Call for Proposals

FY 2021
Laboratory Directed Research and Development
(LDRD) Program

I. Overview

The purpose of the LDRD program is to encourage innovation, creativity, originality, and quality to keep the Laboratory's research activities and staff at the forefront of science and technology.

The FY2021 LDRD program will have two funding tracks for proposals. Please note that these tracks are not in order of priority and are as follows:

- Area-priority
- Early Career Development

All proposals, including continuations, must be submitted through the online submission database located at https://ldrd.lbl.gov/.

Note: After thorough discussion at the senior scientific leadership level, the Lab-wide Initiative Track has been suspended for FY2021. Continuation proposals for FY2020 Lab-wide Initiative projects will be submitted for review through the Area-priority funding track. The expectation is that as the needs of Berkeley Lab change, the Lab-wide Initiative Track will resume at a future date.

The Area-Priority Track

Area-priority track proposals will be accepted in each of the scientific Areas of the Lab:

- Biosciences
- Computing Sciences
- Earth and Environmental Sciences
- Energy Sciences
- Energy Technologies
- Physical Sciences

Criteria

Area-priority proposals will be evaluated based on their novelty and scientific quality, as well as the ability to introduce new research activities in areas important to one or more of the Scientific Divisions of the Lab. High-risk projects with the potential for significant scientific impact are strongly encouraged.

Multi-divisional and multi-area proposals are highly encouraged. Multi-Area topics may be called out in advance in two or more Area descriptions below. The descriptions may differ in approach or division of work, so please make sure to read through completely. These proposals should be submitted by the lead division/area, usually the primary PI's division/area. However, if your proposal aligns more appropriately to an Area outside of your own, please make sure to contact the appropriate Area LDRD proposal review lead who will be identified in a January follow up article in the Elements newsletter.

Review

The Associate Laboratory Director and the Area-specific Division Directors will review the proposals in their Area; they may also include additional reviewers in the process. The PI will be involved in a single round of reviews involving the written proposal and follow-up to Area and Division management. The highly ranked Area Proposals will be presented by the relevant ALD or Division Director to the Lab Director and Deputy Lab Director for Research for final selection and funding level recommendations. For multi-area proposals, the submitting ALD should seek input from the ALDs of the partner Areas and present this input during the final presentation to the Lab Director.

Early Career Development Track

The intent of the Early Career Development (ECD) track is to develop the future scientific workforce and prepare early career PIs for a successful scientific career. An ECD LDRD grant is intended to be a first opportunity for an early career scientist to develop a PI experience at a national lab, which may include preparing for a DOE Early Career Grant application. Considering the future scientific workforce of Berkeley Lab, it is a goal of the laboratory to develop a diverse group of early career scientists and applications from underrepresented and other employee groups are very much encouraged. A maximum funding amount not to exceed $225,000 per PI will be allocated.

Criteria

PIs must have received their Ph.D. no earlier than January 1, 2012. Current postdocs are also encouraged to submit proposals, and, if successfully funded, must have a scientific job title (career or career track, research scientist or staff scientist) before the project starts. Minor changes to the PI criteria may change based on suggestions from the Early Career Task Force. Any changes will be communicated all ECD applicants.

A typical proposal should consist of funding for up to 50% of an FTE for the PI, and additional funding for a postdoc, and/or students. While the topic of the proposed project should be consistent with the Area strategy and create a strong basis for a future DOE Early Career grant application or other high value funding opportunities, it is

expected that the early Career LDRD project will be independent from and carried out in parallel to the assigned work from their home Divisions.

Please direct any further questions or inquiries about eligibility to your Division Director or ALD.

Review

Applying for this LDRD award invites early career scientists to start thinking strategically about their long-term plans and how these plans fit into the program goals of the Lab and the DOE. Thus, the ALD and the Area-specific Division Directors should encourage and mentor outstanding early career scientists to become ECD PIs in their area, paying particular attention to diversity and inclusion. Ongoing mentorship by the Area or Division will be essential for the success of the ECD PIs, thus ALDs/Division Directors should also prepare a mentoring plan for the PIs, and a mentoring plan should be submitted with the application.

ALDs and Division Directors will review the ECD proposals in their Area; they may also include additional reviewers in the process. The ECD PIs will be involved in a single round of review involving the written proposal and possibly a presentation to Area and Division management. Each ALD will forward the top ECD Proposal from their Area.

The selected ECD proposals from all Areas will then be presented by their PIs to the Lab Director, Deputy Lab Director, and all ALDs.

II. FY21 Area-priorities

The Area-priority LDRDs are encouraged in new "breakthrough" science areas. Within each Area, the particular research topics for which proposals are especially encouraged are:

Biosciences: i) Biomaterials; ii) Single Cell Characterization; iii) Biodefense / Biodetection; iv) Tools for Plant- and Microbe-mediated Carbon Capture; v) Quantum Imaging and Sensing; and vi) Integrated Hybrid Methods.

Computing Sciences: i) New mathematical and statistical methods, including machine learning methods, that enable new capabilities in modeling, simulation, data analysis and control of scientific instruments or energy systems; ii) Methods and systems to address complex data problems using HPC; iii) Techniques that explore new "superfaciity" research challenges and use cases that integrate HPC and networking facilities with experimental and observational facilities; iv) Architectures, programming frameworks and system software for resilience, security, productivity and performance on future architectures, including advanced microelectronics devices, quantum devices, and specialized architectures "at the edge". New cross-divisional and cross-area partnerships are especially encouraged.

