Domestic Nuclear Detection Office-National Science Foundation Academic Research Initiative (ARI)

PROGRAM SOLICITATION
NSF 13-554

REPLACES DOCUMENT(S):
NSF 11-530

National Science Foundation

Directorate for Engineering

Directorate for Mathematical & Physical Sciences

Directorate for Computer & Information Science & Engineering

Department of Homeland Security

Domestic Nuclear Detection Office

Transformational and Applied Research Directorate

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

July 10, 2013

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), NSF 13-1, was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in NSF 13-1 apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 14, 2013, must also follow the guidelines contained in NSF 13-1.

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, National Science Foundation's Merit Review Criteria: Review and Revisions. While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the *Grant Proposal Guide* and the *Award & Administration Guide*.

Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the Grant Proposal Guide.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Joint Domestic Nuclear Detection Office-National Science Foundation: Academic Research Initiative (ARI)

Synopsis of Program:

The ARI is a joint Domestic Nuclear Detection Office (DNDO) and National Science Foundation (NSF) program seeking novel cross-cutting research that will enhance the nation's ability to detect and interdict nuclear or radiological material outside of regulatory control, and otherwise help prevent nuclear or radiological attacks. This year's solicitation topics will encompass a range of subjects, with an emphasis on unconventional, multidisciplinary approaches to threat detection. A number of small to medium awards are intended in the areas of novel approaches to extremely low-cost threat detection, orthogonal and informatics approaches to threat detection, deterrence analytics, and advanced forensics techniques. A single large award is intended for an integrated, multidisciplinary approach to shielded special nuclear material detection. Primary objectives of the ARI include advancing fundamental knowledge in the above areas and developing intellectual capacity in scientific fields relevant to long-term advances in these areas.

Proposals outside of the scope described in this solicitation will be returned without review.

Research proposals specific to detection of biological, chemical, and conventional weapons are excluded from the scope of this solicitation, however approaches that consider explosives detection and nuclear or radiological materials detection are of interest.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Paul Werbos, Program Director, ENG/EFRI, telephone: (703) 292-8339, email: pwerbos@nsf.gov
- Gail Dodge, Program Director, Nuclear Physics, MPS/PHY, telephone: (703) 292-8958, email: gdodge@nsf.gov
- Bruce Hamilton, Program Director, Environmental Sustainability, ENG/CBET, telephone: (703) 292-8320, email: bhamilto@nsf.gov
- Bradley Keister, Program Director, Nuclear Physics, MPS/PHY, telephone: (703) 292-7377, email: bkeister@nsf.gov
- Sylvia Spengler, Program Director, Information Integration and Informatics, CISE/IIS, telephone: (703) 292-8930, email: sspengle@nsf.gov
- Dennis Wenger, Program Director, ENG/CMMI, telephone: (703) 292-8606, email: dwenger@nsf.gov
- Kerstin Mukerji, Science Assistant, ENG/ECCS, 525, telephone: (703) 292-8339, email: kmukerji@nsf.gov
- Joel Rynes, Assistant Director, Transformational and Applied Research Directorate, DNDO, telephone: (202)254-7608, email: joel.rynes@dhs.gov
- Mark Wrobel, DNDO Lead Program Manager, Transformational and Applied Research Directorate, DNDO, telephone: (202)254-7629, email: mark.wrobel@dhs.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.070 --- Computer and Information Science and Engineering
- 97.077 --- Homeland Security Testing, Evaluation, and Demonstration of Technologies

Award Information

Anticipated Type of Award: - Standard grant for the first year from NSF. Award type for follow-up years determined by DNDO.

Estimated Number of Awards: 6 to 8 One large and up to seven small to medium awards in FY 2013. The large award will not to exceed $1,000,000 annually for a maximum duration of five years with a maximum total award size of up to $5,000,000 inclusive of both direct and indirect costs. The requested budget for small to medium awards should adhere to the following:

- Single Investigator Awards will average approximately $150,000 per year
- Multi-disciplinary Awards will average approximately $350,000 per yearfor durations up to five years.

