

**FINANCIAL ASSISTANCE  
FUNDING OPPORTUNITY ANNOUNCEMENT**



**U.S. Department of Energy  
Office of Science  
Office of Biological and Environmental Research  
Low Dose Radiation Research Program –Basic Biology and  
Modeling**

**Funding Opportunity Number: DE-PS02-08ER08-20  
Announcement Type: Initial  
CFDA Number: 81.049**

**ISSUE DATE: April 3, 2008**

**Preapplication Due Date: Encouraged – No Due Date**

**Application Due Date: 6/25/2008, 8:00 PM Eastern Time**

## NOTE: REQUIREMENTS FOR GRANTS.GOV

**Where to Submit:** Applications must be submitted through Grants.gov to be considered for award. You cannot submit an application through Grants.gov unless you are registered. Please read the registration requirements carefully and start the process immediately. Remember you have to update your CCR registration annually. If you have any questions about your registration, you should contact the Grants.gov Helpdesk at 1-800-518-4726 to verify that you are still registered in Grants.gov.

**Registration Requirements:** There are several one-time actions you must complete in order to submit an application through Grants.gov (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the Central Contract Registry (CCR), register with the credential provider, and register with Grants.gov). See <http://www.grants.gov/GetStarted>. Use the Grants.gov Organization Registration Checklist at <http://www.grants.gov/assets/OrganizationRegCheck.doc> to guide you through the process. Designating an E-Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in the CCR registration process. Applicants, who are not registered with CCR and Grants.gov, should allow at **least 21 days** to complete these requirements. It is suggested that the process be started as soon as possible.

**IMPORTANT NOTICE TO POTENTIAL APPLICANTS:** When you have completed the process, you should call the Grants.gov Helpdesk at 1-800-518-4726 to verify that you have completed the final step (i.e. Grants.gov registration).

**MICROSOFT VISTA AND OFFICE 2007 COMPATIBILITY:** Grants.gov is currently incompatible with both the new Microsoft (MS) Vista Operating System and the new Microsoft (MS) Office 2007 versions of Word, Excel and Power Point. If you attach a file created using MS Office 2007, you will NOT get an error message when you submit the application, HOWEVER your entire application will not be able to be processed or accepted at Grants.gov and will not reach DOE.

Microsoft Windows Vista users: Please note that PureEdge does not work with Microsoft Windows Vista at this time. Grants.gov provides an alternative solution at [http://www.grants.gov/resources/download\\_software.jsp#citrixnonwindow](http://www.grants.gov/resources/download_software.jsp#citrixnonwindow) or [http://www.grants.gov/resources/download\\_software.jsp](http://www.grants.gov/resources/download_software.jsp) and click on "Software/Technical/Downloads".

The default file format used by Microsoft Office 2007 presents compatibility issues with Grants.gov. For solutions to the Office 2007 compatibility issue, go to [http://www07.grants.gov/help/submit\\_application\\_faqs.jsp](http://www07.grants.gov/help/submit_application_faqs.jsp), and click on "Restrictions".

Otherwise, you must find a computer with a previous version Microsoft Operating System, such as Windows XP.

Grants.gov can accept applications with attachments created in MS Office 2007 if the attachments are saved in the prior format. See [www.grants.gov/www.grants.gov/assets/Vista\\_and\\_office\\_07\\_Compatibility.pdf](http://www.grants.gov/www.grants.gov/assets/Vista_and_office_07_Compatibility.pdf) for detailed instructions on how to do this. A file created in MS Office 2007 can be identified by the "x" at

the end of the file extension, for example "sample.docx" for a Word file.

Contact Grants.gov at 1-800-518-4726 with any questions.

**Questions:** Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or [support@grants.gov](mailto:support@grants.gov). Part VII of this announcement explains how to submit other questions to the Department of Energy.

**Application Receipt Notices:** After an application is submitted, the Authorized Organization Representative (AOR) will receive a series of five e-mails. It is extremely important that the AOR watch for and save each of the e-mails. It may take up to two (2) business days from application submission to receipt of e-mail Number 2. When the AOR receives e-mail Number 5, it is their responsibility to follow the instructions in the e-mail to logon to IIPS and verify that their application was received by DOE. The titles of the five e-mails are:

- Number 1 – Grants.gov Submission Receipt Number
- Number 2 – Grants.gov Submission Validation Receipt for Application Number
- Number 3 – Grants.gov Grantor Agency Retrieval Receipt for Application Number
- Number 4 – Grants.gov Agency Tracking Number Assignment for Application Number
- Number 5 – DOE e-Center Grant Application Received

The last e-mail will contain instructions for the AOR to register with the DOE e-Center. If the AOR is already registered with the DOE e-Center, the title of the last e-mail changes to:

- Number 5 – DOE e-Center Grant Application Received and Matched

This e-mail will contain the direct link to the application in IIPS. The AOR will need to enter their DOE e-Center user id and password to access the application.

