

**DEPARTMENT OF ENERGY  
OFFICE OF SCIENCE**

**BASIC ENERGY SCIENCES  
HIGH ENERGY PHYSICS  
NUCLEAR PHYSICS**



**DATA, ARTIFICIAL INTELLIGENCE, AND MACHINE LEARNING  
AT DOE SCIENTIFIC USER FACILITIES**

**DOE NATIONAL LABORATORY PROGRAM ANNOUNCEMENT NUMBER:  
LAB 20-2261**

**ANNOUNCEMENT TYPE: INITIAL**

<b>Announcement Issue Date:</b>	<b>March 9, 2020</b>
<b>Submission Deadline for Proposals:</b>	<b>May 1, 2020, at 5 PM Eastern Time</b>

**Table of Contents**

REGISTRATIONS ..... I

UPDATES AND REMINDERS.....III

SECTION I – DOE NATIONAL LABORATORY OPPORTUNITY DESCRIPTION .....1

SECTION II – AWARD INFORMATION .....5

    A. TYPE OF AWARD INSTRUMENT.....5

    B. ESTIMATED FUNDING .....5

    C. MAXIMUM AND MINIMUM AWARD SIZE.....5

    D. EXPECTED NUMBER OF AWARDS.....6

    E. ANTICIPATED AWARD SIZE .....6

    F. PERIOD OF PERFORMANCE .....6

    G. TYPE OF PROPOSAL .....6

SECTION III – ELIGIBILITY INFORMATION .....7

    A. ELIGIBLE APPLICANTS AND TOPICS .....7

    B. COST SHARING.....7

    C. ELIGIBLE INDIVIDUALS .....7

    D. LIMITATIONS ON SUBMISSIONS.....8

SECTION IV – PROPOSAL AND SUBMISSION INFORMATION .....9

    A. ADDRESS TO REQUEST PROPOSAL PACKAGE.....9

    B. LETTER OF INTENT AND PRE-PROPOSAL.....9

    C. CONTENT AND PROPOSAL FORMS .....9

    D. SUBMISSIONS FROM SUCCESSFUL APPLICANTS.....21

    E. SUBMISSION DATES AND TIMES .....21

    F. FUNDING RESTRICTIONS .....22

    G. OTHER SUBMISSION AND REGISTRATION REQUIREMENTS .....22

SECTION V - PROPOSAL REVIEW INFORMATION .....24

    A. CRITERIA .....24

    B. REVIEW AND SELECTION PROCESS .....25

    C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES .....26

SECTION VI - AWARD ADMINISTRATION INFORMATION .....27

    A. AWARD NOTICES.....27

    B. REPORTING .....27

    C. OTHER CONDITIONS .....27

SECTION VII - QUESTIONS/AGENCY CONTACTS.....	29
A. QUESTIONS .....	29
B. AGENCY CONTACTS .....	29
SECTION VIII - OTHER INFORMATION .....	30
A. MODIFICATIONS .....	30
B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE.....	30
C. COMMITMENT OF PUBLIC FUNDS.....	30
D. PROPRIETARY PROPOSAL INFORMATION.....	30
E. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL .....	30
F. AVAILABILITY OF FUNDS.....	31

## REGISTRATIONS

### **A. DOE Office of Science Portfolio Analysis and Management System (PAMS)**

The Department of Energy (DOE) Office of Science (SC) performs many functions for DOE national laboratory proposals in the Portfolio Analysis and Management System (PAMS), which is available at <https://pamspublic.science.energy.gov>.

You must register in PAMS to submit a pre-proposal, letter of intent, or DOE national laboratory proposal.

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

Notifications sent from the PAMS system will come from the PAMS email address <[PAMS.Autoreply@science.doe.gov](mailto:PAMS.Autoreply@science.doe.gov)>. Please make sure your email server/software allows delivery of emails from the PAMS email address to yours.

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.

#### **1. 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. (Note: If you reviewed for or were listed as PI on a prior submission to SC but have not previously created an account, you may already be linked to an institution in PAMS. If this is the case, PAMS will take you to the PAMS home page.)

#### **2. 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. A “like” search in PAMS returns results that contain the word or phrase you enter; you need not enter the exact name of the institution, but you should enter a word or phrase contained within the institution name. (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.
- All DOE National Laboratories have established profiles in PAMS, so please keep searching until you find your laboratory.

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](mailto:sc.pams-helpdesk@science.doe.gov). All submissions and inquiries about this DOE National Laboratory Announcement should reference **LAB 20-2261**.

## **UPDATES AND REMINDERS**

### RECOMMENDATION

SC encourages you to register in all systems as soon as possible. You are also encouraged to submit proposals before the deadline.

### DATA MANAGEMENT PLAN

The Office of Science Statement on Digital Data Management, published at <http://science.osti.gov/funding-opportunities/digital-data-management/>, governs proposals submitted under this Announcement. Compliance is detailed in Section IV of this Announcement.

### ACKNOWLEDGMENT OF FEDERAL SUPPORT

SC published guidance about how its support should be acknowledged at <http://science.osti.gov/funding-opportunities/acknowledgements/>.

### AVOIDING ERRORS

The following advice is compiled from actual experiences of applicants for SC awards.

- Please ensure that the research narrative is comprised of one and only one Portable Document Format (PDF) file, including all appendices, when it is uploaded.
- When using the PAMS website at <https://pamspublic.science.energy.gov>, please avoid using the back-arrow button in your web browser to navigate.
- Please ensure that the proposal contains no personally identifiable information (PII).
- Please ensure that the budget is calculated using the applicable negotiated indirect cost and fringe benefit rates.

Checklist for Common Errors:

<b>Item</b>	<b>Issue</b>
Page Limits	Strictly followed throughout application, including particular attention to: <ul style="list-style-type: none"> <li>- Research Narrative</li> <li>- Appendix 2 Narrative, if any</li> <li>- Biosketches</li> <li>- DMP(s)</li> <li>- Letter(s) of Recommendation, if any</li> </ul>
Personally Identifiable Information	None present in the application
Research Narrative	Composed of one PDF file including all appendices
Project Summary / Abstract	Name(s) of applicant, PI(s), PI's institutional affiliation(s), Co-Investigator(s), Co-Investigator's institutional affiliation(s)
DOE Cover Page	Follow instructions closely
Budget	Use current negotiated indirect cost and fringe benefit rates
Budget Justification (attached to budget)	Justify all requested costs
Biographical Sketches	Follow page limits strictly
Current and Pending Support	Ensure completeness, including brief abstract of scope of work for all items listed
Data Management Plans	<ul style="list-style-type: none"> <li>- If referring to an experiment's DMP, describe the relationship to the proposed research</li> <li>- Include a DMP even if no experimental data is expected</li> </ul>