For the purposes of this solicitation multi-disciplinary means two or more investigators from substantially different disciplines, departments or organizations within a single university or from multiple universities.

Anticipated Funding Amount: $15,000,000

$3,000,000 is planned for direct funding this year for the first year of new awards through NSF. About $12 million is planned for follow-on funding of the outyears of these new awards from DNDO/DHS. NSF will support the initial year of the projects with funds made available from DHS in accordance with NSF policies and conditions. Future funding beyond year one will be awarded and administered by DHS, contingent upon awardees' progress and availability of funds, in accordance with the DHS/DNDO policies and procedures. Estimated program budget, number of awards and average award size or duration are subject to the availability of funds, and the quality and appropriateness of proposals received. There is a possibility that this solicitation will be reopened again in future years, depending on the level of new potential breakthroughs and new directions and partnerships which emerge from the work.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An individual researcher may not be named as a participant on more than one proposal submitted to this solicitation. This limitation includes participation as a PI, co-PI, senior researcher, consultant, or any other role for which financial remuneration is requested.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposals:**
  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

  July 10, 2013

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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IX. **Other Information**

I. INTRODUCTION

This Joint NSF/Domestic Nuclear Detection Office (DNDO) solicitation is seeking proposals for new ideas and technologies that will significantly improve the Nation's capability to prevent nuclear or radiological attacks. The Department of Homeland Security (DHS) has been tasked to ensure that the United States remains safe from the illicit importation, development, procurement or use of a nuclear or radiological device. Critical to supporting this objective is cutting-edge research supporting the development of new capabilities for law enforcement and DHS components to aid detecting and interdicting these devices or component materials. Research is also required to improve capabilities to effectively respond from nuclear or radiological events, and specifically to support U.S. capabilities for effective and timely attribution. In FY 2013 DNDO, a component of DHS, in partnership with the NSF will invest in leading-edge, fundamental research in science and technology that will support the successful detection and interdiction of nuclear and radiological threats through this Academic Research Initiative (ARI). Through this ARI, funding will be provided to establish and maintain aggressive research efforts at a number of academic institutions in a broad array of disciplines. These efforts will also help rebuild intellectual capacity in academic specialties relevant to the above objectives through the initiation and maintenance of long-term frontier research.

This research and the research community that will be developed under the ARI are seen as critical to our Nation's ability to deploy increasingly effective homeland security capabilities. This DNDO-NSF program will also coordinate with and leverage research currently underway in other areas of the federal government, to include research sponsored by DHS, the Department of Energy, and the Department of Defense, to further ARI program objectives.

Radiological and nuclear threats have traditionally been detected through the deployment of radiation sensing technologies that detect the intrinsic radiological signatures of threat materials. Related sensors have been developed and deployed that enable identification of detected radiological materials. The sensitivity and specificity of these sensors and sensor systems determine what nuclear and radiological threats can be detected, at what distances or locations, and how quickly. Shielding or masking of threat materials can significantly impact their detectability. Radiographic approaches can also be used to detect high atomic number materials and high mass density objects, and active interrogation techniques are being investigated that seek to extract or identify uniquely detectable signatures of special nuclear materials, even when shielded. ARI-funded research has previously focused on a wide array of activities intended to improve detection, identification and localization of threats through advanced neutron and gamma radiation sensing materials, passive radiation detection technology, active interrogation techniques, and other technical approaches that could result in high confidence detection and identification with minimal false alarms and minimal impact to the flow of commerce.