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## PART I – FUNDING OPPORTUNITY DESCRIPTION

### GENERAL INQUIRIES ABOUT THIS FOA SHOULD BE DIRECTED TO:

#### Scientific/Technical Program Contact:

Dr. Noelle F Metting, Sc.D.  
U.S. Department of Energy  
Office of Biological and Environmental Research  
Phone: (301) 903-8309  
Email: [noelle.metting@science.doe.gov](mailto:noelle.metting@science.doe.gov)

Dr. Frank M Sulzman, Ph.D.  
National Aeronautics and Space Administration (NASA)  
Human Research/Space Radiation Program  
Phone: (631) 344-4751  
Email: [frank.m.sulzman@nasa.gov](mailto:frank.m.sulzman@nasa.gov)

#### SUMMARY:

The Office of Biological and Environmental Research (BER) of the Office of Science (SC), U.S. Department of Energy (DOE) and the Human Research Program (HRP), National Aeronautics and Space Administration (NASA), hereby announce their interest in receiving grant applications for new research to develop a better scientific basis for understanding risks to humans from exposures to low doses or low fluences of ionizing radiation. Research applications must primarily support the needs of the DOE/BER Low Dose Radiation Research Program; applications may also include complementary research of direct interest to the NASA/HRP Space Radiation Project of sufficient scientific merit to qualify for partial NASA support. Research must focus on elucidating molecular mechanisms and pathways involved in normal radiobiological responses to low dose exposure, and must have the potential to ultimately increase understanding of health outcomes from radiation exposures that are at or near current workplace exposure limits. New research that focuses on molecular and cellular responses within tissue- and higher levels of biological organization will receive higher priority. Experimental research of particular interest to this call includes radio-adaptive responses; systems genetics of inter-individual variation; low dose and/or low dose-rate effects on: a) proteomic responses, b) the immune system, c) epigenetic regulation, and d) molecular and cellular hallmarks of aging. The Programs are also interested in funding new mathematical/risk modeling projects that will incorporate the latest low dose and low dose-rate biological research into mechanism-based models of tissue function. Scientists working in rapidly developing areas of biological sciences not necessarily associated with the study of radiation are also encouraged to consider the contributions that their field can make. **Please review the Supplementary Information sections below for further discussion of DOE and NASA programmatic needs.**

#### SUPPLEMENTARY INFORMATION

##### I. DOE Low Dose Radiation Research Program

The DOE/BER Low Dose Radiation Research Program has the challenge of conducting research that can be used to inform the development of future national radiation risk policy for the public and the workplace. Funded research must have the potential to ultimately increase understanding of health outcomes from radiation exposures that are at or near current workplace exposure limits. High risk research having the potential to rapidly advance the field is particularly encouraged. Scientists working in rapidly developing areas of biological sciences not necessarily associated with the study of radiation are also encouraged to consider the contributions that their field can make and to propose relevant investigations. However, investigators new to radiobiology research are encouraged to consult or collaborate with radiobiology experts in order to develop realistic experimental plans.

Research must focus on elucidating molecular mechanisms and pathways involved in normal radiobiological responses to low dose exposure; exclusively phenomenological studies will not be considered. In general, research is desired that focuses on low Linear Energy Transfer (low LET) ionizing radiation (x- and gamma-rays; high-energy electrons and protons) exposures, and total radiation doses that are less than 0.1 Gray (Gy) (10 rads). Some experiments will likely involve selected exposures to higher doses of radiation for comparisons with previous experiments or for determining the validity of extrapolation methods previously used to estimate the effects of low doses of radiation from observations made at high doses. In some cases, a biological response of interest seen only at high doses may actually be absent (as opposed to simply undetectable) at low doses of radiation; evidence is also accumulating that biological responses after low dose exposure are qualitatively different from responses after high dose exposure. Therefore, research aimed at defining the dose where the mechanisms of response shift (dose-series and time-series experiments) has high programmatic priority.

Low dose-rate studies are also very desirable. In these studies it is important that the range of total doses delivered also encompass the low dose range, i.e., total doses should adequately cover the range of 0.1 Gy or less in addition to any higher total doses. It is worth noting that experimental delivery of only 0.01 Gy (1 rad) over a period of 24 hours is still an approximately 1000-fold higher dose rate than the average background radiation dose rate in the U.S. It is well known that viable biological systems have cellular and molecular surveillance mechanisms that can detect much less than a 1000-fold change in environmental conditions, including the case of radiation exposure. The radiobiological evidence from studies in various biological systems shows that low dose rate exposures often initiate adaptive, homeostatic responses. Research is sought to verify and further elucidate these responses in normal intact tissues.

The Low Dose Program is already making significant investments and progress in the important research areas of radiation-induced DNA damage and repair, endogenous oxidative damage versus low dose radiation-induced damage, radio-adaptive responses, bystander effects, genomic instability, and individual genetic susceptibility to low dose radiation exposure. Descriptions of these topics can be found in the open literature via PubMed, <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>, and on the Program website, <http://www.lowdose.energy.gov/>. Information on current and past Program-funded projects, publications lists, and other information relevant to low dose radiation studies can also be found on the Program website.

Until recently, most molecular studies of radiation effects were carried out using isolated cells in monolayer culture, and the responses of those cells were then extrapolated to mammalian tissues and organisms. New research indicates that fundamentally different cellular and molecular responses can occur as a function of the level of biological organization (cells, tissues, or whole organisms), and that normal, intact tissue responds, in general, differently to radiation than does monoculture/monolayer cell populations. These observations are especially pronounced in the low dose range. Innovative new research is needed to explore and more fully understand low dose radiation-induced molecular and cellular responses, and subsequent health outcomes, within these higher levels of biological organization.