## **Section I – DOE NATIONAL LABORATORY OPPORTUNITY DESCRIPTION**

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

**Technical/Scientific Program Contacts:**

Dr. Eliane Lessner, Basic Energy Sciences  
[Eliane.Lessner@science.doe.gov](mailto:Eliane.Lessner@science.doe.gov)  
301-903-9365

Dr. John Boger, High Energy Physics  
[John.Boger@science.doe.gov](mailto:John.Boger@science.doe.gov)  
301-903-4520

Dr. Manouchehr Farkhondeh  
[manouchehr.farkhondeh@science.doe.gov](mailto:manouchehr.farkhondeh@science.doe.gov)  
301-903-4398

### **SUMMARY**

The U.S. Department of Energy's (DOE's) scientific user facilities provide access to the world's most advanced research instruments and produce increasingly larger quantities of data. While impressive, reaching the full potential of the rapidly growing data streams will require new innovations to solve a variety of technical challenges in data acquisition, control, modeling, and analysis. Artificial intelligence and machine learning (AI/ML) have opened corresponding new avenues in optimization, efficient surrogate models, data analytics, and inverse problems. These intriguing capabilities suggest that AI/ML can greatly accelerate the quest to probe and understand fundamental phenomena across a vast range of lengths and timescales, potentially leading to transformative advances across scientific disciplines.

Both industry and science already use AI/ML approaches for data analysis. User facilities, however, crucially require AI/ML tools throughout the lifetime of an experiment: not just for data analysis, but also for data creation, acquisition, and storage. In the next 10 years, AI/ML are expected to go beyond traditional data analysis to aid the design and control of complex facilities, enable real-time capabilities to acquire and analyze large data volumes, automatically steer data collection for in-the-loop experiments, and support experimentalists' use of exascale computing. These advances will in turn open new avenues of scientific research in energy sciences and beyond.

In addition, AI/ML approaches can have a significant impact on increasing the operational efficiencies of large, complex scientific user facilities and scientific instrumentation. AI/ML approaches, for example, can be used to predict detector and accelerator component performance which can result in improved performance and higher beam availability for research.



We envision a future of AI/ML-enabled facilities that maximize the DOE's scientific impact. As a first step towards this vision, DOE announces its interest in receiving National Laboratory proposals from the twelve Basic Energy Sciences (BES), three High Energy Physics (HEP), and three Nuclear Physics (NP) Scientific User Facilities to support data, artificial intelligence (AI) and machine learning (ML) research and development of tools addressing the priorities identified in the Supplementary Information below. It is expected that the proposed research will impact other Office of Science facilities and programs and envision future partnering with those facilities and programs to further evolve and strengthen the advances.

## SUPPLEMENTARY INFORMATION

The BES, HEP, and NP scientific user facilities (SUFs) annually serve over 21,000 users. Efficient management of the rapidly increasing quantity of data in these complex systems demands increasing human and instrumentation resources. Current and upgraded facilities face a variety of technical challenges in simulations, control, data acquisition, and analysis. AI/ML methods and techniques promise to address these challenges and impart a drastic acceleration of experimental and computational discovery. AI/ML approaches can also facilitate and improve the operations of these complex machines and their instrumentation.

BES held a roundtable on “Producing and Managing Large Scientific Data with Artificial Intelligence and Material Learning” in October 2019 to identify priority research opportunities (PROs) for the use of AI/ML that will greatly enhance the impact of the user facilities. For this funding opportunity, proposed research should support development of AI/ML tools that address the PROs described below. Additional information on the workshop and these research opportunities can be found at <https://science.osti.gov/bes/Community-Resources/Reports>.

- **Efficiently extract critical and strategic information from large complex data sets:** Address how AI/ML can extract robust and meaningful information from the increasingly vast and complex data now being produced at the SUFs. AI/ML techniques have the potential to significantly reduce the effort to process and analyze the data to obtain the desired physical information. In addition, AI/ML can help unmask the complexity hidden in problems in high-dimensional spaces (multi-modal measurements, many experimental variables, etc.) by finding connections elusive to human observations.
- **Address the challenges of autonomous control and experimentation:** Incorporate use of AI/ML to address the challenges in the real-time operation of large, complex scientific user facilities. AI/ML based methods are needed to efficiently search large, complex parameter spaces in real time, and to predict the health and failure of instruments that operate at high power sources and experiments that run on these instruments. Such capabilities could dramatically reduce facility tuning-time and downtime, improve facility performance, and maximize the productivity of the SUFs.
- **Enable offline design and optimization of facilities and experiments:** Research to enable offline design and optimization of the facilities and experiments to achieve new scientific goals. Physically accurate virtual laboratory environments of experimental facilities (a lab in the computational cloud) will help in guiding *in-silico* experiments from conception to

synthesis and measurements. Digital twins that faithfully mimic facilities, including shared workflows and continuous updates from real experiments, can enable the design of new facility capabilities and execution of optimal experimental strategies to drive physics knowledge acquisition at the SUFs.

- **Use shared scientific data for machine learning driven discovery:** Address how to catalyze scientific discovery by leveraging the wealth of diverse and complementary data recorded across the SUFs. A radical improvement in data sharing, curation, and analysis is needed to catalyze scientific discovery across all facilities. Through the application of new AI/ML platforms to integrate diverse scientific data resources, the SUFs could create extensive new datasets from heterogeneous experimental and simulated data, leading to new opportunities for scientific discovery. Coordinated development of workflows on a shared facility-based data repository could catalyze development of data standards, formats, and priorities across the SUFs. As a byproduct, these curated datasets can serve as training sets for developing new AI/ML methods

In addition to the above topics, specific interest areas for HEP are implementation of data science techniques such as AI/ML to improve operations of large accelerator complexes, including development of tools and techniques that enable guided optimization, semi-autonomous operations, de-noising and data mining, digital twinning (e.g., virtual laboratories), and failure anticipation. Work conducted on large HEP facilities, such as the Fermilab accelerator complex, are of particular interest, but work may be conducted on other accelerator facilities that have analogous properties. For additional information, go to “Basic Research Needs Workshop on Compact Accelerators for Security and Medicine” [https://science.osti.gov/-/media/hep/pdf/Reports/2020/CASM\\_WorkshopReport.pdf?la=en&hash=AEB0B318ED0436B1C5FF4EE0FDD6DEB84C2F15B2](https://science.osti.gov/-/media/hep/pdf/Reports/2020/CASM_WorkshopReport.pdf?la=en&hash=AEB0B318ED0436B1C5FF4EE0FDD6DEB84C2F15B2), May 6-8, 2019. See sections 2.2 and 5.2.1-5.2.3.