Previous studies conducted by DNDO have highlighted a number of significant, long-term challenges in the deployment and operation of an effective Global Nuclear Detection Architecture (GNDA). The GNDA is a worldwide network of sensors, communications, and personnel, with the supporting information exchanges, programs, and protocols that serve to deter, detect, identify, and report on nuclear and radiological devices and materials out of regulatory control. Many of these challenges cannot be easily overcome with existing or near-term technology developments. Solutions to these challenges will need sustained, long-term and interdisciplinary research to develop the fundamental scientific and technological foundation required to make such capabilities effective and affordable. Additional perspective and background is provided in the report on the Workshop on the Role of the Nuclear Physics Research Community in Combating Terrorism, as well as by the Congressional Research Service on Detection of Nuclear Weapons and Materials at the following sites:

http://science.energy.gov/np/news-and-resources/workshop-reports/

http://opencrs.com/document/R40154/2009-08-04/

II. PROGRAM DESCRIPTION

In order to effectively build on previous DNDO and NSF-supported research and address the program objectives discussed above, proposed research must fit into one or more of the following five topic areas:

1. Scientific and Engineering Approaches for Extremely Low-cost Monitoring for Radiological and Nuclear Threats

This topic seeks innovative research in science and engineering that can lead to considerably decreased capital investment and operational costs for routine monitoring and/or directed search for nuclear and radiological threat materials out of regulatory control. Approaches that support multiple modalities (choke point monitoring, wide area surveillance, and intelligence directed search) are preferred. Research could focus on techniques that radically decrease the cost of producing high-sensitivity and/or high- energy resolution radiation detection materials and systems, or consider the development of specific and sensitive radiation sensing materials and systems that are inherently extremely low cost. Very low cost detector materials that support both neutron and gamma detection, and that can be readily discriminated from gamma ray interactions are also of interest. Materials can include, but are not limited to, scintillator and semiconductor materials. Capital investment cost goals would be on the order of less than $100 per detector/sensor. Some sacrifice in detector performance may be acceptable to accommodate a significant decrease in associated cost. Alternatively, completely novel approaches for threat monitoring that can be broadly utilized, are highly effective, and given to implementation at very low operational cost and burden are of interest.

All proposals should emphasize fundamental and early applied research that can potentially support dramatically new or improved capabilities to detect nuclear and radiological threats.

2. Deterrence Theory and Analytics

This research topic is seeking innovative proposals to develop and apply deterrence theory to help prevent the importation of nuclear or radiological weapons and materials into the United States. It shall address adversary decision making and uncertainty creation with respect to the design and capabilities of the GNDA, and shall include a methodology for quantifying the deterrence value (i.e. measures of effectiveness) of messaging strategies concerning the GNDA. The approach(es) should apply current state-of-art in informatics, game theory, intelligence, adversary analysis and behavior modeling, to enable the determination of the deterrence

potential of current and proposed GNDA design and capabilities, with an emphasis on the domestic portion. Analytical approaches should encompass adversary cultural and ideological environments, beliefs, values, goals and objectives, modes of communication and messaging, and perceived and actual capabilities of various aspects of the GNDA. The theory and analytical approach should have the aim of informing homeland security deterrence strategy, the design of the GNDA, and should provide suggestions as to the most effective means to communicate deterrent messages to the adversary.

3. Scientific and Engineering of Threat Detection through Data Fusion, Informatics and/or Non-Radiological Signal/Signature Exploitation

Proposed research should explore how detection of nuclear/radiological threats can be definitively made or enhanced through the use of signals or signatures that may be collateral or orthogonal to conventional radiation sensing or radiographic methods. Approaches may be either applied to routine monitoring at chokepoints (i.e. at border crossings or airport terminals), or applied to surge capabilities to discover nuclear/radiological materials within a wide area. Examples are approaches that would enhance detection through collection, fusion and analyses of all available information in a given application. Proposed approaches should clearly indicate the theoretical basis for the approach, and what information or data will be required to evaluate the theory. The proposed approaches must be specific to enabling the detection of nuclear/radiological material and/or the shielding that may be present around this material. Excluded from this topic are investigations of novel signals/signatures directly associated with the intrinsic radiological signatures of threat materials (e.g. atmospheric fluorescence associated with ionizing radiation), but may include use of traditional radiological signatures in data-fusion approaches. Non-radiological signals may include thermal/infrared imaging, radar, electro-optical imaging, acoustics, gravimetrics or other potential sensing modalities, or utilization of other available data/information concerning the vehicle or container.