Experimental research of particular interest to this call includes the following:

1. **Radio-adaptive responses** - as they relate to significant health outcomes
2. **Systems genetics** - Inter-individual variation in radiation exposure outcomes may result from polymorphisms at multiple loci that can be identified via discovery genetics strategies.
3. **Low dose and/or low dose-rate effects** on:
  - a. **Proteomic responses** – Comparing proteomic response after low versus high dose exposures may provide information on underlying systemic processes.
  - b. **The immune system and inflammation** – Recent studies of experimental models of cancer underscore the absolute requirement for inflammatory and/or immune cell involvement. The effect of low dose exposure on these tissue interactions and their role in health outcomes is poorly understood.
  - c. **Epigenetic regulation** – There are epigenetic mechanisms by which radiation exposure causes an alteration of cell phenotype that persists. The signaling mechanisms establishing such epigenetic programs, and their contribution to health outcomes, are not well understood.
  - d. **Molecular /cellular hallmarks of aging** - Recent developments in the field of aging research have revealed cellular and molecular effects, the study of which may be important to the understanding of low dose radiation biology.
4. **Mathematical modeling** – Modeling is needed that incorporates the latest low dose and low dose rate biological research into mechanism-based systems biology models of tissue function. It may be a component of an experimental effort, or it may stand alone, but it should aim to include relevant research results across levels of biological organization that influence health effects at high versus low dose exposures.

Because the knowledge base of regulatory, metabolic, and signaling pathways is growing rapidly across all fields of biology, applications should point out, wherever possible, how the proposed radiobiological research might link with, clarify, and/or extend this information. Any data and results generated through funded investigations that are appropriate to share with the broader scientific community should, where possible, be provided in a format amenable to deposition in databases.

The Low Dose Program was established with the intention of supporting science that is useful to policy makers, standard setters, and the public. Successful applications will ideally have an approach or component (whether experimental or modeling) that could potentially link data from

experiment to downstream health outcomes that might occur in humans. Investigators will be expected to effectively communicate research results through publication in peer-reviewed journals. Investigators will also be encouraged to communicate with the wider community of concerned persons, so that current thinking and public debate are better able to reflect sound science.

Finally, several tissue archives are available for Low Dose Program investigations. Fixed tissue samples from individual animals (rodent, canine) exposed to either external radiation or to internally-deposited radioactive materials are available for study. For information on these tissue archives, please contact Dr. Gayle Woloschak, Northwestern University; (312) 503-4322; [g-woloschak@northwestern.edu](mailto:g-woloschak@northwestern.edu).

## **II. Specifics for the Space Radiation Project (NASA)**

The NASA/HRP Space Radiation Project is charged with providing input for the determination of health risks to humans visiting the space radiation environment. NASA is especially interested in human exposure to low fluences of high-energy particulate ionizing radiation (protons and heavy ions). Applications whose principal focus is on low LET radiation are encouraged to include complementary research with high-energy particulate ionizing radiation that leverages progress, resources, and technology used for the low LET radiation research. Investigators with currently funded low dose projects may also apply for supplementary funding to address closely related research of interest to NASA.

The primary area of emphasis of the NASA/HRP Space Radiation Project is the development of mechanistic insights into biological effects of space radiation that account for radiation risks. Applications are required to be hypothesis-driven and are expected to obtain their data in ground-based experimental radiobiology studies with protons and high-energy heavy ion beams in the energy range corresponding to space radiation. This is mainly a ground-based program using accelerator facilities to simulate space radiation. In addition to the research topics already described above this includes research on non-phenomenological predictors of late cell and tissue effects and the control and modification of radiation effect mechanisms

A description of the current awards in the Space Radiation Project may be found at: [http://taskbook.nasaprs.com/peer\\_review/index.cfm](http://taskbook.nasaprs.com/peer_review/index.cfm). (Search by checking Radiation Health) A description of the ground-based facilities and experimental program at Brookhaven National Laboratory can be found at: <http://server.c-ad.bnl.gov/esfd/nsrl/index.html>. The proton therapy facilities at Loma Linda University Medical Center are described at: [http://research.hq.nasa.gov/code\\_u/bcpr/index.cfm](http://research.hq.nasa.gov/code_u/bcpr/index.cfm).

Research applications to which NASA will assign high priority to studies that:

- a.** increase the confidence in the accuracy of extrapolating the probability of radiation-induced genetic alterations or carcinogenesis from rodents to humans;
- b.** reduce uncertainties in risk prediction for cancer following irradiation by protons and HZE particles;
- c.** provide data to develop risk projection models for central nervous system (CNS) and other degenerative tissue risks.

This opportunity does not request applications for flight research. Research applications are expected to utilize beams of charged particles available at the NASA Space Radiation Laboratory (NSRL) or lower energy ( $< 250$  MeV) protons at the Loma Linda University Medical Center Proton Treatment Facility, and to address experimental data obtained with such beams in ways leading to significant predictions that can be tested in future experiments.

The particles of interest to the Space Radiation Project are protons with energies between 20 and 1000 MeV, and nuclei of elements with atomic numbers between helium and iron, with energies between 50 and 3000 MeV/nucleon. Fluences of interest are of the order of 1-2 particles per cell; studies with higher fluences will need to be justified by compelling arguments, including an explanation of how the results can be applied in the low fluence regime. NASA has developed facilities for use of protons at Loma Linda University Medical School and high-energy heavy ion beams at the NASA Space Radiation Laboratory (NSRL) at Brookhaven National Laboratory. Applications should not budget for the use of beams at these facilities, which is paid by NASA. NASA will cooperate with DOE to provide the range of technical resources available for experimentation and analysis of experimental results at Brookhaven National Laboratory.