In addition to the above topics, NP is interested in supporting technical development at the intersections between real-time ML and the control and optimization of accelerator systems operation and detector design using AI models. Specific AI/ML applications are sought in accelerator and detector operations that impact beam availability and nuclear physics data collection. Examples include: predicting and minimizing superconducting radio frequency (SRF) faults, SRF cavity instability detection using trained AI models, and development of data driven models to predict machine and detector behaviors for increased performance. Work conducted at [NP scientific user facilities](#) are of particular interest. NP held a one-day roundtable on “Machine Learning and Artificial Intelligence (ML/AI) for NP Accelerator Facilities” on January 30, 2020, with a focus on discussing opportunities in AI/ML for improving efficiencies of accelerator operations of NP facilities. Additional information on the workshop and copies of presentations can be found at: <https://science.osti.gov/np/Research#ac>.

Addressing the above challenges may require advances in, or applications of state-of-the-art capabilities in, for example, storage systems, I/O, data and metadata management, and advanced computing hardware. Proposed teams should include expertise to address these challenges, as needed. Opportunities for collaboration with the Advanced Scientific Computing Research (ASCR) program may be identified in order to address these challenges.

Applications must clearly articulate how the proposed research will address the priorities cited above. Applications that are not aligned with relevant Office's SUFs missions (see <https://science.osti.gov/User-Facilities/User-Facilities-at-a-Glance/BES>; <https://science.osti.gov/User-Facilities/User-Facilities-at-a-Glance/HEP>; and <https://science.osti.gov/User-Facilities/User-Facilities-at-a-Glance/NP>) will be declined without further review.

### **Open Science**

SC is dedicated to promoting the values of openness in Federally supported scientific research, including, but not limited to, ensuring that research may be reproduced and that the results of Federally-supported research are made available to other researchers. These objectives may be met through any number of mechanisms including, but not limited to, data access plans, data sharing agreements, the use of archives and repositories, and the use of various licensing schemes.

The use of the phrase “open-source” does not refer to any particular licensing arrangement but is to be understood as encompassing any arrangement that furthers the objective of openness.

### **Collaboration**

Multi-institutional and multi-facility partnerships to leverage capabilities are encouraged. Collaborative applications, e.g. submissions of identical proposals by different institutions, will not be accepted under this National Laboratory Program Announcement. Group/team efforts must be submitted by the lead institution.

## **Section II – AWARD INFORMATION**

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

DOE anticipates awarding laboratory work authorizations under this DOE National Laboratory Program Announcement.

Any awards made under this Announcement will be subject to the provisions of the contract between DOE and the awardee National Laboratory.

DOE encourages multi-institution collaborations involving national laboratories, universities, and other research partners under this Announcement. Entities proposing as a team must designate a lead national laboratory who will submit an application on behalf of the team members. Only one application is to be submitted for each team. Funding will be provided directly to the individual national laboratories that are part of the team through laboratory work authorizations. Other partners should be supported by authorized laboratory subcontracting processes.

### **B. ESTIMATED FUNDING**

DOE anticipates that the total value of awards made under this announcement will be up to approximately \$40 million, subject to the availability of future year appropriations. Additional funding from other SC programs may be made available to support proposals under this Announcement. By Office, the available funds are: BES: up to \$30M; HEP: up to \$6M; NP: up to \$3M.

DOE expects an annual expenditure of up to \$13 million per year, contingent on satisfactory peer review and the availability of appropriated funds, to support activities proposed under this Announcement. Applicants should request support at a funding level appropriate for the proposed scope for up to three years. Following the first-year award, out-year support will be contingent on the availability of appropriated funds, progress of the research, and programmatic needs. Awards are expected to begin in fiscal year 2020.

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 program announcement.

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

The award size will depend on the availability of appropriated funds.

#### **Ceiling**

\$1,500,000 per year

#### **Floor**

\$300,000 per year

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

The exact number of awards will depend on the number of meritorious proposals, the results of peer review, application of program policy factors, and the availability of appropriated funds. Between 9 and 30 awards are expected for this Announcement.

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

The final award size will depend on the number of meritorious proposals, the results of peer review, program policy factors, and the availability of appropriated funds. NP expects to make awards for proposals that are closer to the lower portion of the funding range.

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

DOE anticipates making awards with a project period of up to three years as befitting the project.

Continuation funding (funding for the second and subsequent budget periods) is contingent on: (1) availability of funds appropriated by Congress and future year budget authority; (2) progress towards meeting the objectives of the approved proposal; and (3) submission of required reports.

#### **G. TYPE OF PROPOSAL**

DOE will accept new DOE National Laboratory Proposals under this DOE National Laboratory Announcement. Please only submit a PAMS lab technical proposal in response to this Announcement; do not submit a DOE Field Work Proposal (FWP) at this time. SC will request FWPs later from those selected for funding consideration under this Announcement.

## **Section III – ELIGIBILITY INFORMATION**

### **A. ELIGIBLE APPLICANTS AND TOPICS**

This is a DOE National Laboratory-only Announcement. FFRDCs from other Federal agencies are not eligible to submit in response to this Program Announcement.

Proposals will be accepted only from

Twelve BES Scientific User Facilities (<https://science.osti.gov/bes/suf/User-Facilities>):

- Advanced Light Source at Lawrence Berkeley National Laboratory;
- Advanced Photon Source at Argonne National Laboratory;
- Center for Functional Nanomaterials at Brookhaven National Laboratory;
- Center for Integrated Nanotechnologies, jointly managed by Sandia National Laboratory and Los Alamos Laboratory, with locations in Albuquerque and Los Alamos, New Mexico
- Center for Nanophase Materials Sciences at Oak Ridge National Laboratory;
- Center for Nanoscale Materials at Argonne National Laboratory;
- High Flux Isotope Reactor at Oak Ridge National Laboratory;
- Linac Coherent Light Source at SLAC National Accelerator Laboratory;
- Molecular Foundry at Lawrence Berkeley National Laboratory;
- National Synchrotron Light Source II at Brookhaven National Laboratory;
- Spallation Neutron Source at Oak Ridge National Laboratory; and
- Stanford Synchrotron Radiation Light source at SLAC National Accelerator Laboratory

Three HEP scientific user facilities (<https://science.osti.gov/hep/Facilities/User-Facilities>):

- Facility for Advanced Accelerator Experimental Tests (FACET) at SLAC National Accelerator Laboratory;
- Fermilab Accelerator Complex at Fermi National Accelerator Laboratory; and
- Accelerator Test Facility at Brookhaven National Laboratory;

Three NP scientific user facilities (<https://science.osti.gov/np/Facilities/User-Facilities>)

- Argonne Tandem Linac Accelerator System at Argonne National Laboratory;
- Continuous Electron Beam Accelerator Facility at Thomas Jefferson National Accelerator Laboratory; and
- Relativistic Heavy Ion Collider at Brookhaven National Laboratory

### **B. COST SHARING**

Cost sharing is not required.

