FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT

U. S. Department of Energy
Office of Science
Office of Advanced Scientific Computing Research

Big Data-Aware Terabits Networking
Funding Opportunity Number: DE-FOA-0000883
Announcement Type: Initial
CFDA Number: 81.049

Issue Date: **March 19, 2013**

Application Due Date: **April 19, 2013 at 11:59 PM Eastern time**

REGISTRATIONS

Required Registrations

There are several one-time actions you must complete in order to submit an application in response to this Announcement. Applicants not currently registered with SAM and Grants.gov should allow **at least 44 days** to complete these requirements. You are encouraged to start the process as soon as possible.

Applicants must obtain a DUNS number at http://fedgov.dnb.com/webform.

Applicants must register with the System for Award Management (SAM) at http://www.sam.gov/. If you had an active registration in the Central Contractor Registry (CCR), you should have an active registration in SAM. More information about SAM registration for applicants is found at https://www.sam.gov/sam/transcript/Quick_Guide_for_Grants_Registrations_v1.7.pdf.

Applicants must register with Grants.gov. There are 3 steps to this process.
1. The Authorized Organizational Representative (AOR) must register at: https://apply07.grants.gov/apply/OrcRegister
2. An email is sent to the E-Business (E-Biz) POC listed in SAM. The E-Biz POC must approve the AOR registration using their MPIN from their SAM registration.
3. AOR verifies that registration was completed at: http://grants.gov/applicants/applicant_profile.jsp.

More information about the above steps is provided at: http://www.grants.gov/applicants/organization_registration.jsp.

Applicants must register with FedConnect at www.fedconnect.net. If an award is made, the full and binding version of the assistance agreement between your institution and DOE will be posted to FedConnect.

Recipients must register with the Federal Funding Accountability and Transparency Act Subaward Reporting System at https://www.fsrs.gov. This registration must be completed before an award may be made: you are advised to register while preparing your application.

DOE Office of Science Portfolio Analysis and Management System (PAMS)

Many functions for grants and cooperative agreements with the DOE Office of Science are performed in the Portfolio Analysis and Management System (PAMS), which is available at https://pamspublic.science.energy.gov.

Preapplications and letters of intent are submitted through PAMS. Formal grant applications are submitted through grants.gov, which will transfer the application into PAMS. This solicitation is available through grants.gov, fedconnect.net, and PAMS. You will receive various notifications from PAMS during the application receipt and review process. Additional functionalities will be added to PAMS in the near future.

You must register in PAMS to submit a pre-application or a letter of intent.

To access PAMS, you may use Internet Explorer, Firefox, Google Chrome, or Safari browsers.

Registering to PAMS is a two-step process; once you create an individual account, you must associate yourself with ("register to") your institution. Detailed steps are listed below.

Create PAMS Account:
- To register, click the "Create New PAMS Account" link on the website https://pamspublic.science.energy.gov/.
- Click the "No, I have never had an account" link and then the "Create Account" button.
- You will be prompted to enter your name and email address, create a username and password, and select a security question and answer. Once you have done this, click the "Save and Continue" button.
- On the next page, enter the required information (at least one phone number and your mailing address) and any optional information you wish to provide (e.g., FAX number, website, mailstop code, additional email addresses or phone numbers, Division/Department). Click the "Create Account" button.
- Read the user agreement and click the "Accept" button to indicate that you understand your responsibilities and agree to comply with the rules of behavior for PAMS.
- PAMS will take you the "Having Trouble Logging In?" page.

Register to Your Institution:
- Click the link labeled "Option 2: I know my institution and I am here to register to the institution." (Note: If you previously created a PAMS account but did not register to an institution at that time, you must click the Institutions tab and click the "Register to Institution" link.)
- PAMS will take you to the "Register to Institution" page.
- Type a word or phrase from your institution name in the field labeled, "Institution Name like," choose the radio button next to the item that best describes your role in the system, and click the "Search" button. (Hint: If your institution has an acronym, such as ANL for Argonne National Laboratory or UCLA for the Regents of the University of California, Los Angeles, you may search for the acronym under "Institution Name like." Many institutions with acronyms are listed in PAMS with their acronyms in parentheses after their names.)
- Find your institution in the list that is returned by the search and click the "Actions" link in the Options column next to the institution name to obtain a dropdown list. Select "Add me to this institution" from the dropdown. PAMS will take you to the "Institutions – List" page.
- If you do not see your institution in the initial search results, you can search again by clicking the "Cancel" button, clicking the Option 2 link, and repeating the search.
- If, after searching, you think your institution is not currently in the database, click the "Cannot Find My Institution" button and enter the requested institution information into PAMS. Click the "Create Institution" button. PAMS will add the institution to the system, associate your profile with the new institution, and return you to the "Institutions – List" page when you are finished.

For help with PAMS, click the "External User Guide" link on the PAMS website, https://pamspublic.science.energy.gov/. You may also contact the PAMS Help Desk, which can be reached Monday through Friday, 9AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free) or (301) 903-9610, Email: sc.pams-helpdesk@science.doe.gov. All submission and inquiries about this Funding Opportunity Announcement (FOA) should reference **DE-FOA-0000883.**

Questions

Questions relating to the registration process, **system requirements, or how an application form works** must be directed to Grants.gov at 1-800-518-4726 or **support@grants.gov**.

Application Preparation and Submission

Applicants must download the application package, application forms and instructions, from Grants.gov at http://www.grants.gov/
(Additional instructions are provided in Section IV A of this FOA.)

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 SAM 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.

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).