## **PART II – AWARD INFORMATION**

### **A. TYPE OF AWARD INSTRUMENT.**

DOE anticipates awarding grants under this program announcement.

### **B. ESTIMATED FUNDING.**

It is anticipated that up to \$ 4 M per year for multiple years will be available for this Notice. The majority of the initial awards will be made in Fiscal Year 2009. All awards are contingent on the availability of funds and programmatic needs. Annual continuations are contingent upon the availability of appropriated funds, progress of the research, and continuing Program need. Funds for this research will come chiefly from the BER Low Dose Radiation Research Program; a portion of the available funds are from NASA for joint funding of new research, also contingent upon budget availability. NASA provides beam time at the NSRL and the Loma Linda proton accelerator; investigators will not be required to pay for the beam time. DOE and NASA are under no obligation to pay for any costs associated with the preparation or submission of applications. DOE reserves the right to fund, in whole or in part, any, all, or none of the applications submitted in response to this Notice.

- **Post-doctoral applications:** Annual budgets for project applications are expected to range from \$50,000 to \$100,000 total costs. Applications may request project support for up to three years. Applicants must have prior permission from their supervisor and their research institution.
- **Senior Investigator applications:** Applicants may request project support for up to three years. Annual budgets for project applications are expected to range from \$150,000 to \$375,000 total costs.

### **C. MAXIMUM AND MINIMUM AWARD SIZE.**

See B. Estimated Funding section above.

### **D. EXPECTED NUMBER OF AWARDS.**

See B. Estimated Funding section above.

### **E. ANTICIPATED AWARD SIZE.**

See B. Estimated Funding section above.

### **F. PERIOD OF PERFORMANCE.**

See B. Estimated Funding section above.

### **G. TYPE OF APPLICATION.**

New and Renewal applications - DOE and NASA will accept new and renewal applications under this Announcement. Renewal applications are requests for additional funding for a period subsequent to that provided by a current award. Renewal applications compete with all other applications and must be submitted by the established due date/deadline. In preparing a renewal application, applicants should assume that reviewers will not have access to previous applications. The application should be developed as fully as though the applicant were applying for the first time. The application must include all the information required for a new project, and should also discuss the results from prior work.

### **PART III - ELIGIBILITY INFORMATION**

#### **A. ELIGIBLE APPLICANTS.**

All types of entities are eligible to apply, except other Federally Funded Research and Development Center (FFRDC) Contractors, and nonprofit organizations described in section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995.

Researchers from other Federal Agencies interested in submitting a proposal are encouraged to submit a preproposal referencing this Program Solicitation DE-PS02-08ER08-20; if a formal proposal is encouraged, Federal agencies should follow instructions at this website [http://www.sc.doe.gov/grants/fed\\_prop.html](http://www.sc.doe.gov/grants/fed_prop.html) on how to submit a formal proposal.

#### **B. COST SHARING.**

Cost sharing is not required.

#### **C. OTHER ELIGIBILITY REQUIREMENTS.**

N/A

## **PART IV – APPLICATION AND SUBMISSION INFORMATION**

### **A. ADDRESS TO REQUEST APPLICATION PACKAGE.**

Application forms and instructions are available at Grants.gov. To access these materials, go to <http://www.grants.gov>, select "Apply for Grants", and then select "Download Application Package". Enter the CFDA and/or the funding opportunity number located on the cover of this announcement and then follow the prompts to download the application package.

### **B. LETTER OF INTENT AND PREAPPLICATION.**

#### **1. Letter of Intent.**

A Letter of Intent is not required.

#### **2. Preapplication.**

Potential applicants are strongly encouraged to submit a brief pre-application that consists of two pages of narrative describing the research objectives, the technical approach(s), and the proposed team members and their expertise. They should be sent by email to [SCLifesci.lowdose@science.doe.gov](mailto:SCLifesci.lowdose@science.doe.gov). A response will be communicated to the applicant within one week after receipt, encouraging or discouraging formal application. Applicants who have not received a response regarding the status of their pre-application within 7 days of submission should contact the Low Dose Program Contact immediately.

The intent in requesting a preapplication is to save the time and effort of applicants in preparing and submitting a formal project application that may be inappropriate for the program. Preapplications will be reviewed relative to the scope and research needs as outlined in the summary paragraph and in the SUPPLEMENTARY INFORMATION. The preapplication should identify, on the cover sheet, the title of the project, the institution or organization, principal investigator name, telephone number, fax number, and e-mail address. No budget information or biographical data need be included, nor is an institutional endorsement necessary.

## C. CONTENT AND FORM OF APPLICATION – SF 424 (R&R).

You must complete the mandatory forms and any applicable optional forms (e.g., SF-LLL-Disclosure of Lobbying Activities) in accordance with the instructions on the forms and the additional instructions below. **Files that are attached to the forms must be in Adobe Portable Document Format (PDF) unless otherwise specified in this announcement.**

### 1. SF 424 (R&R).

Complete this form first to populate data in other forms. Complete all the required fields in accordance with the pop-up instructions on the form. To activate the instructions, turn on the “Help Mode” (Icon with the pointer and question mark at the top of the form). The list of certifications and assurances referenced in Field 18 can be found on the Applicant and Recipient Page at [http://management.energy.gov/business\\_doe/business\\_forms.htm](http://management.energy.gov/business_doe/business_forms.htm), under Certifications and Assurances.