### **C. ELIGIBLE INDIVIDUALS**

Eligible individuals with the skills, knowledge, and resources necessary to carry out the proposed research as a Principal Investigator (PI) are invited to work with their organizations to develop a proposal. Individuals from underrepresented groups as well as individuals with disabilities are

always encouraged to apply.

#### **D. LIMITATIONS ON SUBMISSIONS**

Each user facility can lead a maximum of two proposals submitted for this Announcement. DOE will consider the last proposals submitted as representing the intended submissions from a facility, thereby removing the earlier submissions from consideration.

Team proposals: DOE encourages multi-institution collaborations involving national laboratories including other user facilities, universities, and other research partners under this Announcement. Entities proposing as a team must designate a lead national laboratory who will submit an application on behalf of the team members. Only one application is to be submitted for each team. The designated lead national laboratory must perform a greater percentage of the effort than any other partner organization or subawardee. The percentage of effort will be determined by reviewing the total budget for each participating organization as a percentage of the proposed total project costs. **If a proposal in which the lead national laboratory is not performing a greater percentage of the effort than each of the other institutional partners, team members, or subawardees, as determined by the budget, the proposal will be rejected without further review.**

## **Section IV – PROPOSAL AND SUBMISSION INFORMATION**

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

Proposal submission instructions are available in this Announcement on the DOE SC Portfolio Analysis and Management System (PAMS). Screenshots showing the steps in DOE National Laboratory proposal submission are available in the PAMS External User Guide, accessible by navigating to <https://pamspublic.science.energy.gov> and clicking on the “PAMS External User Guide” link.

Proposals submitted outside of PAMS will not be accepted.

### **B. LETTER OF INTENT AND PRE-PROPOSAL**

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

A letter of intent is not required.

#### **2. Pre-proposal**

A pre-proposal is not required.

### **C. CONTENT AND PROPOSAL FORMS**

PROPOSAL DUE DATE

[See Section IV, Part E.](#)

Files that are attached to the forms must be PDF files unless otherwise specified in this announcement. Attached PDF files must be plain files consisting of text, numbers, and images without editable fields, signatures, passwords, redactions, or other advanced features available in some PDF-compatible software. Do not attach PDF portfolios.

**WARNING:** The PAMS website at <https://pamspublic.science.energy.gov> will permit you to edit a previously submitted proposal in the time between your submission and the deadline. If you choose to edit, doing so will remove your previously submitted version from consideration. If you are still editing at the time of the deadline, you will not have a valid submission. Please pay attention to the deadline.

RESUBMISSION OF PROPOSALS

Proposals submitted under this Announcement may be withdrawn from consideration by using SC’s PAMS website at <https://pamspublic.science.energy.gov>. Proposals may be withdrawn at any time between when the Laboratory submits the application and when DOE makes the application available to merit reviewers. Such withdrawals take effect immediately and cannot be reversed.



After a proposal is withdrawn, it may be resubmitted, if this Announcement is still open for the submission of applications. Such resubmissions will only count as one submission if this Announcement restricts the number of proposals from an applicant.

SC will usually consider the last submission, according to its timestamp, to be the intended version. Please consult with your program manager to resolve any confusion about which version of a proposal should be considered.

#### IMPROPER CONTENTS OF PROPOSALS

Proposals submitted under this Announcement will be stored in controlled-access systems, but they may be made publicly available if an award is made, and they will be made available to merit reviewers. As such, it is critical that Laboratories follow these guidelines:

- Do not include information subject to any legal restriction on its open distribution, whether classified, export control, or unclassified controlled nuclear information.
- Do not include sensitive and protected personally identifiable information, including social security numbers, birthdates, citizenship, marital status, or home addresses. Pay particular attention to the content of biographical sketches and curriculum vitae.
- Do not include letters of support from Federal officials.
- Do not include letters of support on Federal letterhead. Letters that are not letters of support (such as letters confirming access to sites, facilities, equipment, or data; or letters from cognizant contracting officers) may be on Federal letterhead.
- Clearly mark all proprietary or trade-secret information.

#### LETTERS

Letters of commitment are required in Appendix 7 to the research narrative as detailed below.

### **1. Summary of Proposal Contents and Information about PAMS**

Each DOE National Laboratory proposal will contain the following sections:

- Budget, entered into PAMS as structured data using the PAMS budget form
- Abstract (one page), entered into PAMS as a separate pdf
- Budget justification, entered into PAMS as a separate pdf
- Proposal, combined into a single pdf containing the following information:
  - Proposal Cover Page
  - Table of Contents
  - Project Narrative (main technical portion of the proposal, including background/introduction, proposed research and methods, timetable of activities, and responsibilities of key project personnel)
  - Appendix 1: Biographical Sketch(es)
  - Appendix 2: Current and Pending Support
  - Appendix 3: Bibliography and References Cited
  - Appendix 4: Facilities and Other Resources
  - Appendix 5: Equipment

- Appendix 6: Data Management Plan
- Appendix 7: Letters of Commitment from co-PIs and Collaborators.
- Appendix 8: Other Attachments (optional)

## SUBMISSION INSTRUCTIONS

Completed proposals must be submitted into the DOE SC Portfolio Analysis and Management System (PAMS). 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, 9:00 AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free number) or (301) 903-9610, Email: [sc.pams-helpdesk@science.doe.gov](mailto:sc.pams-helpdesk@science.doe.gov). All submissions and inquiries about this Program Announcement should reference **LAB 20-2261**. Full proposals submitted in response to this Program Announcement must be submitted to PAMS no later than May 1, 2020, at 5:00 PM Eastern Time.

All PIs and those submitting on behalf of PIs are encouraged to establish PAMS accounts as soon as possible to ensure timely submissions. To register, click “Create New PAMS Account” on the website <https://pamspublic.science.energy.gov/> and follow the instructions for creating an account.

The following information is provided to help with proposal submission. Detailed instructions and screen shots can be found in the user guide. To find the user guide, click the “External User Guide” link on the PAMS home page. Onscreen instructions are available within PAMS.

