of demographically diverse, well qualified students is likely to be engaged?
- Are there indications of consideration of inter-level bridging activities that help students and faculty envision pathways—at pre-doctoral, doctoral and post-doctoral levels—to achievement of milestones and NASA/NSBRI-relevant career development?
- Is there a clear description of how personal attention will be provided to enrolled students through processes of mentoring, tutoring and related activities?
- Is there a clear description of how laboratory and/or applied learning activities will be incorporated into the program and evaluated with regard to contributions to students' learning and its relevancy to NSBRI and NASA priorities and goals?
- Does the project involve development or demonstration of promising new strategies or materials for science and/or engineering instruction, student achievement or public awareness of space-related research?

- Does the application indicate appropriate mechanisms for continuous evaluation, including quantitative and/or qualitative measures that guide instructional adjustments to heighten impact?

2) Relevance and Cost:

- Do the proposed activities constitute a coherent effort to further the goals of the NASA Space Program and the NSBRI Education and Public Outreach Program?
- Are the requested costs reasonable in relation to the objectives, design and potential significance of the proposed project?
- Is there appropriate institutional support, including facilities, equipment, supplies and other resources?

5.3 Site Visits

For those proposals that are identified as exemplary and that merit consideration for funding, a pre-award site visit and planning review may be requested. In the event that a site visit is needed, NSBRI personnel will work with the proposing institution(s) selected for site visits to establish the agenda for the on-site review, specify materials and facilities that should be available for review and identify key personnel from the institution and/or collaborating organizations who should be available to meet with members of the site review team. Additional information regarding site visits will be provided well in advance of any scheduled visits.

5.4 Selection for Award

At the end of the selection process, each proposing organization is notified in writing of its selection or non-selection status. NSBRI provides debriefings to those Principal Investigators who request one. The selection letters will include a statement indicating that the selected organization's business office will be contacted by the NSBRI, and a reminder that any costs incurred by the investigator in anticipation of an award are at their own risk. Selection notification will be made by a letter signed by the selecting official. The NSBRI reserves the right to offer selection of only a portion of a proposal. In these instances, the Principal Investigator will be given the opportunity to accept or decline the offer.

5.5 Conditions for Funding Continuation

Following initial year funding of a Graduate Education Project, awardee organizations will be expected to meet performance milestones established for the specific graduate options supported with NSBRI funding. Specific performance milestones will be identified early in the project implementation phase through collaborative discussions between the NSBRI leadership and project leaders at awardee institutions. Both measurable performance targets and dates for target attainment will be determined based upon expectations for performance by students in typical doctoral programs for the discipline(s) in which learning options are provided. The likely measurement points for reporting on milestone attainment are 18-, 36-, and 54-months following project initiation. However, these may be adjusted to accommodate specific issues or characteristics of an option or science/engineering discipline that may influence progression

toward goals and objectives. The timing of the milestone dates will be determined by the NSBRI and communicated to the awardee institution well in advance of any reporting deadlines.

5.6 Cancellation of Request for Proposals

Prospective proposers to this RFP are advised that, in general, funds are not available for award at the time of its release. NSBRI's obligation to make an award(s) is contingent upon the availability of appropriated funds from which payment can be made and the receipt of proposals that NSBRI determines are acceptable for award under this RFP.

NSBRI reserves the right to make no awards under this RFP and to cancel the RFP. NSBRI assumes no liability for canceling the RFP or for the failure of anyone to receive actual notice of cancellation.

6.0 RFP SCHEDULE AND SELECTION INFORMATION

The following items apply only to this RFP:

Solicitation RFP Identifier:	NSBRI-RFP-05-02
Application Format Required:	Electronic proposal using the NSBRI Electronic Proposal Submission System (See Section 4.0 Application Procedures for further information)
Letter of Intent Due (not required):	August 3, 2005
Proposals Due:	September 14, 2005, 5:00pm EDT
Selection Announcement:	Winter 2005-6
Funding Begins:	Approximately 30-90 days following notification of selection
Selecting Official:	Director, National Space Biomedical Research Institute