### 2. RESEARCH AND RELATED Other Project Information.

Complete questions 1 through 5 and attach files. The files must comply with the following instructions:

#### **Project Summary/Abstract (Field 6 on the Form).**

The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s) (PD/PI), the project title, the objectives of the project, the hypotheses to be tested, the proposed experimental design, the names of **all investigators** and their affiliations, and the potential impact of the project (i.e., benefits, outcomes). This document must not include any proprietary or sensitive business information as the Department may make it available to the public. The project summary must not exceed 1 page when printed using standard 8.5” by 11” paper with 1” margins (top, bottom, left and right) with font not smaller than 11 point. To attach a Project Summary/Abstract, click “Add Attachment.”

#### **Project Narrative (Field 7 on the form).**

The project narrative for an **Application must not exceed 15 pages** of technical information, including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right). **EVALUATORS WILL ONLY REVIEW THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE.** The font must not be smaller than 11 point. Do not include any Internet addresses (URLs) that provide information necessary to review the application, because the information contained in these sites will not be reviewed. See Part VIII.D for instructions on how to mark proprietary application information. To attach a Project Narrative, click “Add Attachment.”

**The first page of your narrative must include the following information (this page will not count in the project narrative page limitation):**

**Applicant/Institution:**  
**Street Address/City/State/Zip:**  
**Principal Investigator:**  
**Address:**  
**Telephone Number:**  
**Email:**  
**DOE/Office of Science Program Office: BER**  
**DOE/Office of Science Program Office Scientific/Technical Contact: Dr. Noelle F. Metting**  
**DOE Grant Number (if Renewal or Supplemental Application):**

Is this a Collaboration? If yes, please list ALL Collaborating Institutions/PIs\* and indicate which ones will also be submitting applications.

*\* Note that collaborating applications must be submitted separately.*

The narrative comprises the research plan for the project. Letters of intent from all collaborators and short curriculum vitae of all senior personnel must be included in the application. Applications not meeting these requirements will be deemed ineligible during the initial screening process. The major part of the narrative should be devoted to a description and justification of the proposed project, including details of the methods to be used. It should also include a timeline for the major activities of the proposed project, and should indicate which project personnel will be responsible for which activities.

The project narrative must include:

Project Objectives:

This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.

Project Timetable:

This section should outline as a function of time, year by year, all the important activities or phases of the project, including any activities planned beyond the project period. Successful applicants must use this project timetable to report progress.

Project Performance Site:

Indicate the primary site where the work will be performed. If a portion of the work will be performed at any other sites, identify those sites, also.

Biographical Sketch Appendix:

Provide a biographical sketch for the project director/principal investigator (PD/PI) and each senior/key person listed in Section A on the R&R Budget form. **Provide the biographical sketch information as an appendix to your project narrative. Do not attach a separate file.** The biographical sketch appendix will not count in the project narrative page limitation. The biographical information for each person must not exceed 2 pages when printed on 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right) with font not smaller than 11 point and must include:

Education and Training. Undergraduate, graduate and postdoctoral training, provide institution, major/area, degree and year.

Research and Professional Experience: Beginning with the current position list, in chronological order, professional/academic positions with a brief description.

Publications. Provide a list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically.

Patents, copyrights and software systems developed may be provided in addition to or substituted for publications.

Synergistic Activities. List no more than 5 professional and scholarly activities related to the effort proposed.

Current and Pending Support Appendix.

Provide a list of all current and pending support (both Federal and non-Federal) for the Project Director/Principal Investigator(s) (PD/PI) and senior/key persons, including subawardees, for ongoing projects and pending applications. For each organization providing support, show the total award amount for the entire award period (including indirect costs) and the number of person-months per year to be devoted to the project by the senior/key person. **Provide the Current and Pending Support as an appendix to your project narrative. Do not attach a separate file. The Current and Pending Support Appendix will not count in the project narrative page limitation.** Concurrent submission of an application to other organizations for simultaneous consideration will not prejudice its review.

Identification of Potential Conflicts of Interest or Bias in Selection of Reviewers Appendix.

**Provide the following information in this appendix and append to your project narrative. Do not attach a separate file. (This appendix will not count in the project narrative page limitation):**

Collaborators and Co-editors: List in alphabetical order all persons, including their current organizational affiliation, who are, or who have been, collaborators or co-authors with you on a research project, book or book article, report, abstract, or paper during the 36 months preceding the submission of this application. Also, list any individuals who are currently, or have been, co-editors with you on a special issue of a journal, compendium, or conference proceedings during the 24 months preceding the submission of this application. If there are no collaborators or co-editors to report, state "None."

Graduate and Postdoctoral Advisors and Advisees: List the names and current

organizational affiliations of your graduate advisor(s) and principal postdoctoral sponsor(s) during the last 5 years. Also, list the names and current organizational affiliations of your graduate students and postdoctoral associates during the past 5 years.