Table of Contents

Section I – FUNDING OPPORTUNITY DESCRIPTION

GENERAL INQUIRIES ABOUT THIS FOA SHOULD BE DIRECTED TO:

Technical/Scientific Program Contact:
Dr. Thomas Ndousse-Fetter
Office of Advanced Scientific Computing Research
Phone: 301-335-4876
Email: Thomas.ndousse-Fetter@science.doe.gov

STATUTORY AUTHORITY

Public Law 95-91, US Department of Energy Organization Act
Public Law 109-58, Energy Policy Act of 2005

APPLICABLE REGULATIONS

U.S. Department of Energy Financial Assistance Rules, codified at 10 CFR 600
U.S. Department of Energy, Office of Science Financial Assistance Program Rule, codified at 10 CFR 605

SUMMARY

The Office of Advanced Scientific Computing Research (ASCR) in the Office of Science (SC) at the U.S. Department of Energy (DOE) hereby announces its interest in receiving grant applications to address the networking challenges of scientific Big Data across the Office of Science. DOE's scientific instruments, observatories, and supercomputers are increasingly generating complex heterogeneous massive data sets that are revolutionizing the conduct of science and overwhelming scientific computing and network infrastructures. In particular, these massive data sets are introducing distributed data management challenges that cannot be adequately addressed with current state-of-the-art Internet-based networking and commercial storage system management technologies. This FOA has two main objectives: 1) to conduct research on terabit data-aware network technologies and storage system management to address scientific Big Data infrastructure challenges, and 2) to explore innovative theoretical frameworks, network-aware data management concepts, and storage system performance optimization models that will improve our understanding of how complex heterogeneous massive data sets should be organized, stored, and shared.

As major computational science efforts increasingly depend on the manipulation of complex data sets, scientists face considerable hardship and waste of productive time in locating, accessing, and moving complex data sets in batch-oriented or streaming modes over current networks. Incremental improvements of the current Internet's best-effort Transmission Control Protocol/Internet protocol (TCP/IP) networking technologies have so far met the needs of some distributed High-Performance Computing (HPC) applications. However, this incremental approach may not produce networks with adequate capabilities to support emerging network-intensive science applications that involve the movement of massive data sets. Moving large data

sets over Wide Area Networks (WANs) will introduce complex network traffic patterns and distributed data management that will require advanced network capabilities that far outstrip what is available in most commercial networks today. Grant applications must therefore focus on those data-aware network technologies that can deliver 100x end-to-end throughputs to distributed data-intensive science applications.

A companion Program Announcement to DOE Laboratories (LAB 13-883) will be posted on the SC Grants and Contracts web site at: http://www.science.doe.gov/grants

SUPPLEMENTARY INFORMATION

Scientists today encounter many challenges in conducting research that involves large shared data sets. Many of the challenges have to do with how massive data sets generated by complex instruments and supercomputers are captured, archived, searched, and shared among geographically distributed research teams. Other challenges are due to the performance limitations of conventional distributed data management systems and associated network infrastructure bottlenecks that hinder the timely and reliable distribution of large data sets. End systems such as storage systems, file systems, metadata, and Data Transfer Nodes (DTN) continue to be challenging performance bottlenecks in high-speed data movement. The performance of storage systems has not kept up with that of other computing hardware and advanced optical network components. This introduces a major throughput mismatch between end-system and backbone networks that impact end-to-end throughputs. Additionally, current distributed data movement systems, optimized for batch-oriented data transfers, lack the capability to meet the diverse needs of emerging data-centric applications with real-time constraints. For example, support for online data exploration, remote I/O operation, remote visualization, and on-demand data movement at execution time is lacking in current systems. In particular, given that online data explorations are emerging as a new modality of scientific inquiry around scientific instruments such as light sources, the need for such capability will be critical in the next few years.

Applicants interested in addressing the above challenges should focus on scaling existing network technologies or developing radically new ones. The common thread that should run across all proposed solutions is data awareness and 100x network throughputs for data movement applications. The outcomes of successful research awards funded under this FOA are anticipated to be technologies that could be seamlessly integrated into DOE's production network and storage system infrastructures or theoretical concepts, methodologies, and optimization models that improve our understanding of organizing and sharing complex scientific massive data sets. The above challenges are summarized into two main categories corresponding to the following two major technical areas of research:

a) **Terabit data-aware network technologies** –The focus of this topic is on innovative network technologies optimized for automated sharing of complex data over ultra-high-speed optical networks. The proposed technologies should be able to deliver end-to-end throughputs several orders of magnitude greater than what is possible today promptly and reliably. Despite the abundant bandwidth in the backbone networks made possible by Dense Wave Division (DWDM) Multiplexing) optical communication technology, scientists continue to

face insurmountable challenges in transferring massive data promptly. The low throughput of end-to-end distributed data-intensive applications can be attributed to the pervasive use of best-effort TCP/IP network technologies, legacy ftp-based file transfer software, and low-speed network security systems that do not fully exploit parallelism in emerging hardware and software subsystems. Beyond the throughput issues, scientists need intelligent data-aware network middleware services embedded in applications that facilitate the automated discovery, query, and transfer of complex data sets at execution time or offline. The objective of awards in this topic is to develop scalable and automated network solutions to address the above issues. Applicants interested in this topic are encouraged to address these challenges with innovative and scalable network protocols, intelligent network traffic management schemes, and associated network-aware data management services, while exploiting multicore parallelism to scale the resulting software implementations whenever possible. These include but are not limited to (a) scalable and composable transport network protocols that can be dynamically configured to handle different modes of data transfer modes, including real-time, batch, and streaming traffic over different types of transport networks (dynamic circuits, shared networks) at speeds several orders of magnitude (100x) greater than what is possible with existing ones; (b) automated high-speed data movement software that dynamically adapts to a wide variety of transport protocols (TCP, UDP-based Data Transfer), RoCE (RDMA over Converge Ethernet), IB (InfiniBand), etc.); (c) intelligent traffic management schemes that leverage the emerging Software-Defined Networking (SDN) concepts to simplify the management of complex end-to-end network flows resulting from large data movements; d) intelligent high-speed network security technologies for Science De-Militarized Zone (DNZ) such as smart high-speed firewalls, dynamic circuit authentication mechanisms; and e) data movement workflows that simplify or automate the sharing of complex data sets for scientists.