- Log into PAMS. From the proposals tab, click the “View DOE National Laboratory Announcements” link and find the current announcement in the list. Click the “Actions/Views” link in the Options column next to this Announcement to obtain a dropdown menu. Select “Submit Proposal” from the dropdown.
- Note that you must select one and only one Principal Investigator (PI) per proposal; to do so, click the “Select PI” button on the far-right side of the screen. Find the appropriate PI from the list of all registered users from your institution returned by PAMS. (Hint: You may have to sort, filter, or search through the list if it has multiple pages.) Click the “Actions” link in the Options column next to the appropriate PI to obtain a dropdown menu. From the dropdown, choose “Select PI.”
- If the PI for whom you are submitting does not appear on the list, it means he or she has not yet registered in PAMS. For your convenience, you may have PAMS send an email invitation to the PI to register in PAMS. To do so, click the “Invite PI” link at the top left of the “Select PI” screen. You can enter an optional personal message to the PI in the “Comments” box, and it will be included in the email sent by PAMS to the PI. You must wait until the PI registers before you can submit the proposal. Save the proposal for later work by selecting “Save” from the dropdown at the bottom of the screen and then clicking the “Go” button. It will be stored in “My Proposals” for later editing. As a minimum, you must complete all the required fields on the PAMS cover page before you can save the proposal for the first time.
- The cover page, budget, and attachments sections of the lab proposal are required by PAMS before it can be submitted to DOE.

- Complete the sections in PAMS one at a time, starting with the cover page and following the instructions for each section.
- Click the “+View More” link at the top of each section to expand the onscreen instructions. On the budget section, click the “Budget Tab Instructions” link to obtain detailed guidance on completing the budget form.
- Save each section by selecting either “Save” (to stay in the same section) or “Save... and Continue to the Next Section” (to move to the next section) from the dropdown menu at the bottom of the screen, followed by clicking the “Go” button.
- If you save the proposal and navigate away from it, you may return later to edit the proposal by clicking the “View My Existing Proposals” or “My Proposals” links within PAMS.
- You must enter a budget for each annual budget period.
- You must also enter a budget for each proposed sub-award. The sub-award section can be completed using the same steps used for the budget section.
- In the attachments section of the lab proposal, the abstract, the budget justification, and the proposal narrative are required and must be submitted as separate files.
- You must bundle everything other than the budget, abstract, and budget justification into one single PDF file to be attached under “Proposal Attachment.”
- Do not attach anything under “Other Attachments.”
- To upload a file into PAMS, click the “Attach File” button at the far right side of the screen. Click the “Browse” (or “Choose File” depending on your browser) button to search for your file. You may enter an optional description of the file you are attaching. Click the “Upload” button to upload the file.
- Once you have saved all of the sections, the “Submit to DOE” option will appear in the dropdown menu at the bottom of the screen.
- To submit the proposal, select “Submit to DOE” from the dropdown menu and then click the “Go” button.
- Upon submission, the PI will receive an email from the PAMS system <[PAMS.Autoreply@science.doe.gov](mailto:PAMS.Autoreply@science.doe.gov)> acknowledging receipt of the proposal.
- The proposal will also appear under My Proposals with a Proposal Status of “Submitted to DOE.”

Please only submit a PAMS lab technical proposal in response to this Announcement; do not submit a DOE Field Work Proposal (FWP) at this time. SC will request FWPs later from those selected for funding consideration under this Announcement.

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, 9:00 AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free number) or (301) 903-9610, Email: [sc.pams-helpdesk@science.doe.gov](mailto:sc.pams-helpdesk@science.doe.gov). All submissions and inquiries about this Program Announcement should reference **LAB 20-2261**.

## 2. Detailed Contents of the Proposal

### BUDGET AND BUDGET EXPLANATION

The budget must be submitted into PAMS using the PAMS budget form. Research proposed under this Announcement may only have one annual budget period.

PAMS will calculate the cumulative budget totals for you.

A written justification of each budget item is to follow the budget pages. The budget justification should be placed in a separate, single pdf document and attached on the appropriate screen in PAMS. Further instructions regarding the budget and justification are given below and in the PAMS software.

#### PROJECT SUMMARY/ABSTRACT (NO MORE THAN ONE PAGE)

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 Principal Investigator (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). 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. The one-page project summary/abstract should be placed in a separate, single pdf document and attached on the appropriate screen in PAMS.

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

#### DOE COVER PAGE (PART OF PROJECT NARRATIVE)

The following proposal cover page information may be placed on a plain page. No form is required. This cover page will not count in the project narrative page limitation.

- The project title:
- Applicant/Institution:
- Street Address/City/State/Zip:
- Postal Address:
- Administrative Point of Contact name, telephone number, email:
- Lead PI name, telephone number, email:
- Submitting User Facility:
- DOE National Laboratory Announcement Number: **LAB 20-2261**
- DOE/SC Program Office: **Basic Energy Sciences, High Energy Physics, or Nuclear Physics**
- DOE/SC Program Office Technical Contact: **Dr. Eliane Lessner, Dr John Boger, or Dr. Manouchehr Farkhondeh**
- Include a table listing the annual and total funding to each institution participating in the application. The lead Institution must be the first listed. The second column must list the

lead PI for the institution. The PI for the lead institution is the Lead PI for the proposal. A sample table is provided below:

<b>Institution</b>	<b>PI Name</b>	<b>Year 1 Budget</b>	<b>Year 2 Budget</b>	<b>Year 3 Budget</b>	<b>Total Budget</b>

Example budget table (\$ in thousands)

Note that each user facility can lead only two proposals under this Announcement. If more than two are received, only the final two proposals will be considered.

**PROJECT NARRATIVE (NO MORE THAN 15 PAGES LONG)**

The project narrative **must not exceed 15 pages** of technical information, including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5” by 11” paper with 1-inch margins (top, bottom, left, and right). 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. This page limit does not apply to the Cover Page, Budget Page(s), Budget Justification, biographical material, publications and references, and appendices, each of which may have its own page limit.

Do not include any Internet addresses (URLs) that provide supplementary or additional information that constitutes a part of the proposal. Merit reviewers are not required to access Internet sites; however, Internet publications in a list of references will be treated identically to print publications. See Part VIII.D for instructions on how to mark proprietary proposal 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 Management Plan:** Multi-institutional proposals must include a project management plan that clearly indicates the roles and responsibilities of each organization and indicates how activities will be coordinated and communicated among team members.

**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. There should be no ambiguity about which personnel will perform particular parts of the project, and the time at which these activities will take place.

Do not include any Internet addresses (URLs) that provide supplementary or additional information that constitutes a part of the proposal. Using Internet sites in an attempt to avoid page limits will fail: The content of those sites will not be reviewed. See Part VIII.D for instructions on how to mark proprietary proposal information.

#### APPENDIX 1: BIOGRAPHICAL SKETCH

Provide a biographical sketch for the PI and each senior/key person as an appendix to your technical narrative.

As part of the sketch, provide information that can be used by reviewers to evaluate the PI's potential for leadership within the scientific community. Examples of information of interest are invited and/or public lectures, awards received, scientific program committees, conference or workshop organization, professional society activities, special international or industrial partnerships, reviewing or editorship activities, or other scientific leadership experiences.