**Bibliography & References Cited Appendix.**

Provide a bibliography of any references cited in the Project Narrative. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Include only bibliographic citations. Applicants should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the application. In order to reduce the number of files attached to your application, please provide the Bibliography and References Cited information as an appendix to your project narrative. This appendix will not count in the project narrative page limitation.

**Facilities & Other Resources Appendix.** This information is used to assess the capability of the organizational resources, including subawardee resources, available to perform the effort proposed. Identify the facilities to be used (Laboratory, Animal, Computer, Office, Clinical and Other). If appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Describe other resources available to the project (e.g., machine shop, electronic shop) and the extent to which they would be available to the project. In order to reduce the number of files attached to your application, please provide the Facility and Other Resource information as an appendix to your project narrative. This appendix will not count in the project narrative page limitation.

**Equipment Appendix.**

List major items of equipment already available for this project and, if appropriate identify location and pertinent capabilities. In order to reduce the number of files attached to your application, please provide the Equipment information as an appendix to your project narrative. This appendix will not count in the project narrative page limitation.

**Other Attachment Appendix.**

If you need to elaborate on your responses to questions 1-5 on the “Other Project Information” document, please provide this information as an appendix to your project narrative. This appendix will not count in the project narrative page limitation.

**Do not attach files for fields 8, 9, 10, and 11, instead follow the above instructions to include the information as appendices to the project narrative file (these appendices will not count in the project narrative page limitation).**

**3. RESEARCH AND RELATED BUDGET.**

Complete the Research and Related Budget form in accordance with the instructions on the form (Activate Help Mode to see instructions) and the following instructions. You

must complete a separate budget for each year of support requested. The form will generate a cumulative budget for the total project period. You must complete all the mandatory information on the form before the NEXT PERIOD button is activated. You may request funds under any of the categories listed as long as the item and amount are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions in this announcement (See PART IV, G).

**Budget Justification (Field K on the form).**

Provide the required supporting information for the following costs (See R&R Budget instructions): equipment; domestic and foreign travel; participant/trainees; material and supplies; publication; consultant services; ADP/computer services; subaward/consortium/contractual; equipment or facility rental/user fees; alterations and renovations; and indirect cost type. Provide any other information you wish to submit to justify your budget request. **Attach a single budget justification file for the entire project period in Field K.** The file automatically carries over to each budget year.

**4. SF-LLL Disclosure of Lobbying Activities.**

If applicable, complete SF- LLL. Applicability: 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, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the grant/cooperative agreement, you must complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying."

**Summary of Required Forms/Files**

Your application must include the following documents:

Name of Document	Format	Attach to
SF 424 (R&R)	PureEdge Form	N/A
<b>RESEARCH AND RELATED Other Project Information</b>	PureEdge Form	N/A
Project Summary/Abstract	PDF	Field 6
Project Narrative, including required appendices	PDF	Field 7
<b>RESEARCH &amp; RELATED BUDGET</b>	PureEdge Form	N/A
Budget Justification	PDF	Field K

## **D. SUBMISSIONS FROM SUCCESSFUL APPLICANTS.**

If selected for award, DOE reserves the right to request additional or clarifying information for any reason deemed necessary, including, but not limited to:

- Indirect cost information
- Other budget information
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5)
- Representation of Limited Rights Data and Restricted Software, if applicable
- Commitment Letter from Third Parties Contributing to Cost Sharing, if applicable

## **E. SUBMISSION DATES AND TIMES.**

### **1. Letter of Intent Due Date.**

A Letter of Intent (LOI) is not required.

### **2. Preapplication Due Date.**

Potential applicants are strongly encouraged to submit a brief pre-application that consists of two pages of narrative describing the research objectives, the technical approach(s), and the proposed team members and their expertise. They should be sent by email to [SCLifesci.lowdose@science.doe.gov](mailto:SCLifesci.lowdose@science.doe.gov). A response will be communicated to the applicant within one week after receipt, encouraging or discouraging formal application. Applicants who have not received a response regarding the status of their pre-application within 7 days of submission should contact the Low Dose Program Contact immediately.

There is no Due Date.

### **3. Formal Applications.**

Formal applications submitted in response to this Announcement must be received by June 25, 2008, 8:00 p.m. Eastern, to permit timely consideration of awards in Fiscal Year 2009. **You are encouraged to transmit your application well before the deadline. APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.**

## **F. INTERGOVERNMENTAL REVIEW.**

This program is not subject to Executive Order 12372 Intergovernmental Review of Federal Programs.

## **G. FUNDING RESTRICTIONS.**

Cost Principles. Costs must be allowable in accordance with the applicable Federal cost principles referenced in 10 CFR Part 600.

Pre-award Costs. Recipients may charge to an award resulting from this announcement pre-award costs that were incurred within the ninety (90) calendar day period immediately preceding the effective date of the award, if the costs are allowable in accordance with the applicable Federal cost principles referenced in 10 CFR Part 600. Recipients must obtain the prior approval of the contracting officer for any pre-award costs that are for periods greater than this 90 day calendar period.

Pre-award costs are incurred at the applicant's risk. DOE is under no obligation to reimburse such costs if for any reason the applicant does not receive an award or if the award is made for a lesser amount than the applicant expected.