All proposals should emphasize fundamental and early applied research that can potentially support dramatically new or improved capabilities to detect nuclear and radiological threats.

4. Science and Engineering of Nuclear Forensics

In general, the National Technical Nuclear Forensics (NTNF) community is interested in advancements in separations or analyses of nuclear or radioactive materials that result in improvements in the speed, accuracy, and precision of determining the physical, chemical, radiological, micro-structural and/or morphological qualities of materials. We are seeking improvements in the quantification of micro-structural and morphology measurements of bulk uranium and plutonium in oxide and metal form.

Basic studies are also needed to improve our understanding of how relevant stages of the nuclear fuel cycle create, persist, or modify discriminating material characteristics in the metal or oxide forms of uranium or plutonium. Activities should focus on identifying discriminating material characteristics (physical, chemical, isotopic) that help assess the recent process history and provenance of bulk uranium and plutonium materials produced in the enrichment, conversion to oxides, and conversion to metal stages of the nuclear fuel cycle; and developing simulations that predict material characteristics from parameterized processes.

5. Integrated Multi-disciplinary Approaches to Clear Objects from Nuclear Threats

Proposals under this topic should investigate integrated multidisciplinary approaches to verify with high confidence that special nuclear material (SNM), specifically weapons grade plutonium or highly enriched uranium, even when shielded, is not present in an object (e.g., truck, container, vessel, rail car). Although definitive detection of the presence of SNM is desired at all times, it is not necessary if (1) the selected approach can discriminate all but extremely rare objects; and (2) the actual, well-shielded and masked threat is never cleared. Research should emphasize highly mobile yet efficient and effective means of high volume, low-dose screening/scanning for nuclear threats with minimal operational burden. Modalities of interest include rapid screening/scanning of cargo or conveyances and vehicle chokepoint monitoring. Proposed research should include a detailed step-wise approach to investigating, assessing and recommending novel but practical and cost-effective concepts and approaches to detect and interdict threat materials in transit while expeditiously clearing innocent objects. Research should emphasize multi- and inter-disciplinary integrated approaches, for which radiation screening or radiographic scanning may be only components. The proposal should encompass multi-sensor / multi-data source analyses, data fusion, modeling and experimentation to support and defend the recommended approach. Successful approaches should dramatically enhance or support law enforcement and other front-line personnel's ability to detect, adjudicate and interdict nuclear threats when implemented in primary and secondary scanning roles.

This ARI strongly encourages PIs to develop education initiatives that train graduate and undergraduate students in science and engineering disciplines supporting these topic areas. PIs are particularly encouraged to provide experiential opportunities that allow students to develop a deeper knowledge, expertise, and appreciation of these important areas (e.g., undergraduate research experiences for individual students or for multiple students through a program like NSF's Research Experiences for Undergraduates Sites). This program seeks to integrate research and education, which is a key objective NSF supports and promotes.

Proposals should involve a program of innovative and potentially high-risk research with potential for high impact. Multi- or inter-disciplinary approaches are preferred. The research must include the involvement of multiple graduate students and is encouraged to include undergraduate students as well as post-doctoral fellows. Collaborations with National Laboratories including summer internships and other exchange of personnel are strongly encouraged but must be performed on a no-exchange-of-funds basis.

All students supported with award funds must be citizens or permanent residents of the U.S., its territories, or its possessions.

Proposals outside of the scope of the above topics will be returned without review.

Research proposals specific to detection of biological, chemical, and conventional weapons are excluded from the scope of this solicitation, however approaches that consider explosives detection and nuclear or radiological materials detection are of interest.

III. AWARD INFORMATION

Anticipated Type of Award: Standard grant for the first year from NSF. Award type for follow-up years determined by DHS. NSF will not provide Continuing Grant Increments, or any other type of funding beyond the funding of the first year.