b) **Network-Aware Storage and File System Middleware –** The focus of this topic is on improving the performance and reliability of end systems (storage systems, file systems, metadata, disk-to-network I/O, and data transfer nodes) involving high-speed data transfers. The volume of data anticipated in the next decade will drastically increase the complexity of these end systems, making them a source of potential data movement bottlenecks. In particular, given that the performance of disk systems has not kept up with advances in many areas of computing, improving the performance of end systems will require innovative network-aware storage management middleware to bridge the performance gap between low-speed disk-to-network I/O subsystems and ultra-high-speed optical network links. It has been shown that data movement applications cannot be achieved at line rates over 100 Gbps optical links because end systems cannot source and ingest data at these rates. In many data movement scenarios, the data transfer nodes are not provisioned to provide QoS services that take full advantage of dynamic circuit reservation and on-demand bandwidth services available in backbone networks such as the ESnet's OSCARS bandwidth reservation system. These and other related end-system issues highlight the challenges that must be addressed to improve the throughput of end-to-end data transfers. Applicants interested in this topic are encouraged to propose innovative frameworks, methodologies, protocols, and optimization models that significantly improve the throughput of end systems in distributed data-centric environments. Potential areas of interest include but are not limited to (a) storage resource brokers and co-schedulers to coordinate end-to-end data movement resources, (b) end-system

QOS mechanisms that are linked to WAN provisioning schemes such as ESnet's OSCARS, (c) scalable parallel file systems and metadata extensions to improve disk-to-network I/O performance, and d) network-aware storage system virtualization capabilities.

Applications may focus on other related high-performance networks and storage systems; however, they must address the two main elements of this FOA, namely 100x network capability and scientific Big Data awareness. Research themes specific to a single application or limited to a single laboratory are strongly discouraged. All proposed solutions must be generic enough to support a wide range of applications in different laboratories or science environments.

References

[01] DOE ASCR 2011 Scientific Collaborations for Extreme-Scale Science (SCESS) Workshop, December 6-7, 2011, Gaithersburg Marriott Washington Center, Gaithersburg, MD - SCESS Workshop (Report in PDF)
[02] Terabits Networks for Extreme-Scale Science, February 16-17, 20011, Rockville Hotel & Executive Meeting Center, MD – (Report in PDF)
[03] Data and Communications in Basic Energy Sciences: Creating a Pathway for Scientific Discovery Workshop, October 24-25, 2011, Bethesda Marriott Hotel and Conference Center, Bethesda, MD – PDF Report
[04] DOE Exascale Workshop on Data Analysis, Management, and Visualization Workshop, February 22-23, 2011, Hilton Hotel, Houston, TX – PDF Report
[05] Fusion Energy Network Requirements Workshop, December 2011 - Final Report, ESnet Network Requirements Workshop, December 8, 2011, (Report.pdf)
[06] Nuclear Physics Network Requirements Workshop, August 2011 - Report.pdf
[07] Cross-cutting Technologies for computing at the Exascale Workshop, February 2-4, 2010, Washington DC – PDF Report
[08] Science Driven R&D Requirements for ESnet Workshop, April 23-24, 2007 - Report (pdf)
[09] Networking Requirements Workshop- Office of Biological and Environmental Research, April 29-30, 2010- Report (pdf)
[10] Networking Requirements Workshop- Office of Basic Energy Sciences - Report (pdf)
[11] ESnet On-Demand Secure Circuits and Advanced Reservation Systems Federation Networking, Report (ppt)
[13] A. Shoshani et al, Scientific Data management, CRC Press, pp. 773-180, 2009

ADDITIONAL REQUIREMENTS:

Annual Meeting
If a project is funded, beginning in the first year of funding, one or more project participants will be required to attend an annual investigator meeting, generally held in the Washington DC area. Reasonable travel expenses may be included as part of the project budget.

Collaboration
Collaborative research projects with other institutions such as universities, industry, non- profit organizations, and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories are strongly encouraged but not required. Collaborative

applications submitted from different institutions should clearly indicate they are part of a proposed collaboration. All collaborative applications must use the same title, abstract and technical narrative. In addition, such applications must describe the work and the associated budget for the research effort to be performed under the leadership of the principal investigator in each participating institution. The first page of collaborative applications should contain the project title followed by a tabular list of the researcher names, institutions, annual budget, and role as lead PI or co-PI of each participant. These collaborative applications should all have the same title as the lead institution. Each collaborating institution submitting an application must use the same title in Block 11 of the SF 424 (R&R) form.

Our intent is to create from the various applications associated with a collaborative group one document for merit review that consists of the common, identical application materials combined with a set of detailed budgets from the partner institutions. Thus, it is very important that every application in the collaborative group be exactly identical (including the title) with the exception of the budget and budget justification pages.

Collaborative proposals from DOE National Laboratories should be submitted following the above rules in response to the companion announcement, LAB 13-883.

Section II – AWARD INFORMATION

A. TYPE OF AWARD INSTRUMENT

DOE anticipates awarding cooperative agreements under this FOA.

