

Call for Proposals

FY 2016 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 FY2016 LDRD program will have two funding tracks for proposals:

- A) The Lab-Initiative track and
- B) The Area Priority track.

A) The Lab-Initiative Track

Proposals in the Lab-Initiative track should foster the development of new teams and activities in areas that directly support the high level strategic goals of the Laboratory (<http://www.lbl.gov/LBL-Programs/>).

These proposals will be submitted to one of four strategic initiatives:

- 1) Exploration of Novel Computing Technologies
- 2) ALS-Upgrade Science and Technology
- 3) Microbes to Biomes
- 4) Energy Innovation

Proposals outside of the topics listed above that support other potential Laboratory-wide strategic goals will be grouped together in an additional general category.

PIs will indicate on their proposal submission that they wish to be reviewed under the Lab-Initiative funding track.

Criteria

All proposals will be evaluated based on: i) their alignment with the Lab's strategic initiatives, ii) the quality of the proposed research, and iii) the ability to leverage the unique cross-divisional capabilities of the Lab.

Review

Lab-Initiative proposals will be reviewed in two rounds:

- 1) First by a committee formed and managed by the *Initiative Review Lead* (see table below), and
- 2) Second by the Scientific Division Directors, Associate Laboratory Directors, and Senior Lab management.

Both reviews will involve a combination of an evaluation of the written proposal and presentation(s) to a review team. The proposal text and presentation may be modified after the first round based on input from the review committee.

The *LDRD Lab-Initiative Review Leads* will organize and manage the first round of review, including selection of other experts for the review committee.

For the second round of review, the set of related Lab-Initiative proposals will be presented as a portfolio to a review committee of the Scientific Division Directors, Associate Laboratory Directors, and other Senior Lab management. For the second presentation, the Initiative Review Lead will also be responsible for a coordinated presentation of the proposals and may include one or more of the PIs.

Proposals that are considered scientifically competitive by the first review committee, but not well aligned with the Lab-Initiative, will be automatically considered in the Area Priority track.

B) The Area Priority Track

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

- 1) Biosciences,
- 2) Computing Sciences,
- 3) Energy Sciences,
- 4) Energy Technologies, and
- 5) 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.

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 review 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 final ranking and funding level recommendations.

II. FY16 Lab-Initiatives

As described above, new Lab-Initiative proposals will be considered, especially those aligned with one of the topics of the Lab Strategic Plan:

Exploration of Novel Computing Technologies: We intend to fund proposals that address the use of non-traditional computing technology, such as quantum or neuromorphic computing, that show promise for scientific computations. DOE is a leader on the use of advanced computing techniques for both simulation and data analysis, but with transistor density improvements slowing, there is a growing interest in alternatives to traditional digital devices and computer architecture models. Proposals are encouraged in the foundational areas for new computing models and algorithms for novel technologies,, as well as cross-area collaborations to demonstrate novel technologies and their relevance to scientific problems.

ALS-Upgrade Science and Technology: Proposals are encouraged from all divisions to continue building the case for upgrading the ALS for diffraction-limited operation throughout the soft x--ray regime. Proposed projects are expected to seed new science and technology, for example, using existing facilities or using simulation. Of particular interest are i) proposals for accelerator R&D that reduce risk in the emerging ALS--U conceptual design and ii) proposals that exploit the unique high brightness, high coherence capabilities of diffraction limited soft x--ray beams to probe chemical, material, biological, and earth/environmental systems with high spatial, temporal, and spectral resolution.

Microbes to Biomes: We seek proposals to develop a mechanistic understanding of multi-scale interactions among molecules, microbes, plants, metazoans, and/or the abiotic environment, and their feedbacks. Topics could include research to understand gut, soil, or other microbiomes that are important for fuel, food, health, and environmental security.

Energy Innovation: We seek proposals in Energy Innovation that will lead to high impact if successful, in areas of energy generation, transmission and distribution, storage, monitoring, control, and communication, and end-use. We also seek proposals that address global and local environmental impacts of energy use, as well as address adverse health impacts of energy use via innovative approaches.

One particular topic of interest is next-generation water systems at scale: we seek proposals that contribute to building a crosscutting, multi--disciplinary Berkeley Lab water--energy nexus research portfolio. Coherent research approaches that include basic science, technology, socio-economics and policy

to provide substantial economic and environmental benefits are invited. Proposals addressing the following R&D thrusts are strongly encouraged:

- Science and Technology (S&T) breakthrough solutions for lowering energy intensity/cost of clean water. ('Energy for Water')
- Revolutionary S&T concepts for reducing energy and water use in industrial processes, including agriculture and energy production. ('Water for Energy')
- Climate--water--energy modeling and analysis for actionable government planning.