- 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:

SC does not require a particular format for a biosketch. Applicants may use a format developed for other agencies or generated by any software package, including SciENCv, a cooperative venture maintained at <https://www.ncbi.nlm.nih.gov/sciencv/>. The biographical information (curriculum vitae) must include the following items within its page limit:

- **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.

In addition, the biographical sketch must include information to permit DOE to identify individuals who are conflicted with or potentially biased (favorably or unfavorably) against the investigator. Include a section entitled “**Identification of Potential Conflicts of Interest or Bias in Selection of Reviewers**” that will not count in a page limit: 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). Also, list the names and current organizational affiliations of your graduate students and postdoctoral associates.

**Personally Identifiable Information:** Do not include sensitive and protected personally identifiable information including social security numbers, birthdates, citizenship, marital status, or home addresses. Do not include information that a merit reviewer should not make use of.

This appendix will not count in the project narrative page limitation.

## APPENDIX 2: CURRENT AND PENDING SUPPORT

Provide a list of all current and pending support (both Federal and non-Federal) for the PI and senior/key persons, including subawardees, for ongoing projects and pending applications. List all sponsored activities or awards requiring a measurable commitment of effort, whether paid or unpaid. SC does not require a particular format for current and pending support. Applicants may use a format developed for other agencies or generated by any software package, including SciENCv, a cooperative venture maintained at <https://www.ncbi.nlm.nih.gov/sciencv/>.

For every activity, list the following items:

- The sponsor of the activity or the source of funding
- The award or other identifying number
- The title of the award or activity
- The total cost or value of the award or activity, including direct and indirect costs. For pending proposals, provide the total amount of requested funding.
- The award period (start date – end date).
- The person-months of effort per year being dedicated to the award or activity

- Briefly describe the research being performed and explicitly identify any overlaps or synergies with the proposed research.

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. 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 proposal. 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: DATA MANAGEMENT PLAN

Provide a Data Management Plan (DMP) that addresses the following requirements:

1. DMPs should describe whether and how data generated in the course of the proposed research will be shared and preserved. If the plan is not to share and/or preserve certain data, then the plan must explain the basis of the decision (for example, cost/benefit considerations, other parameters of feasibility, scientific appropriateness, or limitations discussed in #4). At a minimum, DMPs must describe how data sharing and preservation will enable validation of results, or how results could be validated if data are not shared or preserved.
2. DMPs should provide a plan for making all research data displayed in publications resulting from the proposed research digitally accessible to the public at the time of publication. This includes data that are displayed in charts, figures, images, etc. In addition, the underlying digital research data used to generate the displayed data should be made as accessible as possible to the public in accordance with the principles stated in the Office of Science Statement on Digital Data Management (<http://science.osti.gov/funding-opportunities/digital-data-management/>). This requirement could be met by including the data as supplementary information to the published article, or through other means. The published article should indicate how these data can be accessed.
3. DMPs should consult and reference available information about data management resources to be used in the course of the proposed research. In particular, DMPs that explicitly or implicitly commit data management resources at a facility beyond what is conventionally made available to approved users should be accompanied by written approval from that facility. In determining the resources available for data management at SC User Facilities, researchers should consult the published description of data management resources and practices at that facility and reference it in the DMP. Information about other SC facilities can be found in the additional guidance from the sponsoring program.
4. DMPs must protect confidentiality, personal privacy, Personally Identifiable Information, and U.S. national, homeland, and economic security; recognize proprietary interests, business confidential information, and intellectual property rights; avoid significant negative impact on innovation, and U.S. competitiveness; and otherwise be consistent with all applicable laws, regulations, and DOE orders and policies. There is no requirement to share proprietary data.

DMPs will be reviewed as part of the overall SC research proposal merit review process.

Applicants are encouraged to consult the SC website for further information and suggestions for how to structure a DMP: <http://science.osti.gov/funding-opportunities/digital-data-management/>

- This appendix should not exceed 2 pages 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)
- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

## APPENDIX 7: LETTERS OF COMMITMENT FROM CO-PIs AND COLLABORATORS

Letters of commitment are required from each funded co-PI/collaborator from other institutions must be endorsed by the co-PI/collaborator and an appropriate member of the institutional administration authorized to commit the institution to performance of the research. Letters of support from any additional unfunded collaborators should be included here also.

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



## APPENDIX 8: 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 proposal. Reviewers are not required to consider information in this appendix.

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

## 2. Detailed Instructions for the Budget

Budgets are required for the entire project period. A budget form should be completed for each budget period of the award, and a cumulative budget form for the entire project period will be populated by PAMS. A detailed budget justification narrative should be included after the budget pages. The justification should cover labor, domestic travel, equipment, materials and supplies, and anything else that will be covered with project funds.

To edit a section on the budget, click the edit icon (  ) for each section on the page. Remember to save all budget periods before moving on to the next section. You can save the budget periods by selecting “Save All Budget Periods” from the dropdown on the lower right corner of the PAMS budget entry screen and then clicking the “Go” button. You can also save any data entry page in PAMS using the blue diskette icon (  ) in the floating toolbar on the bottom of the screen.

### **Section A. Senior/Key Person (Required)**

For each Senior/Key Person, enter the appropriate information. List personnel, salary funds, and the number of months that person will be allocated to the project. Also include a written narrative in the budget justification that fully justifies the need for requested personnel.

### **Section B. Other Personnel**

List personnel, salary funds, and the number of months that person will be allocated to the project. Also include a written narrative in the budget justification that fully justifies the need for requested personnel.

### **Section C. Equipment Description**

For the purpose of this budget, equipment is designated as an item of property that has an acquisition cost of \$5,000 or more and an expected service life of more than one year. (Note that this designation applies for proposal budgeting only and differs from the DOE definition of capital equipment.) List each item of equipment separately and justify each in the budget justification section. Allowable items ordinarily will be limited to research equipment and apparatus not already available for the conduct of the work. General-purpose office equipment, such as a personal computer, is not eligible for support unless primarily or exclusively used in the actual conduct of scientific research.

#### **Section D. Travel**

In the budget justification, list each trip's destination, dates, estimated costs including transportation and subsistence, number of staff traveling, the purpose of the travel, and how it relates to the project. Indicate whether travel cost estimates are based upon quotes from travel agencies; upon past experience of similar number of trips to similar travel destinations; or something else (describe). To qualify for support, attendance at meetings or conferences must enhance the investigator's capability to perform the research, plan extensions of it, or disseminate its results.

#### **Section E. Participant/Trainee Support Costs:**

If applicable, submit training support costs. Educational projects that intend to support trainees (precollege, college, graduate and post graduate) must list each trainee cost that includes stipend levels and amounts, cost of tuition for each trainee, cost of any travel (provide the same information as needed under the regular travel category), and costs for any related training expenses. Participant costs are those costs associated with conferences, workshops, symposia or institutes and breakout items should indicate the number of participants, cost for each participant, purpose of the conference, dates and places of meetings and any related administrative expenses. In the budget justification, indicate whether trainee cost estimates are based upon past experience of support of similar number of trainees on similar projects; past experience of support of similar number of participants attending similar conferences/workshops/symposia; or something else (describe).