7.0 ADDITIONAL INFORMATION

Additional information on the NSBRI is posted at <http://www.nsbri.org> and is also available from:

Jeffrey P. Sutton, M.D., Ph.D.
Director
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E-mail: director@www.nsbri.org

Original signed by:

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

Date

8.0 SELECTED BIBLIOGRAPHY

1. **OBPR Program Tasks and Bibliography (Task Books)** for FY1995-2004 are available at http://taskbook.nasaprs.com/peer_review/index.cfm
2. **National Space Biomedical Research Institute Web site.** <http://www.nsbri.org/>
3. **Space Life Sciences Ground Facilities Information Package.** This document is available at http://research.hq.nasa.gov/code_u/nra/current/NRA-03-OBPR-04/index.html
4. **The Space Life Sciences Data Archive (LSDA)** is an online database containing descriptions and results of completed NASA-sponsored flight experiments. Descriptions are included of experiments, missions, procedures, hardware, biospecimens collected, personnel, and documents. Biospecimens available for research purposes are described in detail. A limited number of experiments contain final reports and spreadsheet data suitable for downloading. Data from human subjects are unavailable online for reasons of privacy.

Internet address: <http://lsda.jsc.nasa.gov/>
LSDA Help Desk: 281-483-7876
Email: lsda@semail.jsc.nasa.gov
5. **Center for Advanced Studies in the Space Life Sciences** contains a list of workshops and seminars sponsored by the Center. Proceedings and final reports of these workshops are also posted as they become available at <http://www.mbl.edu/CASSLS/workshops.html>
6. **Guidance for NASA Medical Board Procedures.** National Aeronautics and Space Administration, Medical Policy Board. Richard Williams, M.D., Chairperson. NASA Headquarters. This document is available at http://peer1.nasaprs.com/peer_review/prog/mpbhand.pdf
7. **A Strategy for Research in Space Biology and Medicine in the New Century.** National Academy of Science. National Research Council Committee on Space Biology and Medicine. Mary J. Osborn, Committee Chairperson. 1998. Washington, DC: National Academy Press.
<http://www.nas.edu/ssb/csbn1.html/>
8. **Space Physiology and Medicine, 3rd ed.** A. Nicogossian, C. Huntoon, and S. Pool. (Eds.). 1994. Philadelphia, PA: Lea & Febiger.
9. **Task Force on Countermeasures.** This report incorporates output of the Countermeasures Task Force, the Vestibular Countermeasures Task Group, and the Behavior and Performance Working Group into a unified document. This document is available at http://peer1.nasaprs.com/peer_review/prog/countermeasures/countermeasures.html
10. **International Workshop on Cardiovascular Research in Space.** *Medicine and Science in Sports and Exercise*, Volume 28, Number 10 Supplement, 1996.
11. **Muscle Research in Space: International Workshop.** *International Journal of Sports Medicine*, Volume 18, Supplement 4, S257-S331, 1997.

12. **Space Neuroscience Research.** *Brain Research Reviews*, Volume 28, Numbers 1/2, Special Issue, 1998.
13. **International Workshop on Bone Research in Space.** *Bone, Official Journal of the International Bone and Mineral Society*, Volume 22, Number 5 (Supplement), 1999.
14. **Small Clinical Trials: Issues and Challenges.** Institute of Medicine, National Academy Press, Washington, DC. <http://www.nap.edu/books/0309073332/html/>
15. **Sex and Gender: Exploring the Biological Contributions to Human Health.** *NIH Guidelines on the Inclusion of Women and Minorities as Subjects in Clinical Research*, 59 Fed. Reg. 14508 (1994).
16. **Grant and Cooperative Agreement Handbook.** Office of Procurement, National Aeronautics and Space Administration, Washington, DC 20546
17. **Safe Passage, Astronaut Care for Exploration.** Institute of Medicine, National Academy Press, Washington, DC, (2001).
18. **NSBRI Team Strategic Plans:**
 - Bone Loss: <http://www.nsbri.org/Research/Bone.html>
 - Cardiovascular Alterations: <http://www.nsbri.org/Research/Cardio.html>
 - Education and Outreach: <http://www.nsbri.org/Education/index.html>
 - Human Performance Factors: <http://www.nsbri.org/Research/Sleep.html>
 - Immunology, Infection and Hematology: <http://www.nsbri.org/Research/Immune.html>
 - Muscle Alterations and Atrophy: <http://www.nsbri.org/Research/Muscle.html>
 - Neurobehavioral and Psychosocial Factors: <http://www.nsbri.org/Research/Psycho.html>
 - Neurovestibular Adaptation: <http://www.nsbri.org/Research/Neuro.html>
 - Nutrition, Physical Fitness and Rehabilitation: <http://www.nsbri.org/Research/Nutrition.html>
 - Smart Medical Systems: http://www.nsbri.org/Research/Med_Sys.html
 - Technology Development: <http://www.nsbri.org/Research/Tech.html>
19. **Space Life Sciences Directorate Web site:** <http://slsd.jsc.nasa.gov/>
20. **Exploration Systems Mission Directorate Interim Strategy:** This document is available at: http://www.exploration.nasa.gov/documents/explor_strategy_hi.pdf
21. **NASA Vision for Space Exploration:** This document is available at: http://www.nasa.gov/pdf/55584main_vision_space_exploration-hi-res.pdf

***CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND
OTHER RESPONSIBILITY MATTERS
PRIMARY COVERED TRANSACTIONS***

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 14 CFR Part 1265.

- A. The applicant certifies that it and its principals:
 - a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
 - b. Have not, within a three-year period preceding this application proposal, been convicted or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or Local) transaction or contract under a public transaction ; violation of Federal or State antitrust statutes or commission of embezzlement , theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - c. Are not presently indicted for, or otherwise criminally or civilly charged by, a government entity (Federal, State, or Local) with commission of any of the offenses enumerated in paragraph A.(b) of this certification; and
 - d. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or Local) terminated for cause or default.

- B. Where the applicant is unable to certify to any of the statements in this certification, he or she shall attach an explanation to this application.

- C. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions (Subgrants or Subcontracts).
 - a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principal is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency.
 - b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

**CERTIFICATION REGARDING
LOBBYING**

As required by S 1352 Title 31 of the U.S. Code for persons entering into a grant or cooperative agreement over \$100,000, the applicant certifies that:

- (a) No Federal appropriated funds have been paid or will be paid by, or on behalf of, the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency or a Member of Congress, in connection with the making of any Federal grant, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal grant or cooperative agreement;
- (b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, Member of Congress, or an employee of a Member of Congress in connection with this Federal grant or cooperative agreement, the undersigned shall complete Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (c) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subgrants, contracts under grants and cooperative agreements, and subcontracts), and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by S1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

CERTIFICATION OF COMPLIANCE WITH THE NASA REGULATIONS
PURSUANT TO
NONDISCRIMINATION IN FEDERALLY ASSISTED PROGRAMS

The (Institution, corporation, firm, or other organization on whose behalf this assurance is signed, hereinafter called "Applicant") hereby agrees that it will comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352), Title IX of the Education Amendments of 1962 (20 U.S. 1680 et seq.), Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S. 794), and the Age Discrimination Act of 1975 (42 U.S. 16101 et seq.), and all requirements imposed by or pursuant to the Regulation of the National Aeronautics and Space Administration (14 CFR Part 1250) (hereinafter called "NASA") issued pursuant to these laws, to the end that in accordance with these laws and regulations, no person in the United States shall, on the basis of race, color, national origin, sex, handicapped condition, or age be excluded from participating in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives federal financial assistance from NASA; and hereby give assurance that it will immediately take any measure necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of federal financial assistance extended to the Applicant by NASA, this assurance shall obligate the Applicant, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Applicant for the period during which the federal financial assistance is extended to it by NASA.

This assurance is given in consideration of, and for the purpose of, obtaining any and all federal grants, loans, contracts, property, discounts, or other federal financial assistance extended after the date hereof to the Applicant by NASA, including installment payments after such date on account of applications for federal financial assistance which were approved before such date. The Applicant recognizes and agrees that such federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign on behalf of the Applicant.