Initiative Topic	LDRD Lab-Initiative Review Lead / Deputy
Exploration of Novel Computing Technologies	Jonathan Carter / Kathy Yelick
ALS-Upgrade Science and Technology	Steve Kevan / Melissa Summers
Microbes to Biomes	Jay Keasling / Jim Bristow
Energy Innovation	Ramamoorthy Ramesh/ Ashok Gadgil

III. FY16 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) fundamental advances in synthetic biology that relate to energy and environment; ii) research on ecosystem resilience to environmental change and methods to improve environmental quality and resource utilization; iii) biological responses to environmental challenges; and, iv) scalable and flexible bio-manufacturing technologies for energy and environment.
- Computing Sciences: i) new mathematical approaches for enhancing scientific discovery; ii) advanced algorithms, software techniques, and networking for data-intensive sciences; iii) research into scalable applications to deliver new scientific capability on future exascale machines.
- Energy Sciences: novel theoretical and experimental approaches to: i) systems with bio-inspired functionality, ii) in situ and operando chemistry, iii) Earth material properties and dynamics, iv) imaging and spectroscopic characterization of materials, and v) quantum materials.
- Energy Technologies: i) Next Gen Grid: measurement, control, and communication techniques for energy and environmental systems, particularly, focused on next generation Grid and energy distribution; ii) Urban Systems: with a strong focus on buildings efficiency, dynamic and scaled energy efficiency in buildings; iii) EV Everywhere: next generation transportation: including low cost storage concepts; EVs as a part of the

grid; integration of transportation with buildings; and, iv) water-climate-energy dependencies and trajectories, including impacts to water quality. (v) Advanced Manufacturing: this will be a new focal point for this year and we are looking for proposals that will help establish LBL as a key player in the Manufacturing space, with a focus on energy systems (generation, storage, additive manufacturing, 3-D printing).

- Physical Sciences: i) scientific opportunities in high energy and nuclear physics; ii) advanced accelerator systems; iii) development of novel technical capabilities especially microelectronics; iv) semiconductor detectors, superconducting magnets and composite materials; and, v) community impact of nuclear energy.

IV. Detailed Requirements and Review Process

Proposals must include:

- 1) Cover Sheet,
- 2) Technical proposal (as described below),
- 3) Budget Request form,
- 4) NEPA/CEQA form,
- 5) Human Subject and Animal Use form, and
- 6) Intellectual Property forms

The technical proposal section may not exceed a maximum of three pages of text with up to one additional page for figures and references. *Continuing project* proposals must include within the three-page limit a statement of progress to date, current fiscal year plans, 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 FY16 is two years*, with a third year available in outstanding and exemplary circumstances.

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. General laboratory overhead (e.g., general and administrative overhead and site support) estimate should be included as a separate line item.

V. Schedule and Support

The nominal schedule for the FY 2016 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 2016 Laboratory Directed R&D (LDRD) Proposal Schedule

Schedule as of January 8, 2015. For any updates, please go to:

<http://www.lbl.gov/DIR/LDRD/cfp/schedule.html>

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| <i>January 8, 2015</i> | Director issues Call for Proposals and guidance for FY 2016 LDRD to ALDs, Division Directors, and staff scientists via e-mail and TABL. |
| <i>March 30, 2015</i> | Principal investigators submit and lock FY 2016 LDRD proposals in the web-based submission system for Division processing. Associate Laboratory Directors (ALDs) initiate review processes. |
| <i>April 6, 2015</i> | ALDs begin preliminary review of all marked “Lab-Initiative” proposals and send non-selected proposals back to the appropriate Division and Area review teams for consideration. |
| <i>April 27, 2015</i> | ALDs complete reviews and rankings for “Area Priority” proposals. |
| <i>April 27, 2015</i> | ALDs finalize their reviews and recommendations for the “Lab-Initiative” proposals. |
| <i>May 11, 2015</i> | Presentation and Review Meetings for all FY 2016 “Lab-Initiative” proposals. |
| <i>May 12, 2015</i> | Presentation and Review Meetings for all FY 2016 “Area Priority” proposals. |
| <i>July 1, 2015</i> | Director or Deputy Director notifies Associate Laboratory Directors and Division Directors of preliminary FY 2016 awards. Awards will also be announced after the start of the fiscal year in <i>Today at Berkeley Lab</i> after final allocations are made, DOE concurrence is received, and authorization to proceed is provided. |