#### **Section F. Other Direct Costs:**

Enter Other Direct Costs information for each item listed.

- **Materials and Supplies:** Enter total funds requested for materials and supplies in the appropriate fields. In the budget justification, indicate general categories such as glassware, and chemicals, including an amount for each category (items not identified under "Equipment"). Categories less than \$1,000 are not required to be itemized. In the budget justification, indicate whether cost estimates are based upon past experience of purchase of similar or like items; quotes/catalog prices of similar or like items; or something else (describe).
- **Publication Costs:** Enter the total publication funds requested. The proposal budget may request funds for the costs of documenting, preparing, publishing or otherwise making available to others the findings and products of the work conducted under the award. In the budget justification, include supporting information. In the budget justification, indicate whether cost estimates are based upon past experience of purchase of similar or like items; vendor quotes of similar publication services; or something else (describe).

- **Consultant Services:** Enter total funds requested for all consultant services. In the budget justification, identify each consultant, the services he/she will perform, total number of days, travel costs, and total estimated costs. In the budget justification, indicate whether consultant cost estimate is based upon previous experience/quotes for similar or like services; or something else (describe).
- **ADP/Computer Services:** Enter total funds requested for ADP/Computer Services. The cost of computer services, including computer-based retrieval of scientific, technical and education information may be requested. In the budget justification, include the established computer service rates at the proposing organization if applicable. In the budget justification, indicate whether cost estimates are based upon quotes/past experience of purchase of similar computer services; established computer service rates at the proposing institution; or something else (describe).
- **Subawards/Consortium/Contractual Costs:** Enter total costs for all subawards/consortium organizations and other contractual costs proposed for the project. In the budget justification, justify the details.
- **Equipment or Facility Rental/User Fees:** Enter total funds requested for Equipment or Facility Rental/User Fees. In the budget justification, identify each rental/user fee and justify. In the budget justification, indicate whether cost estimates are based upon past experience with similar or like items; vendor quotes of similar items; or something else (describe).
- **Alterations and Renovations:** Enter total funds requested for Alterations and Renovations.
- **In the budget justification,** itemize by category and justify the costs of alterations and renovations, including repairs, painting, removal or installation of partitions, shielding, or air conditioning. Where applicable, provide the square footage and costs.
- **Other:** Add text to describe any other Direct Costs not requested above. Enter costs associated with “Other” item(s). Use the budget justification to further itemize and justify.

### **Section G. Direct Costs**

This represents Total Direct Costs (Sections A thru F) and will be calculated by PAMS.

### **Section H. Other Indirect Costs**

Enter the Indirect Cost information for each field. Only four general categories of indirect costs are allowed/requested on this form, so please consolidate if needed.

### **Section I. Total Direct and Indirect Costs**

This amount will be calculated by PAMS (Sections G + H)

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

If selected for award, DOE reserves the right to request additional or clarifying information.

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

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

Not applicable.

## **2. Pre-proposal Due Date**

Not applicable.

## **3. Proposal Due Date**

May 1, 2020, at 5 PM Eastern Time

You are encouraged to transmit your proposal well before the deadline. Proposals may be submitted at any time between the publication of this Announcement and the stated deadline.

## **4. Late Submissions**

Delays in submitting letters of intent, pre-proposals, and proposals may be unavoidable. DOE has accepted late submissions when applicants have been unable to make timely submissions because of widespread technological disruptions or significant natural disasters. DOE has made accommodations for incapacitating or life-threatening illnesses and for deaths of immediate family members. Other circumstances may or may 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.
- An upper respiratory infection (a “cold”) the week of the deadline.

You are responsible for beginning the submission process in sufficient time to accommodate reasonably foreseeable incidents, contingencies, and disruptions.

Applicants must contact the Program Office/Manager listed in this Funding Opportunity Announcement to discuss the option of a late submission. Contacting the Program Office/Manager after the deadline may reduce the likelihood that a request will be granted.

DOE notes that not all requests for late submission will be approved.

## **F. FUNDING RESTRICTIONS**

Funding for all awards and future budget periods are contingent upon the availability of funds appropriated by Congress and the availability of future-year budget authority.

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

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

Proposals must be submitted through PAMS to be considered for award.

Please only submit a PAMS lab technical proposal in response to this Announcement; do not submit a DOE Field Work Proposal (FWP) at this time. SC will request FWPs via the Searchable FWP system later from those selected for funding consideration under this Announcement.

## **2. Registration Process**

### ONE-TIME REGISTRATION PROCESS

You must complete the one-time registration process (all steps) before you can submit your first proposal through PAMS. Registration instructions appear in the front matter of this Announcement.

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](mailto:sc.pams-helpdesk@science.doe.gov). All submission and inquiries about this DOE National Laboratory Program Announcement should reference **LAB 20-2261**.

## **3. Proposal Receipt Notices**

Upon submission, the PI will receive an email from the PAMS system <[PAMS.Autoreply@science.doe.gov](mailto:PAMS.Autoreply@science.doe.gov)> acknowledging receipt of the proposal.

## **4. Viewing Submitted Proposals**

Upon submission, the proposal will appear under My Proposals for the PI and the Submitter with a Proposal Status of “Submitted to DOE.”

## Section V - PROPOSAL REVIEW INFORMATION

### A. CRITERIA

#### 1. Initial Review Criteria

Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for the award; (2) the information required by the Program Announcement has been submitted; (3) all mandatory requirements are satisfied; (4) the proposed project is responsive to the objectives of the Program Announcement, (5) the proposed project is not duplicative of programmatic work; (6) the proposed work addressed research that is programmatically aligned with the BES, HEP, or NP mission, as appropriate; and (7) for team proposals only, that the lead institution is performing the largest percentage of the effort as determined by the budget allocations. Proposals that fail to pass the initial review will not be forwarded for merit review and will be eliminated from further consideration.

#### 2. Merit Review Criteria

Proposals will be subjected to scientific merit review (peer review) and will be evaluated against the following criteria, listed in descending order of importance.

- 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;
- Reasonableness and Appropriateness of the Proposed Budget; and
- Adequacy of the Management Plan.