## **H. OTHER SUBMISSION AND REGISTRATION REQUIREMENTS.**

### **1. Where to Submit.**

**APPLICATIONS MUST BE SUBMITTED THROUGH GRANTS.GOV TO BE CONSIDERED FOR AWARD.** Submit electronic applications through the "Apply for Grants" function at [www.Grants.gov](http://www.Grants.gov). If you have problems completing the registration process or submitting your application, call Grants.gov at 1-800-518-4726 or send an email to [support@grants.gov](mailto:support@grants.gov).

### **2. Registration Process.**

You must COMPLETE the one-time registration process (all steps) before you can submit your first application through Grants.gov (See [www.grants.gov/GetStarted](http://www.grants.gov/GetStarted)). **We recommend that you start this process at least three weeks before the application due date.** It may take 21 days or more to complete the entire process. Use the Grants.gov Organizational Registration Checklists at <http://www.grants.gov/assets/OrganizationRegCheck.doc> to guide you through the process. **IMPORTANT:** During the CCR registration process, you will be asked to designate an E-Business Point of Contact (EBIZ POC). The EBIZ POC must obtain a special password called "Marketing Partner identification Number" (MPIN). When you have completed the process, you should call the Grants.gov Helpdesk at 1-800-518-4726 to verify that you have completed the final step (i.e. Grants.gov registration).

### **3. Application Receipt Notices.**

After an application is submitted, the Authorized Organization Representative (AOR) will receive a series of five e-mails. It is extremely important that the AOR watch for and save each of the emails. It may take up to two (2) business days from application submission to receipt of email Number 2. When the AOR receives email Number 5, it is their responsibility to follow the instructions in the email to logon to IIPS and verify that their application was received by DOE. You will need the Submission Receipt Number (email Number 1) to track a submission. The titles of the five e-mails are:

Number 1 - Grants.gov Submission Receipt Number

Number 2 - Grants.gov Submission Validation Receipt for Application Number

Number 3 - Grants.gov Grantor Agency Retrieval Receipt for Application Number

Number 4 - Grants.gov Agency Tracking Number Assignment for Application Number

## Number 5 – DOE e-Center Grant Application Received

The last email will contain instructions for the AOR to register with the DOE e-Center. If the AOR is already registered with the DOE e-Center, the title of the last email changes to:

### Number 5 – DOE e-Center Grant Application Received and Matched

This email will contain the direct link to the application in IIPS. The AOR will need to enter their DOE e-Center user id and password to access the application.

## **Part V - APPLICATION REVIEW INFORMATION**

### **A. CRITERIA.**

#### **1. Initial Review Criteria.**

Prior to a comprehensive merit evaluation, DOE will perform an initial review in accordance with 10 CFR 605.10(b).

#### **2. Merit Review Criteria.**

Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following evaluation criteria which are listed in descending order of importance codified at 10 CFR 605.10(d):

1. Scientific and/or Technical Merit of the Project;
2. Appropriateness of the Proposed Method or Approach;
3. Competency of Applicant's Personnel and Adequacy of Proposed Resources; and
4. Reasonableness and Appropriateness of the Proposed Budget.

DOE and NASA will make final funding decisions based on the results of the peer review and internal programmatic review. NASA agrees to abide by DOE's application review procedures. Applicants selected for funding may be required to provide additional information. The evaluation process will include program policy factors such as the relevance of the proposed research to the terms of the announcement and the agencies' programmatic needs. Note that external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Both Federal and non-Federal reviewers may be used, and submission of an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

### **B. REVIEW AND SELECTION PROCESS.**

#### **1. Merit Review.**

Applications that pass the initial review will be subjected to a merit review in accordance with the guidance provided in the "Office of Science Merit Review System for Financial Assistance." This Merit Review System is available at: <http://www.science.doe.gov/grants/merit.html>.

#### **2. Selection.**

The Selection Official will consider the merit review recommendation, program policy factors, and the amount of funds available.

#### **3. Discussions and Award.**

The Government may enter into discussions with a selected applicant for any reason deemed necessary, including but not limited to: (1) the budget is not appropriate or reasonable for the

requirement; (2) only a portion of the application is selected for award; (3) the Government needs additional information to determine that the recipient is capable of complying with the requirements in 10 CFR part 600 and 605; and/or (4) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

**C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES.**

DOE intends to make awards in FY 2009.

## **Part VI - AWARD ADMINISTRATION INFORMATION**

### **A. AWARD NOTICES.**

#### **1. Notice of Selection.**

DOE will notify applicants selected for award. This notice of selection is not an authorization to begin performance. (See Part IV.G with respect to the allowability of pre-award costs.)

Organizations whose applications have not been selected will be advised as promptly as possible. This notice will explain why the application was not selected.

#### **2. Notice of Award.**

A Notice of Financial Assistance Award issued by the contracting officer is the authorizing award document. It normally includes, either as an attachment or by reference: 1. Special Terms and Conditions; 2. Applicable program regulations, if any; 3. Application as approved by DOE; 4. DOE assistance regulations at 10 CFR Part 600, or, for Federal Demonstration Partnership (FDP) institutions, the FDP terms and conditions; 5. National Policy Assurances to Be Incorporated As Award Terms; 6. Budget Summary; and 7. Federal Assistance Reporting Checklist, which identifies the reporting requirements.