B. ESTIMATED FUNDING

It is anticipated that up to $3,000,000 per year will be available under this FOA and DOE National Laboratory Announcement LAB 13-883, contingent on satisfactory peer review and the availability of appropriated funds. Applicants should request project support for up to 3 years, with out-year support contingent on the availability of appropriated funds, progress of the research, and programmatic needs. Awards are expected to begin in fiscal year 2013, which ends on September 30, 2013.

DOE is under no obligation to pay for any costs associated with the preparation or submission of an application. DOE reserves the right to fund, in whole or in part, any, all, or none of the applications submitted in response to this FOA.

C. MAXIMUM AND MINIMUM AWARD SIZE

Ceiling
The maximum funding level for single investigator/single institution is $200,000 per year and $600,000 per year for multi-investigator/institution awards (multi-investigators must come from different institutions). **Applications exceeding these funding limits will not be reviewed.**

Floor
None

D. EXPECTED NUMBER OF AWARDS

DOE anticipates making approximately 10 single-investigator awards and 1-2 multi-institution/multi-investigator awards under this FOA and DOE National Laboratory Announcement LAB 13-883. The number of awards will depend on the number of meritorious applications and the availability of appropriated funds.

E. ANTICIPATED AWARD SIZE

The anticipated maximum award size over 3 years is $600,000 for single investigator projects and $1,800,000 for multi-investigators/institutions. Typical budgets per year will be $200,000 for three years for single investigators and $600,000 for multi-investigator/multi-institution projects.

Applications exceeding these funding limits will not be reviewed.

F. PERIOD OF PERFORMANCE

Research Awards are expected to be made for a period of three years. Out-year funding will depend upon suitable progress and the availability of appropriated funds.

G. TYPE OF APPLICATION

DOE will accept only new applications under this FOA.

Section III – ELIGIBILITY INFORMATION

A. ELIGIBLE APPLICANTS

All types of applicants are eligible to apply, except 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.

B. COST SHARING

Cost sharing is not required.

C. ELIGIBLE INDIVIDUALS

Individuals with the skills, knowledge, and resources necessary to carry out the proposed research as a Program Director/Principal Investigator are invited to work with their organizations to develop an application for assistance. Individuals from underrepresented groups as well as individuals with disabilities are always encouraged to apply for assistance.

Section 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 number (81.049) and/or the funding opportunity number (DE-FOA-0000883) shown on the cover of this FOA and then follow the prompts to download the application package.

Applications submitted through www.FedConnect.net will not be accepted.

B. LETTER OF INTENT AND PRE-APPLICATION

N/A

C. CONTENT AND APPLICATION FORMS

You must complete the mandatory forms and any applicable optional forms (e.g., Disclosure of Lobbying Activities (SF-LLL)) 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.

LETTERS

Do not submit general letters of support as these are not used in making funding decisions and can interfere with the selection of peer reviewers.

Optional letters of collaboration for unfunded or funded collaborations may be placed in Appendix 6 (Other Attachments). Letters of collaboration should state the intention to participate, but they should not be written as recommendation or endorsement letters, which are not allowed.

Each optional letter of collaboration may contain two and only two sentences and must use the following format:

Dear <Principal Investigator Name>:

If your application entitled, "<Application Name>," is selected for funding under the DOE Office of Advanced Scientific Computing Research Big Data-Aware Terabits Networking announcement, it is my intent to collaborate in this research by <Complete Sentence With a Very Short Description of What the Collaborator Offers to Do or Provide>. Thank you for the opportunity to participate.

Sincerely,

<Collaborator's Name and Signature Block>

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. The list of certifications and assurances referenced in Field 17 is available on the DOE Financial Assistance Forms Page at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms under Certifications and Assurances.

CERTIFICATIONS

By submitting an application in response to this FOA the Applicant certifies that:
- It is **not** a corporation that has been convicted (or had an officer or agent of such corporation acting on behalf of the corporation convicted) of a felony criminal violation under any Federal law within the preceding 24 months,
- It is **not** a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability,
- If the Applicant's financial assistance application is chosen for award and the award is in excess of $1,000,000, the applicant will, by the end of the fiscal year, upgrade the efficiency of their facilities by replacing any lighting that does not meet or exceed the energy efficiency standard for incandescent light bulbs set forth in Section 325 of the Energy Policy and Conservation Act (42 USC 6295).

PUBLIC POLICY REQUIREMENTS

The applicant further certifies its compliance with the following public policy requirements:

- Animal Welfare as required by the Animal Welfare Act of 7 USC 2131 et seq. and regulated by 10 CFR 600 and 10 CFR 602
- "Blocking Property and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism," EO 13224 of September 23, 2001, published at 66 FR 49079
- The Buy American Act of 1933, codified at 41 USC 10 et seq.