The evaluation process will also include program policy factors such as the relevance of the proposed research to the terms of the DOE National Laboratory Announcement and the agency's programmatic needs, the balance of activities within the program, and the utility of the proposed activities to the broader scientific community. 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 a proposal constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

The questions below are provided to the merit reviewers to elaborate the criteria:

#### SCIENTIFIC AND/OR TECHNICAL MERIT OF THE PROPOSED RESEARCH

- What is the scientific innovation of the proposed research?
- Will it bring a new and unique capability into the User Facility system for Users?
- What is the likelihood of achieving valuable and impactful results?
- How does the proposed research advance Data/AI/ML-related research?
- Is the Data Management Plan suitable for the proposed research and to what extent does it support the validation of research results?

#### APPROPRIATENESS OF THE PROPOSED METHOD OR APPROACH

- How logical are the hypotheses and how feasible are the research approaches to test these hypotheses?
- How innovative is the proposed method or approach?
- How well does the applicant recognize significant potential problems and consider alternative strategies?

#### COMPETENCY OF APPLICANT'S PERSONNEL AND ADEQUACY OF PROPOSED RESOURCES

- What is the past performance and qualifications of the principal investigator (PI) and the broader team of researchers?
- How likely is the plan for accessing the required facilities resources to be successful?
- How does the proposed work take advantage of unique facilities and capabilities?

#### REASONABLENESS AND APPROPRIATENESS OF THE PROPOSED BUDGET

- How adequate are the proposed budget and staffing levels to carry out the proposed research?
- How reasonable and appropriate is the budget for the scope?
- For multi-institution (team) proposals, is the proposed division of work scope and budget among participants reasonable and appropriate?

#### MANAGEMENT PLAN

- What are the strengths and weaknesses of the application's management plan, including the proposed timeline?
- How will the team achieve synergy among the participants, including integration of experimental and theoretical work (if both are included in the proposed research)?
- For multi-institution (team) proposals, what is the past performance and qualifications of the lead institution and lead PI in managing similar activities?

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

### **1. Merit Review**

Proposals that pass the initial review will be subjected to a formal merit review and will be evaluated based on the criteria above.

### **2. Program Policy Factors**

The Selection Official may consider any of the following program policy factors in making the selection, listed in no order of significance:



- Availability of funds
- Relevance of the proposed activity to Office of Science priorities
- Ensuring an appropriate balance of activities within Office of Science programs
- Performance under current awards
- Current or previous DOE support
- Degree of engagement by the lead institution for team proposals

### **3. Selection**

The Selection Official will consider the findings of the merit review and may consider any of the Program Policy Factors described above.

### **4. Discussions and Award**

The Government may enter into discussions with a selected applicant for any reason deemed necessary. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

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

DOE is interested in projects supported under this Announcement beginning work by September 1, 2020.

## **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.

**Non-selected Notification:** Organizations whose proposals have not been selected will be advised as promptly as possible. This notice will explain why the proposal was not selected.

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

A work authorization/contract modification issued by the contracting officer is the authorizing award document.

### **B. REPORTING**

Annual progress reports from the award investigator will be required and will be due 90 days before the end of each budget year. All awarded projects will be required to undergo a mid-term project progress review, possibly including in-person participation.

### **C. OTHER CONDITIONS**

#### **1. Publications**

Researchers are expected to publish or otherwise make publicly available the results of the work conducted under any authorization resulting from this Announcement. Publications and other methods of public communication describing any work based on or developed under an authorization resulting from this Announcement must contain an acknowledgment of SC support. The format for such acknowledgments is provided at <https://science.osti.gov/funding-opportunities/acknowledgements/>. The author's copy of any peer-reviewed manuscript accepted for funding must be announced to DOE's Office of Scientific and Technical Information (OSTI) and made publicly available in accordance with the instructions contained in the Reporting Requirements Checklist incorporated in all Assistance Agreements.

#### **2. Environmental, Safety and Health (ES&H) Performance of Work at DOE Facilities**

With respect to the performance of any portion of the work under this award which is performed at a DOE-owned or controlled site, the recipient agrees to comply with all state and Federal ES&H regulations, and with all other ES&H requirements of the operator of such site.

Prior to the performance on any work at a DOE-Owned or controlled site, the recipient shall contact the site facility manager for information on DOE and site specific ES&H requirements.

The recipient shall apply this provision to all subawardees at any tier.

#### **4. Federal, State, and Local Requirements**

With respect to the performance of any portion of the work under this award, the recipient agrees to comply with all applicable local, state, and Federal ES&H regulations. The recipient shall apply this provision to all sub awardees at any tier.

## Section VII - QUESTIONS/AGENCY CONTACTS

### A. QUESTIONS

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](mailto:sc.pams-helpdesk@science.doe.gov). All submission and inquiries about this DOE National Laboratory Program Announcement should reference **LAB 20-2261**.

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 DOE National Laboratory Program Announcement or below.

Please contact the program staff with all questions not directly related to the PAMS system.

### B. AGENCY CONTACTS

PAMS Customer Support	855-818-1846 (toll-free) 301-903-9610 <a href="mailto:sc.pams-helpdesk@science.doe.gov">sc.pams-helpdesk@science.doe.gov</a>
Program Manager Scientific Contact	Dr. Eliane Lessner Basic Energy Sciences <a href="mailto:Eliane.Lessner@science.doe.gov">Eliane.Lessner@science.doe.gov</a> 301-903-9365  Dr John Boger High Energy Physics <a href="mailto:John.Boger@science.doe.gov">John.Boger@science.doe.gov</a> 301-903-4520  Dr. Manouchehr Farkhondeh <a href="mailto:manouchehr.farkhondeh@science.doe.gov">manouchehr.farkhondeh@science.doe.gov</a> 301-903-4398

### C. DEPARTMENT OF ENERGY, OFFICE OF INSPECTOR GENERAL HOTLINE:

The Office of Inspector General (OIG) maintains a Hotline to facilitate the reporting of allegations of fraud, waste, abuse, or mismanagement in DOE programs or operations. If you wish to report such allegations, you may call, send a letter, or email the OIG Hotline [ighotline@hq.doe.gov](mailto:ighotline@hq.doe.gov). Allegations may be reported by DOE employees, DOE contractors, or the general public. OIG contact information is available at <http://energy.gov/ig/services>.

## **Section VIII - OTHER INFORMATION**

### **A. MODIFICATIONS**

Notices of any modifications to this DOE National Laboratory Announcement will be posted on the Grants and Contracts website (<http://science.osti.gov/grants/>).

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

DOE reserves the right, without qualification, to reject any or all proposals received in response to this DOE National Laboratory Announcement and to select any proposal, 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 PROPOSAL INFORMATION**

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the applicant, should be included in a proposal 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 proposal which are to be restricted:

“The data contained in pages \_\_\_\_\_ of this proposal have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes.”

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 proposal, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign a conflict of interest and a certificate of confidentiality prior to reviewing a proposal. Non-Federal personnel conducting administrative activities must sign a non-disclosure

agreement.

#### **F. 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.