Estimated Number of Awards: One large and up to seven small to medium awards in FY 2013. The large award will not to exceed $1,000,000 annually for a maximum duration of five years with a maximum total award size of up to $5,000,000 inclusive of both direct and indirect costs. The requested budget for small to medium awards should adhere to the following:

- Single Investigator Awards will average approximately $150,000 per year

- Multi-disciplinary Awards will average approximately $350,000 per year

for durations up to five years. For the purposes of this solicitation multi-disciplinary means two or more investigators from substantially different disciplines, departments or organizations within a single university or from multiple universities.

Anticipated Funding Amount: FY 2013 is the seventh year of this program. This year the total funding planned for new awards under this solicitation is approximately $3,000,000, subject to availability of funds. NSF will support the initial year of the projects with funds made available from DHS in accordance with NSF policies and conditions. Future funding beyond year one will be awarded and administered by DHS, contingent upon awardees' progress and availability of funds, in accordance with the DHS policies and procedures. This solicitation may continue to be reopened annually with the number of additional projects selected based on the availability of funding the progress of on-going projects, and the mission needs of DHS/DNDO.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An individual researcher may not be named as a participant on more than one proposal submitted to this solicitation. This limitation includes participation as a PI, co-PI, senior researcher, consultant, or any other role for which financial remuneration is requested.

Additional Eligibility Info:

All non-academic institutions, regardless of profit or non-profit status, are not eligible to submit proposals in response to this solicitation.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.4 of the Grant Proposal Guide provides additional information on collaborative proposals.

Important Proposal Preparation Information: FastLane will check for required sections of the proposal, in accordance with *Grant Proposal Guide* (GPG) instructions described in Chapter II.C.2. The GPG requires submission of: Project Summary; Project Description; References Cited; Biographical Sketch(es); Budget; Budget Justification; Current and Pending Support; Facilities, Equipment & Other Resources; Data Management Plan; and Postdoctoral Mentoring Plan, if applicable. If a required section is

missing, **FastLane will not accept the proposal.**

Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions. If the solicitation instructions do not require a GPG-required section to be included in the proposal, insert text or upload a document in that section of the proposal that states, "Not Applicable for this Program Solicitation." Doing so will enable FastLane to accept your proposal.

The standard Grant Proposal Guide or NSF Grants.gov Application Guide instructions for proposal preparation apply, with the following modifications.

1. **Cover Sheet:**

   Project Title Block: The project title for ARI small proposals must begin with "ARI-MA" and follow with an informative title. Proposals for the large ARI awards must begin with "ARI-LA".

   Program Selection Block: This will be populated automatically upon selecting the ARI solicitation (see next program block).

   Program Solicitation Block:

   - FastLane Users: Select the ARI program solicitation number from the pull-down list. Entries on the cover sheet are limited to the principal investigator and a maximum of four co-principal investigators. Additional project leaders or senior personnel should be listed on the Project Summary page and entered into FastLane as senior investigators.
   - Grants.gov Users: The ARI program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page. NSF allows one principal investigator and a maximum of four co-principal investigators to be identified on a proposal. Instructions for entering additional senior project participants are included in Section V.5. of the NSF Grants.gov Application Guide.

2. **Project Summary:**

   The Project Summary consists of an overview and statements on the intellectual merit and broader impacts of the proposed activity. The project summary **must include a brief but explicit statement on how the proposed research relates to enabling the global nuclear detection architecture and/or the topic areas and research objectives outlined in Section II. Program Description. Omission of this statement will result in the proposal being returned without review.**

3. **Project Description:**

   Descriptor Codes: At the beginning of the project description, each proposal must specify a primary review code chosen from the following list. These codes will be used to help identify the type of expertise required, and do not imply any kind of allocation to units at NSF:

   Primary Review Code (specify one and only one)

   CISE (for Computer & Information Science & Engineering)

   ENG (for Engineering)

   MPS (for Mathematical and Physical Sciences)