- The Cargo Preference Act, codified at 46 USC 55305 and regulated by 46 CFR 381.7
- Civil Rights Protections including but not limited to the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, the Rehabilitation Act of 1973, and the Age Discrimination Act of 1975, all of which are regulated by 10 CFR 1040 and 10 CFR 600
- "Creating a National Women's Business Enterprise Policy and Prescribing Arrangements for Developing, Coordinating and Implementing a National Program for Women's Business Enterprise," EO 12138 of May 18, 1979, published at 44 FR 29637
- Debarment and Suspension, as regulated at 10 CFR 600, 2 CFR 180 and 2 CFR 901
- The Drug-Free Workplace Act of 1988 (41 USC 701) as regulated by 10 CFR 607
- Environmental protection, including but not limited to
  - The Clean Air Act, codified at 42 USC 7401 et seq. and regulated by 10 CFR 600
  - The Clean Water Act, codified at 33 USC 1251 et seq. and regulated by 10 CFR 600
  - The National Environmental Policy Act of 1969, codified at 42 USC 4321 et seq. and regulated by 10 CFR 600
- The False Claims Acts (civil at 31 USC 3729 et seq. and criminal at 18 USC 287 and 18 USC 1001) regulated by 10 CFR 1013
- The Federal Funding Accountability and Transparency Act (Public Law 109-282) as regulated by 2 CFR 170
- The Fly America Act, codified at 49 USC 40118, which generally requires that travel supported by Federal funds be conducted on US-flag carriers
- The Hatch Act of 1939, codified at 5 USC 1501 et seq. and regulated by 10 CFR 600
- Health and Safety Regulations including but not limited to
  - OSHA's guidance at 29 CFR 1910
  - NRC safety regulations at 10 CFR 20
  - Sections of the Public Health Service Act, codified at 42 USC 300f
  - New Drug rules of 10 CFR 35.7
  - The Drug Abuse Office and Treatment Act, codified at 42 USC 290dd
  - Safe handling of etiological agents, as regulated at 49 CFR 171.1
  - Safe handling of recombinant DNA, as regulated at 10 CFR 600.3 and 10 CFR 602.10(b)
- Human Research Subjects Protection as regulated by 10 CFR 745 and 10 CFR 600
- The Lead-Based Paint Poisoning Prevention Act, codified at 42 USC 4831 and regulated by 10 CFR 600
- The Lobbying Disclosure Act of 1995, codified at 2 USC 1601 et seq.
- Lobbying Prohibitions of 31 USC 1352 and regulated by 10 CFR 601
- Metric System use as encouraged by EO 12770 of July 25, 1991
- Non-delinquency on Federal Debt as required by the Federal Debt Collection Procedures Act of 1990, codified at 28 USC 3201
- The Paperwork Reduction Act, codified at 44 USC 3501 et seq. and regulated by 10 CFR 600
- Prohibition on benefiting Members of Congress as required by 41 USC 6306
- Protection of Significant pre-historical, historical, or archeological data as required by the National Historic Preservation Act of 1966, codified at 16 USC 470f, the Archeological and Historic Preservation Act of 1966, codified at 16 USC 469 et seq., EO 11593, published at 36 FR 8921 (May 13, 1971), and Protection of Historic and Cultural Properties, 36 CFR 800, all of which are regulated by 10 CFR 600

- Seat Belt Use, as required by EO 13043 of April 16, 1997
- Select agent registration as regulated by 7 CFR 331, 9 CFR 121 and 42 CFR 73
- Text Messaging While Driving, as required by EO 13513 of October 1, 2009, published at 74 FR 51225
- Trafficking in Persons, as required by the Trafficking Victims Protection Act of 2000 (codified at 22 USC 7104) and regulated by 2 CFR 175

2. Research and Related Other Project Information

Complete questions 1 through 6 and attach files. The files must comply with the following instructions:

PROJECT SUMMARY/ABSTRACT (FIELD 7 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, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and major participants (for collaborative projects). 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."

The abstract may be used to prepare publicly accessible reports about DOE-supported research.

DOE COVER PAGE
(PART OF PROJECT NARRATIVE attached to FIELD 8 on the form)

The application narrative should begin with a cover page that will not count toward the project narrative page limitation. The cover page must include the following items:

- The project title
- Applicant/Institution:
- Street Address/City/State/Zip:
- Postal Address:
- Lead PI name, telephone number, email:
- Administrative Point of Contact name, telephone number, email:
- Funding Opportunity FOA Number: DE-FOA-0000883
- DOE/Office of Science Program Office:
- DOE/Office of Science Program Office Technical Contact:
- DOE Award Number (if Renewal Application):
- Research area or areas (as identified in Part I) :

If the project is a collaboration, provide the following information on a separate page as a supplement to the cover page.

- List all collaborating institutions by name with each institution's principal investigator on the same line.
- Indicate the lead PI who will be the point of contact and coordinator for the combined research activity.
- Include a table modeled on the following chart providing summary budget information from all collaborating institutions. Provide the total costs of the budget request in each year for each institution and totals for all rows and columns.

Collaborative Application Information						
	Names	**Institution**	**Year 1 Budget**	**Year 2 Budget**	**Year 3 Budget**	**Total Budget**
Lead PI						
Co-PI						
Co-PI						
Co-PI						

Example budget table ($ in thousands)

* Note that collaborating applications must be submitted separately.

PROJECT NARRATIVE (FIELD 8 ON THE FORM)

The project narrative **must not exceed 25 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). The font must not be smaller than 11 point. Merit reviewers will only consider the number of pages specified in the first sentence of this paragraph. Applications exceeding the page limit will be rejected without review.

Do not include any Internet addresses (URLs) that provide supplementary or additional information that constitutes a part of the application. Using Internet sites in an attempt to avoid page limits will fail: the content of those sites will not be reviewed. References posted to an Internet-based archive or publications are permitted in a list of references. See Part VIII.D for instructions on how to mark proprietary application information. To attach a Project Narrative, click "Add Attachment."

Background/Introduction: Explanation of the importance and relevance of the proposed work as well as a review of the relevant literature.

Proposed Research and Methods: Identify the hypotheses to be tested (if any) and details of the methods to be used including the integration of experiments with theoretical and computational research efforts.

Timetable of Activities: Timeline for all major activities including milestones and deliverables.

