Call for Proposals

FY 2017 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 FY2017 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 five strategic initiatives:

1) Exploration of Novel Computing Technologies
2) ALS-Upgrade Science and Technology
3) Microbes to Biomes
4) Water-Energy Systems at Scale
5) Quantum to Cosmic – Q2C

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

Principal Investigators (PIs) will indicate on their proposal submission that they wish to be reviewed via 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, iii) the ability to leverage the unique cross-divisional capabilities of the Lab, and iv) the uniqueness and novelty of the proposed project.

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 reviewed via 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) Earth and Environmental Sciences,
4) Energy Sciences,
5) Energy Technologies, and
6) 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. FY17 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 new digital, neuromorphic, or quantum models of 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 simulations. Of particular interest are i) proposals for accelerator R&D that reduce risk in the emerging ALS--U conceptual design and ii) proposals to probe nanoscale chemical, material, biological, and earth/environmental systems with high spatial, temporal, and spectral resolution; exploiting the unique high brightness, high coherence capabilities of diffraction-limited soft x--ray beams.

Microbes to Biomes: We seek proposals to develop a mechanistic understanding of multi-scale interactions and feedbacks between molecules, microbes, plants, metazoans, and environmental or human host systems. We particularly seek proposals to sense, reproducibly measure and manipulate biome components across a range of length scales and complexities as well as novel modeling approaches to predict manipulation outcomes. Proposals can focus on model systems or complex natural biomes important for fuel, food, health, and environmental security, including the soil-plant and gut biomes. More information about the Microbes to Biomes initiative is provided at http://m2b.lbl.gov/.

Water-Energy Systems at Scale: We seek proposals that contribute to building a crosscutting, multi-disciplinary Berkeley Lab water-energy nexus research portfolio, with particular emphasis on development of understanding and approaches needed to guide National and California state investments in water and energy systems. Please go to waterenergy.lbl.gov for more information. Proposals addressing the following R&D thrusts are strongly encouraged:

- Science and Technology (S&T) breakthrough solutions for lowering energy intensity/cost of desalinization. ('Energy for Water')
- Revolutionary S&T concepts for sustainable and efficient fresh water systems, including: water banking, rewater use and water quality aspects associated with agriculture, energy production and industrial processes. ('Water and Energy')
- Climate and ecosystem readiness including prediction and adaptation strategies to guide actionable government planning.

Quantum to Cosmic (Q2C): We seek proposals to prepare Berkeley Lab for leadership roles in upcoming scientific opportunities including the high luminosity Large Hadron Collider (HL-LHC), the Electron-Ion Collider (EIC), and the Stage 4 Cosmic Microwave Background project (CMB S4), with emphasis on cross-divisional partnerships among the Physical Sciences Divisions, and with NERSC and CRD. This initiative aims to rebuild our capabilities to undertake large technical projects and foster the core competencies in microelectronics, semiconductor detectors, superconducting magnets, composite materials and large scale scientific simulations.

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	Eoin Brodie / Trent Northen
Water-Energy Systems at Scale	Ramamoorthy Ramesh / Susan Hubbard
Quantum to Cosmic	Natalie Roe / Henrik von der Lippe

III. FY17 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 cross-divisional partnerships that use advanced computational and mathematical techniques to produce unique lab capabilities ii) advanced algorithms, software techniques, and networking for science at the boundary of observation and simulation; iii) models, algorithms, and software models that will leverage future exascale systems to deliver transformational scientific capabilities.

- Earth and Environmental Sciences: i) Dynamic biological-environmental feedbacks across scales in surface and subsurface systems; ii) earth system properties and dynamics; iii) scale-aware approaches for simulating subsurface through atmosphere processes

- Energy Sciences: novel theoretical and experimental approaches for: i) in situ imaging and spectroscopic characterization techniques that bridge time and length scales, ii) in situ and operando chemistry, iii) design of quantum matter, iv) material systems with bio-inspired and bio-compatible functionalities, and v) synthetic methods for novel chemicals and 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) 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) new scientific opportunities in particle physics and cosmology; ii) new opportunities in nuclear physics identified by the NP long range plan; iii) advanced accelerator systems for colliders and other applications; iv) development of novel technical capabilities especially microelectronics; semiconductor detectors, superconducting magnets and composite materials.

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, 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 FY17 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 2017 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 2017 Laboratory Directed R&D (LDRD) Proposal Schedule

Schedule as of December 17, 2016. For any updates, please go to:
http://www.lbl.gov/DIR/LDRD/cfp/schedule.html

Before January 1, 2016	Director issues Call for Proposals and guidance for FY 2017 LDRD to ALDs, Division Directors, and staff scientists via e-mail and TABL.
March 25, 2016	Principal investigators submit and lock FY 2017 LDRD proposals in the web-based submission system for Division processing. Associate Laboratory Directors (ALDs) initiate review processes.
April 1, 2016	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.
May 2, 2016	ALDs complete reviews and rankings for "Area Priority" proposals.
May 2, 2016	ALDs finalize their reviews and recommendations for the "Lab-Initiative" proposals.
May 16, 2016	Presentation and Review Meetings for all FY 2017 "Lab-Initiative" proposals.
May 17, 2016	Presentation and Review Meetings for all FY 2017 "Area Priority" proposals.
July 1, 2016	Director or Deputy Director notifies Associate Laboratory Directors and Division Directors of preliminary FY 2017 awards. Awards will also be announced in *Today at Berkeley Lab* after final allocations are made, DOE concurrence is received, and authorization to proceed is provided.