   SBE (for Social, Behavioral and Economics)

   IDP (for Interdisciplinary: optional designation for proposals that are broadly interdisciplinary or for which no single disciplinary area stands out as primary)

   Also, to underscore multidisciplinary collaborations, up to two secondary review codes chosen from the list below may be specified below the primary review code:

   Secondary Review Codes (specify from none up to two)

   CISE (for Computer & Information Science & Engineering)

   EHR (for Education and Human Resources)

   ENG (for Engineering)

   MPS (for Mathematical and Physical Sciences)

   SBE (for Social, Behavioral and Economic)

   INT (for International: designation for proposals that include a significant international dimension)

   IDP (for Interdisciplinary: designation for proposals that are interdisciplinary and/or for which no single disciplinary area stands out)

   Project Descriptions must adhere to the 15-page limit, as described in the NSF Grant Proposal Guide (GPG) or NSF Grants.gov Application Guide.

   Describe the vision and goals of the proposed research, approaches and methodologies to attain the goals, and the expected outcomes. **The project description must present a clear and compelling explanation of the cutting-edge nature of the proposed research and its potential impact. High-risk proposals with the potential for high impact are encouraged.**

   Proposed Research: Narrative consisting of the following items:

   - An explanation of the scientific context, intellectual merit, relevance to the solicitation topics in Section II,

its potential long-term impact and timeliness of the proposed project;
- A detailed description of the proposed research;
- A discussion of the broader impacts of the proposed work;
- If appropriate, a justification for why an effort involving at least two investigators is necessary to carry out the proposed project;
- If appropriate, a discussion of the multidisciplinary approach taken and its proposed benefits;
- A description of the contribution to be made by each senior investigator; and
- A timeline for the planned work.

Modes of Dissemination and Education: Narrative describing:

- The mode of training undergraduate students, graduate students, and postdoctoral researchers, including co-mentorship or other collaborative training; and
- Plans for dissemination and education/outreach, including any pilot activities.

Management Plan: If appropriate, narrative describing:

- How the group effort will be coordinated, including any use of cyberinfrastructure;
- How decisions will be made regarding the conduct of the project; and
- How collaboration will be evaluated.

4. **References Cited:**

   References should include full titles of articles and book chapters cited. This section should include bibliographic citations only and must not be used to provide parenthetical information outside of the project description. Indicate with an asterisk (*) references co-authored by two or more proposal investigators.

5. **Biographical sketches:**

   For PIs, co-PIs and all senior personnel, provide brief biographical sketches using the format described in the Grant Proposal Guide. Note that recent collaborators and other affiliates should also be collected into the combined list (see Additional Required Information below).

6. **Budget and Budget Justification:**

   Include up to three or five annual budgets, one for each year of the duration of the award; a cumulative budget will be automatically generated by FastLane or Grants.gov. A detailed budget justification (up to three pages) should document proposed expenses. Multi-institutional proposals should use the award-sub award proposal mechanisms or the collaborative mechanism (see GPG guidelines, Chapter II.D.3).

   Mention if any government-furnished equipment (GFE, e.g. specific radioactive sources to calibrate or test detector systems) is required.

   An annual grantees workshop will enable the investigators of grants awarded through this solicitation to review progress, exchange information, and promote collaborations. The PI, all co-PIs, and at least one of the students supported from each funded grant will be required to participate. Representatives of DNDO, DHS Science and Technology, other Federal agencies, and various National Laboratories and industry are also expected to be present at this annual workshop to provide an expanded opportunity for collaboration and information sharing. Funds must be included in each year of the proposal budget for attendance at this annual workshop. This workshop will be a primary mechanism for the DNDO/NSF program managers to assess progress and thus to adjust the future funding profiles for individual projects.

7. **Current and Pending Support:**

   A full description of the total level of current and pending support from all sources for the key personnel. Any overlap between federally funded projects and the proposed research must be clarified.