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

The Project Narrative comprises the research plan for the project. It should contain enough background material in the Introduction, including review of the relevant literature, to demonstrate sufficient knowledge of the state of the science. The major part of the narrative should be devoted to a description and justification of the proposed project, including details of the method 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.

It is important that the 25-page project narrative section provide a complete description of the proposed work, because reviewers are not obliged to read the Appendices. Applications exceeding these page limits may be rejected without review or the first 25 pages may be reviewed without regard to the remainder. The page count of 25 does not include the Cover Page and Budget Pages, the Title Page, the biographical material and publication information, or any Appendices.

APPENDIX 1: BIOGRAPHICAL SKETCH(ES)

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 (curriculum vitae) 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.

Identification of Potential Conflicts of Interest or Bias in Selection of Reviewers: Provide the following information in this section:

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 48 months preceding the submission of this application. For publications or collaborations with more than 10 authors or participants, only list those individuals in the core group with whom the Principal Investigator interacted on a regular basis while the research was being done. 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.

APPENDIX 2: CURRENT AND PENDING SUPPORT

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. Concurrent submission of an application to other organizations for simultaneous consideration will not prejudice its review.
- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

APPENDIX 3: BIBLIOGRAPHY & REFERENCES CITED

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. For research areas where there are routinely more than ten coauthors of archival publications, you may use an abbreviated style such as the Physical Review Letters (PRL) convention for citations (listing only the first author). For example, your paper may be listed as, "A Really Important New Result," A. Aardvark et. al. (MONGO Collaboration), PRL 999. You may also use this convention in the application bibliography. 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. Provide the Bibliography and References Cited information as an appendix to your project narrative.
- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

APPENDIX 4: FACILITIES & OTHER RESOURCES

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. For proposed investigations requiring access to experimental user facilities maintained by institutions other than the applicant, please provide a document from the facility manager confirming that the researchers will have access to the facility. Please provide the Facility and Other Resource information as an appendix to your project narrative.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

APPENDIX 5: EQUIPMENT

List major items of equipment already available for this project and, if appropriate identify location and pertinent capabilities. Provide the Equipment information as an appendix to your project narrative.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

APPENDIX 6: OTHER ATTACHMENT

If you need to elaborate on your responses to questions 1-6 on the "Other Project Information" document, please provide the Other Attachment information as an appendix to your project narrative. Information not easily accessible to a reviewer may be included in this appendix, but do not use this appendix to circumvent the page limitations of the application. Reviewers are not required to consider information in an appendix, and reviewers may not have time to read extensive appendix materials with the same care they would use with the application proper.

The appendix may contain the following items: up to five publications, manuscripts accepted for publication, abstracts, patents, or other printed materials directly relevant to this project, but not generally available to the scientific community; and letters from investigators at other institutions stating their agreement to participate in the project (do not include letters of endorsement of the project).

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.
- **Do not attach any of the requested appendices described above as files for fields 9, 10, 11, and 12.**
- **Follow the above instructions to include the information as appendices to the project narrative file.**
- **These appendices will not count toward the project narrative's 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 FOA (See PART IV, G).

Funds will not be awarded for international travel: do not request these costs in the budget.

Budgets must conform to the maximum permissible request identified in Section II.

Budgets should include a request for reasonable travel costs to a **mandatory** annual investigator meeting. The meetings will typically be held in the Washington, DC, area.

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; materials 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. R&R Subaward Budget Attachment(s) Form

Budgets for Subawardees, other than DOE FFRDC Contractors: You must provide a separate cumulative R&R budget for each subawardee that is expected to perform work estimated to be more than $100,000 or 50 percent of the total work effort (whichever is less). If you are selected for award, you must submit a multi-year budget for each of these subawardees (See Section IV.D for submission of Subawardees' multi-year budgets). Download the R&R Budget Attachment from the R&R SUBAWARD BUDGET ATTACHMENT(S) FORM and e-mail it to each subawardee that is required to submit a separate budget. After the subawardee has e-mailed its completed budget back to you, attach it to one of the blocks provided on the form. Use up to 10 letters of the subawardee's name (plus.xfd) as the file name (e.g., ucla.xfd or energyres.xfd).

5. Project/Performance Site Location(s)

Indicate the primary site where the work will be performed. If a portion of the project will be performed at any other site(s), identify the site location(s) in the blocks provided.

Note that the Project/Performance Site Congressional District is entered in the format of the 2 digit state code followed by a dash and a 3 digit Congressional district code, for example VA-001. Hover over this field for additional instructions.

Use the Next Site button to expand the form to add additional Project/Performance Site Locations.

6. Summary of Required Forms/Files

Your application must include the following items:

Name of Document	Format	Attach to
SF 424 (R&R)	Form	N/A
RESEARCH AND RELATED Other Project Information	Form	N/A
Project Summary/Abstract	PDF	Field 7
Project Narrative, including required appendices	PDF	Field 8
RESEARCH & RELATED BUDGET	Form	N/A
Budget Justification	PDF	Field K
PROJECT/PERFORMANCE SITE LOCATION(S)	Form	N/A
SF-LLL Disclosure of Lobbying Activities, if applicable	Form	N/A

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
N/A

2. Pre-application Due Date
N/A

3. Application Due Date
April 19, 2013, 2013 at 11:59 PM Eastern Time

You are encouraged to transmit your application well before the deadline. Applications received after the deadline will not be reviewed or considered for award.