### **B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS.**

#### **1. Administrative Requirements.**

The administrative requirements for DOE grants and cooperative agreements are contained in 10 CFR Part 600 and 10 CFR Part 605 (See: <http://ecfr.gpoaccess.gov>), except for grants made to Federal Demonstration Partnership (FDP) institutions. The FDP terms and conditions and DOE FDP agency specific terms and conditions are located on the National Science Foundation web site at [http://www.nsf.gov/awards/managing/fed\\_dem\\_part.jsp](http://www.nsf.gov/awards/managing/fed_dem_part.jsp).

#### **2. Special Terms and Conditions and National Policy Requirements.**

##### **Special Terms and Conditions and National Policy Requirements.**

The DOE Special Terms and Conditions for Use in Most Grants and Cooperative Agreements are located at [http://management.energy.gov/business\\_doe/business\\_forms.htm](http://management.energy.gov/business_doe/business_forms.htm). The National Policy Assurances to Be Incorporated As Award Terms are located at [http://management.energy.gov/business\\_doe/business\\_forms.htm](http://management.energy.gov/business_doe/business_forms.htm).

##### **Intellectual Property Provisions.**

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at [http://www.gc.energy.gov/financial\\_assistance\\_awards.htm](http://www.gc.energy.gov/financial_assistance_awards.htm).

**C. REPORTING.**

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F4600.2, attached to the award agreement.

## PART VII - QUESTIONS/AGENCY CONTACTS

### A. QUESTIONS.

Questions regarding the content of the announcement must be submitted through the “Submit Question” feature of the DOE Industry Interactive Procurement System (IIPS) at <http://e-center.doe.gov>. Locate the program announcement on IIPS and then click on the “Submit Question” button. Enter required information. You will receive an electronic notification that your question has been answered. DOE will try to respond to a question within 3 business days, unless a similar question and answer have already been posted on the website.

Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or [support@grants.gov](mailto:support@grants.gov). DOE cannot answer these questions.

### B. AGENCY CONTACT:

**GENERAL INQUIRIES ABOUT THIS NOTICE SHOULD BE DIRECTED TO:**

#### **Scientific/Technical Program Contact:**

Dr. Noelle F Metting, Sc.D.  
U.S. Department of Energy  
Office of Biological and Environmental Research  
Phone: (301) 903-8309  
Email: [noelle.metting@science.doe.gov](mailto:noelle.metting@science.doe.gov)

Dr. Frank M Sulzman, Ph.D.  
National Aeronautics and Space Administration (NASA)  
Human Research/Space Radiation Program  
Phone: (631) 344-4751  
Email: [frank.m.sulzman@nasa.gov](mailto:frank.m.sulzman@nasa.gov)

## **PART VIII - OTHER INFORMATION**

### **A. MODIFICATIONS.**

Notices of any modifications to this announcement will be posted on Grants.gov and the DOE Industry Interactive Procurement System (IIPS). You can receive an email when a modification or an announcement message is posted by joining the mailing list for this announcement through the link in IIPS. When you download the application at Grants.gov, you can also register to receive notifications of changes through Grants.gov.

### **B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE.**

DOE reserves the right, without qualification, to reject any or all applications received in response to this announcement and to select any application, in whole or in part, as a basis for negotiation and/or award.

### **C. COMMITMENT OF PUBLIC FUNDS.**

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by other than the Contracting Officer, either explicit or implied, is invalid.

### **D. PROPRIETARY APPLICATION INFORMATION.**

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the applicant, should be included in an application only when such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the applicant includes the following legend on the first page of the project narrative and specifies the pages of the application which are to be restricted:

“The data contained in pages \_\_\_\_\_ of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government’s right to use or disclose data obtained without restriction from any source, including the applicant.”

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

“The following contains proprietary information that (name of applicant) requests not be released to persons outside the Government, except for purposes of review and evaluation.”

### **E. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL.**

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application.

Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

#### **F. INTELLECTUAL PROPERTY DEVELOPED UNDER THIS PROGRAM.**

Patent Rights. The government will have certain statutory rights in an invention that is conceived or first actually reduced to practice under a DOE award. 42 U.S.C. 5908 provides that title to such inventions vests in the United States, except where 35 U.S.C. 202 provides otherwise for nonprofit organizations or small business firms. However, the Secretary of Energy may waive all or any part of the rights of the United States subject to certain conditions. (See “Notice of Right to Request Patent Waiver” in paragraph G below.)

Rights in Technical Data. Normally, the government has unlimited rights in technical data created under a DOE agreement. Delivery or third party licensing of proprietary software or data developed solely at private expense will not normally be required except as specifically negotiated in a particular agreement to satisfy DOE’s own needs or to insure the commercialization of technology developed under a DOE agreement.

#### **G. NOTICE OF RIGHT TO REQUEST PATENT WAIVER.**

Applicants may request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of an agreement as a result of this announcement, in advance of or within 30 days after the effective date of the award. Even if such advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver of the rights of the United States in identified inventions, i.e., individual inventions conceived or first actually reduced to practice in performance of the award. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.

Domestic small businesses and domestic nonprofit organizations will receive the patent rights clause at 37 CFR 401.14, i.e., the implementation of the Bayh-Dole Act. This clause permits domestic small business and domestic nonprofit organizations to retain title to subject inventions. Therefore, small businesses and nonprofit organizations do not need to request a waiver.

#### **H. NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES.**

Eligible activities under this program include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.