8. **Facilities, Equipment & Other Resources:**

   A description of the facilities (including laboratories, computational facilities, and cyber infrastructure), equipment and other resources that will be made available to the project. Separate facilities descriptions should be included for multi-institutional projects or those involving non-academic partners. Per guidance in the GPG, the description should be narrative in nature and must not include any quantifiable financial information.

9. **Special Information and Supplementary Documentation:**

   The following should be submitted as supplementary documentation:

   - Proposals must include a quad chart that summarizes the effort, to be submitted as a supplementary document. The quad chart provides a single page summary of the effort and should include a picture, graphic or artist's conception of the effort in the top left, a summary of intellectual merit in the bottom left, a summary of broader impact on the top right, and a summary of schedule and proposed budget in the bottom right.

     The quad chart must include a brief but explicit statement on how the proposed research relates to enabling the global nuclear detection architecture and/or the topic areas and research objectives outlined in Section II. Program Description. Omission of this statement will result in the proposal being returned without review.

   - Proposals that request funding to support postdoctoral researchers must include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. See Chapter II.C.2.j of the GPG for further information about this requirement.

   - Proposals must describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans. See Chapter II.C.2.j of the GPG for further information about this requirement.

10. **Additional Required Information:**

    Proposers must submit the following information immediately after submission of their proposal to NSF separately from the FastLane submission. After receipt of the NSF proposal number, follow the instructions found at http://www.nsf.gov/eng/cmmi/ari.jsp to submit two lists: the first containing the last names, first names and institutional affiliations of all senior personnel (PI and co-PIs) and any named personnel whose salary is requested in the project budget; the second one containing the full names and institutional affiliations of all people having conflicts of interest with any senior personnel (PI and co-PIs) or named personnel whose salary is requested in the project budget. These lists will be used by DHS and NSF to check for conflicts of interest during the selection of reviewers.

11. **Single Copy Documents:**

    Suggested Reviewers/Reviewers Not to Include (Optional, but highly recommended): Include potential reviewers who span the range of disciplines represented by the ARI proposal. Suggestions are also accepted for reviewers that may have interest and expertise on other topics described in the Program Description section.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Other Budgetary Limitations:

All students supported with award funds must be citizens or permanent residents of the US, its territories or its possessions.

ARI award funds may not provide salary support to industry, government laboratories, or international partners, but may be used, in limited cases, to support travel in support of necessary collaborative work, including international research activities for participating U.S. students.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

  July 10, 2013

D. FastLane/Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

  Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are available at: https://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

  Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: https://www.fastlane.nsf.gov/fastlane.jsp.

- **For Proposals Submitted Via Grants.gov:**

  Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www07.grants.gov/applicants/app_help_reso.jsp. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

  Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program and, if they meet NSF proposal preparation requirements, will be reviewed. All proposals are carefully reviewed by DNDO-NSF staff, and by three to ten other persons outside NSF and DNDO who are experts in the particular fields represented by the proposal. These reviewers are selected by the DNDO-NSF Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts with the proposer. In addition, DNDO-NSF Program Officers

may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://www.nsf.gov/bfa/dias/policy/meritreview/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years (FY) 2011-2016*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the core strategies in support of NSF's mission is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students, and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the variety of learning perspectives.

Another core strategy in support of NSF's mission is broadening opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. DNDO-NSF Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision- making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i. prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
    1. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    2. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?

3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

The following additional merit review considerations apply:

- How responsive is the proposal to the topic areas and research objectives as described in Section II?
- How well does the proposal describe how the project will lead to progress in addressing a "big problem" in detection of nuclear threats that involves innovation and/or high risk?
- What potential does the project have for a major advance that is relevant to detection of shielded or unshielded nuclear weapons or special nuclear material (plutonium or highly enriched uranium)?
- How well does the proposal describe its multi-disciplinary and/or multi-institutional approach?
- What is the project's potential to attract broad scientific and public interest and support?
- How effective are the project's educational, dissemination, and, especially for large awards, management plans?
- What is the degree of undergraduate and/or graduate student participation in the effort?