4. Late Submissions

Late submissions will not be accepted under this Funding Opportunity Announcement. However, delays in submitting letters of intent, preproposals, and proposals may be unavoidable. DOE has accepted late submissions when applicants have been unable to make timely submissions because of technological disruptions or significant natural disasters. Other circumstances do not justify late submissions. Unacceptable justifications include the following:

- Failure to begin submission process early enough.
- Failure to provide sufficient time to complete the process.
- Failure to understand the submission process.
- Failure to understand the deadlines for submissions.
- Failure to satisfy prerequisite registrations.
- Unavailability of administrative personnel.

F. INTERGOVERNMENTAL REVIEW

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

G. FUNDING RESTRICTIONS

Funds provided for awards under this FOA may not be used to support international travel. Funding for all awards and future budget periods are contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority.

Cost Principles: Costs must be allowable, allocable and reasonable in accordance with the applicable Federal cost principles referenced in 10 CFR 600. The cost principles for commercial organization are in FAR Part 31.

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 600 and 2 CFR 215. 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. 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.

2. Registration Process

ONE-TIME REGISTRATION PROCESS

You must complete the one-time registration process (all steps) before you can submit your first application through Grants.gov (See http://www.grants.gov/applicants/get_registered.jsp). We recommend that you start this process at least six weeks before the application due date. It may take 44 days or more to complete the entire process. Use the Grants.gov Organizational Registration Checklists at http://www.grants.gov/assets/OrganizationRegCheck.pdf to guide you through the process. During the SAM 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 four 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. The titles of the four 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

Section 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) to determine that (1) the applicant is eligible for the award; (2) the information required by the FOA has been submitted; (3) all mandatory requirements are satisfied; (4) the proposed project is responsive to the objectives of the funding opportunity announcement, and (5) the proposed project is not duplicative of programmatic work. Applications that fail to pass the initial review will not be forwarded for merit review and will be eliminated from further consideration.

Applications requesting more funding than permitted in Section II, Part E (see below) will fail the initial review:

Type of Application	Maximum Total Budget	Maximum Annual Budget
Single investigator	$600,000	$200,000
Multi-investigator / multi-institution	$1,800,000	$600,000

Applications requesting funding for international travel will fail the initial review.

2. Merit Review Criteria

Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following criteria, listed in descending order of importance as found in 10 CFR 605.10 (d), the Office of Science Financial Assistance Program Rule.

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

The evaluation process will include program policy factors such as the relevance of the proposed research to the terms of the FOA and the agency's 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.

The questions below will be provided to the merit reviewers to elaborate the criteria established by regulation:

SCIENTIFIC AND/OR TECHNICAL MERIT OF THE PROPOSED RESEARCH

- Comment on the scientific objectives of the proposed research in terms of an achievable plan.
- Comment on the competence of the investigators, the institutionally available infrastructure, and proposed resources for achieving this plan.
- Comment on the likelihood that the specific project will lead to fundamental advances or discovery in its field within the proposed project period.
- Comment on whether or not the proposed research will significantly advance the state-of-the-art in operating systems and runtime software for Exascale computing.
- Comment on how comprehensive the proposed solution is and how well it addresses all identified challenges in this area.
- Comment on how well the proposed research deals with a dynamic environment resulting from adaptive hardware and software mechanisms as well as from transient faults.
- What is the likelihood that the applicant can overcome the key challenges and, as warranted, shift research directions in response to promising advances in basic research?
- Assess strengths and weaknesses of each high-impact, high-risk research component proposed.
- Comment on the required plans listed in the Summary of Proposal Requirements section.

APPROPRIATENESS OF THE PROPOSED METHOD OR APPROACH

- How logical and feasible are the proposed research approaches?
- Does the proposed research employ innovative concepts or methods?
- Are the conceptual framework, methods, and analyses well justified, adequately developed, and likely to lead to scientifically valid conclusions?
- To what extent does the applicant recognize significant potential problems and consider alternative strategies?
- Does the proposed research leverage the nominal architecture? If no, comment on the presented justifications for creating a new one.
- Comment on the effectiveness of the proposed research effort in addressing the scientific issues and/or objectives of the proposed research.
- Provide separate assessment on the method and approach for each high impact, high risk research component proposed.
- Are details of the proposed OS/R prototype clearly presented?
- Comment on the proposed coordinating activities with X-Stack projects, Co-Design Centers, and other ASCR-funded projects.
- Does the research plan contain appropriate performance metrics that will allow progress and contributions to be measured?
- If this is a collaborative proposal, does it include a management plan that addresses the organization, communications, and coordination of the collaborating teams? Does it include mitigation strategies for foreseeable risks and explain how the project will have sufficient flexibility to adapt to changing priorities, challenges, and resources

COMPETENCY OF APPLICANT'S PERSONNEL AND ADEQUACY OF PROPOSED RESOURCES

- How well qualified are the applicant's personnel to carry out the proposed research?
- Comment on the applicants proven record of success in research and development in the disciplines needed for the proposed work.
- Comment on the applicants' proven record of delivering OS/R results for advanced computational science research.
- Are the roles and intellectual contributions of the Principal Investigator(s), and each senior/key personnel adequately described? Do you consider the contributions of each senior/key personnel of significant value for the project?
- Comment on the applicant's research environment and resources.
- Does the proposed work take advantage of unique facilities and capabilities and/or make good use of collaborative arrangements?
- How well versed are applicants on legacy scientific codes and OS/R issues?
- How well connected are applicants to the exascale ecosystem?
- Do applicants have sufficient connections with the vendor community in order to influence their support for research artifacts generated by the proposed work?

REASONABLENESS AND APPROPRIATENESS OF THE PROPOSED BUDGET

- Are the proposed budget and staffing levels adequate to carry out the proposed research?
- Is the budget as lean as it can be to deliver the promised results? Are budget overheads minimized?
- Does the requested budget support the applicant's specified management structure in a meaningful way?
- Is travel budget appropriate? Are video conferencing technologies proposed to reduce the travel budget?
- Is the requested budget appropriate to support the evaluation plan?