Earth and Environmental Sciences: i) Novel experimental and modeling approaches for subsurface properties

and processes; ii) Novel methods for sensing ecosystem function and response to environmental stresses; and iii) Science underpinning resiliency of natural resources and the built environment to a range of environmental stressors and hazards.

Energy Sciences: i) Novel routes to use the brightness and coherence of the upgraded ALS, and emerging capabilities at the Molecular Foundry, particularly to probe chemical reaction mechanisms and kinetics, novel electronic materials, and the properties of complex soft, environmental, and biological systems; ii) Predictive chemical synthesis and accelerated materials discovery; dynamical measurements beyond pump-probe for chemical transformations; responsive and reconfigurable materials; and quantum molecular and materials systems; and iii) Artificial intelligence and machine learning in chemistry and materials.

Energy Technologies: i) Integrated Energy Systems: Develop spatiotemporal technologies and simulation tools to explain and engineer the dynamics of increasingly coupled energy systems (transportation, buildings, and industry) using the latest advances in computational, economic and policy science; ii) Energy Storage Across Time and Length Scales: Novel concepts and foundational science for large-scale energy storage systems for stationary applications capable of >10 hours of discharge based on recent advances in chemistry and materials sciences with associated techno-economic and policy analysis; iii) Resilient Communities and Infrastructure: increase the resilience of the built environment to natural stressors, through a focus on metrics and measurement, prediction and modeling, and scalable technology and materials; iv) Science of Manufacturing: enable a more circular economy through advances in chemical synthesis, materials science, and life-cycle assessment.

Physical Sciences: i) new scientific opportunities in particle physics and cosmology; ii) new opportunities in nuclear science; iii) advanced accelerator systems for colliders and other applications including high power lasers; iv) novel technical concepts and capabilities: especially microelectronics, semiconductor detectors, "Quantum Information Science" technology, superconducting magnets; v) novel computing capabilities applied to particle physics, cosmology, nuclear science and accelerators; vi) new opportunities in fusion energy sciences.

An important priority for the Physical Sciences Area is to establish the technical capabilities for Berkeley Lab leadership roles in upcoming scientific opportunities identified in the Nuclear Physics Long Range Plan, and the High Energy Physics P5 report, and the Fusion Energy Sciences Long Range Plan. These include the Electron-Ion Collider (EIC), the Stage 4 Cosmic Microwave Background project (CMB S4), long baseline neutrino experiments, ton-scale neutrino-less double-beta decay experiments, high power lasers, superconducting magnet science and technology and other opportunities.

III. Detailed Requirements and Review Process

Proposals must include a:

- Cover Sheet
- Technical proposal (as described below)
- Budget Request form
- NEPA/CEQA form
- Human Subject and Animal Use form
- Intellectual Property forms

The technical proposal section may not exceed a maximum of three pages of text with one additional page for figures and references. Continuing project proposals must include within the page limit a statement of progress to date, detailed scope and deliverables for the current fiscal year, as well as prospects for follow-on funding.

Proposed work cannot supplement existing DOE projects, nor can it contain construction line items or maintenance activities. The expected duration of projects started in FY21 should target two years, with a third year available in outstanding and exemplary circumstances. However, second year funding is not guaranteed and will be based on several factors including progress towards goals and successful stewardship of project funding.

Proposals should be prepared carefully following the given specifications and requirements available online at Detailed Proposal Guidance.

Budget

Budgets must include payroll burden, procurement burden and support burden, if applicable, along with scientific organization burden. A Site Support overhead estimate should be included as a separate line item if applicable.

V. Schedule and Support

The nominal schedule for the FY 2021 cycle is posted - see LDRD Review Schedule. Final detailed scheduling of the review period and any presentations will be arranged by the ALD and/or Lab Director's offices.

Investigators should work with their divisional or Area support staff to prepare their LDRD proposals. Administrative questions on LDRD may be addressed to Darren Ho (dho@lbl.gov).

For additional information about the purpose and implementation of the LDRD program at Berkeley Lab, please click this link: http://www.lbl.gov/DIR/assets/docs/LDRD_Guidelines_10-09-c.pdf

Information about the Laboratory LDRD proposal submission and review process can be found at: http://www.lbl.gov/DIR/LDRD/cfp/process.html

FY 2021 Laboratory Directed R&D (LDRD) Proposal Schedule

Schedule as of March 17, 2020. For any updates, please go to: http://www.lbl.gov/DIR/LDRD/cfp/schedule.html

Before January 1, 2020	Director issues Call for Proposals and guidance for FY 2021 LDRD to ALDs, Division Directors, and staff scientists via e-mail and Elements.
~~**March 23, 2020**~~ **March 27, 2020**	Principal investigators submit and lock FY 2021 LDRD proposals in the web-based submission system for Division processing. Associate Laboratory Directors (ALDs) initiate review processes.
March 25, 2020	ALDs begin preliminary review of all proposals from their Area.
April 15, 2020	ALDs identify proposals selected for Early Career Development track review.
May 11, 2020	Presentation and Review Meetings for FY 2021 ECD and Area/Divisional Priority proposals.
May 12, 2020	Presentation and Review Meetings for FY 2021 Area/Divisional Priority proposals.
July 1, 2020	Director or Deputy Director for Research notifies ALDs and Division Directors of preliminary FY 2021 awards.
September 1, 2020	LDRD Office notifies successfully awarded FY 2021 PIs. Project concurrence requests are provided to DOE-Bay Area Site Office (BASO).
October 1, 2020	DOE project concurrence is provided, and LDRD projects begin work.
December 15, 2020	Awards announced in Elements after final allocations are made.