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Panel Review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, a panel consisting of a DNDO Executive and an NSF Executive will recommend whether the proposal should be declined or recommended for award. DNDO-NSF are striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. The interval ends when the DNDO-NSF Executive Panel accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the DNDO-NSF Program Officers. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF or DNDO should be inferred from technical or budgetary discussions with a DNDO-NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the DNDO-NSF Program Managers administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); * or Research Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF

Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

Special Award Conditions:

NSF will fund the initial year of the projects with funds made available from DHS in accordance with NSF policies and conditions. Future funding beyond year one will be awarded and administered by DHS, contingent upon awardees' progress and availability of funds, in accordance with DHS/DNDO policies and procedures.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

Although NSF will provide funding only for the initial year of each award, all annual and final project reports must be submitted through Research.gov. The project outcomes report also must be prepared and submitted using Research.gov.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

An annual grantees workshop will enable the investigators of grants awarded through this solicitation to review progress, exchange information, and promote collaborations. The PI, all co-PIs, and at least one of the students supported from each funded grant will be required to participate. Representatives of DNDO, DHS Science and Technology, other Federal agencies and various National Laboratories and industry are also expected to be present at this annual workshop to provide an expanded opportunity for collaboration and information sharing. Funds must be included in each year of the proposal budget for attendance at this annual workshop. For budgetary purposes the workshop may be assumed to be in the Washington, D.C. area and be of three days duration. This workshop will be a primary mechanism for the DNDO-NSF program managers to assess progress and thus to adjust the future funding profiles for individual projects. (Include in budget request.)

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Paul Werbos, Program Director, ENG/EFRI, telephone: (703) 292-8339, email: pwerbos@nsf.gov
- Gail Dodge, Program Director, Nuclear Physics, MPS/PHY, telephone: (703) 292-8958, email: gdodge@nsf.gov
- Bruce Hamilton, Program Director, Environmental Sustainability, ENG/CBET, telephone: (703) 292-8320, email: bhamilto@nsf.gov
- Bradley Keister, Program Director, Nuclear Physics, MPS/PHY, telephone: (703) 292-7377, email: bkeister@nsf.gov
- Sylvia Spengler, Program Director, Information Integration and Informatics, CISE/IIS, telephone: (703) 292-8930, email: sspengle@nsf.gov
- Dennis Wenger, Program Director, ENG/CMMI, telephone: (703) 292-8606, email: dwenger@nsf.gov
- Kerstin Mukerji, Science Assistant, ENG/ECCS, 525, telephone: (703) 292-8339, email: kmukerji@nsf.gov
- Joel Rynes, Assistant Director, Transformational and Applied Research Directorate, DNDO, telephone: (202)254-7608, email: joel.rynes@dhs.gov
- Mark Wrobel, DNDO Lead Program Manager, Transformational and Applied Research Directorate, DNDO, telephone: (202)254-7629, email: mark.wrobel@dhs.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, National Science Foundation Update is a free e-mail subscription service designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the NSF web site.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at http://www.grants.gov.

ABOUT THE DOMESTIC NUCLEAR DETECTION OFFICE

Recognizing the risks associated with the potential use of a nuclear weapon within the United States, the Department of Homeland Security (DHS) has integrated all nuclear detection research, development, testing, evaluation, acquisition, and operational support into a single office: the Domestic Nuclear Detection Office (DNDO). DNDO will develop a global nuclear detection architecture; conduct research and development; and acquire and support the deployment of domestic nuclear detection systems.

DNDO is a jointly staffed office established to improve the Nation’s capability to detect and report unauthorized attempts to import, possess, store, develop, or transport nuclear or radiological material for use against the Nation, and to further enhance this capability over time.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at http://www.nsf.gov

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

  Send an e-mail to: nsfpubs@nsf.gov

or telephone:	(703) 292-7827
• **To Locate NSF Employees:**	(703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Division of Administrative Services
National Science Foundation
Arlington, VA 22230