OTHER FACTORS

Merit reviewers will also be asked these questions:

- If applicable, please comment on the educational benefits of the proposed activity.
- What are the overall strengths and weaknesses of the proposal?

B. REVIEW AND SELECTION PROCESS

1. Merit Review

Applications will be subjected to a formal merit review and will be evaluated based on the criteria codified at 10 CFR 605.10(d) in accordance with the guidance provided in the "Office of Science Merit Review System for Financial Assistance," which is available at: http://www.sc.doe.gov/grants/merit.asp.

2. Selection

The Selection Officials will consider merit review recommendations as well as program policy factors, such as ensuring a programmatically appropriate balance within the program areas, and quality of previous performance. Selection of applications for award will be based upon the findings of the technical evaluations, the importance and relevance of the proposed research to the SC mission, and funding availability.

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 600 and 10 CFR 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

It is anticipated that the award selection will be completed by June 15, 2013. It is expected that awards will be made in Fiscal Year 2013.

Section VI - AWARD ADMINISTRATION INFORMATION

A. AWARD NOTICES

1. Notice of Selection

Selected Applicants Notification: 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.)

Non-selected Notification: 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

An Assistance Agreement 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 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 600 and 10 CFR 605. Grants and cooperative agreements made to universities, non-profits and other entities subject to 2 CFR 215 are subject to the Research Terms and Conditions located on the National Science Foundation web site at http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp .

DUNS AND SAM REQUIREMENTS

Additional administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR 25 (See: http://www.ecfr.gov). Prime awardees must keep their data at the System for Award Management (SAM) current at http://www.sam.gov. SAM is the government-wide system that replaced the Central Contractor Registry (CCR). If you had an active registration in the CCR, you have an active registration in SAM. Subawardees at all tiers must obtain DUNS numbers and provide the DUNS to the prime awardee before the subaward can be issued.

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR 170. (See: http://www.ecfr.gov). Prime awardees must register with the new FSRS database and report the required data on their first tier subawardees. Prime awardees must report the executive compensation for their own executives as part of their registration profile in the System for Award Management (SAM).

PROHIBITION ON LOBBYING ACTIVITY

By accepting funds under this award, you agree that none of the funds obligated on the award shall be expended, directly or indirectly, to influence congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 USC 1913. This restriction is in addition to those prescribed elsewhere in statute and regulation.

2. Terms and Conditions

The DOE Special Terms and Conditions for Use in Most Grants and Cooperative Agreements are located at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms under Award Terms.

The standard DOE financial assistance intellectual property provisions applicable to various types of recipients are located at:
http://energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards

3. National Policy Assurances

The National Policy Assurances To Be Incorporated As Award Terms are located at http://www.nsf.gov/bfa/dias/policy/rtc/appc.pdf and at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms under Award Terms.

4. Statement of Substantial Involvement

Cooperative agreements may be awarded under this FOA. The DOE Contract Specialist and DOE Project Officer will negotiate a Statement of Substantial Involvement prior to award.

C. REPORTING

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. The checklist is available at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms under Award Forms.

<h1 style="text-align:center"><u>Section VII - QUESTIONS/AGENCY CONTACTS</u></h1>

A. QUESTIONS

Questions relating to the grants.gov 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. DOE cannot answer these questions.

Please only contact the grants.gov help desk for questions related to grants.gov.

For help with PAMS, click the "External User Guide" link on the PAMS website, https://pamspublic.science.energy.gov/. You may also contact the PAMS Help Desk, which can be reached Monday through Friday, 9AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free) or (301) 903-9610, Email: sc.pams-helpdesk@science.doe.gov. All submission and inquiries about this Funding Opportunity Announcement should reference **DE-FOA-0008883.**

Please contact the PAMS help desk for technological issues with the PAMS system.

Questions regarding the specific program areas and technical requirements may be directed to the technical contacts listed for each program within the FOA or below.

Please contact the program staff with all questions not directly related to the grants.gov or PAMS systems.

B. AGENCY CONTACTS

Grants.gov Customer Support	800-518-4726 (toll-free) support@grants.gov
PAMS Customer Support	855-818-1846 (toll-free) 301-903-9610 sc.pams-helpdesk@science.doe.gov
Program Manager Scientific Contact	Thomas D. Ndousse-Fetter Phone: 301-903-9960 Email: Thomas.Ndousse-Fetter@science.doe.gov

Section VIII - OTHER INFORMATION

A. MODIFICATIONS

Notices of any modifications to this FOA will be posted on Grants.gov and the FedConnect portal. You can receive an email when a modification or an FOA message is posted by registering with FedConnect as an interested party for this FOA. It is recommended that you register as soon after release of the FOA as possible to ensure you receive timely notice of any modifications or other FOAs. More information is available at http://www.fedconnect.net.

B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE

DOE reserves the right, without qualification, to reject any or all applications received in response to this FOA 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 USC 5908 provides that title to such inventions vests in the United States, except where 35 USC 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 FOA, 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, http://www.gc.doe.gov/documents/patwaivclau.pdf.

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.

I. AVAILABILITY OF FUNDS

Funds are not presently available for this award. The Government's obligation under this award is contingent upon the availability of appropriated funds from which payment for award purposes can be made. No legal liability on the part of the Government for any payment may arise until funds are made available to the Contracting Officer for this award and until the awardee receives notice of such availability, to be confirmed in writing by the Contracting Officer.