

December 18, 2012

TO: Division Directors and Associate Laboratory Directors
FROM: A. Paul Alivisatos, Laboratory Director
SUBJECT: Laboratory Directed Research and Development FY 2014 Call for Proposals

With this Call for Proposals, I am initiating the FY 2014 Laboratory Directed Research and Development (LDRD) Program. The LDRD program constitutes one of the principal means to seed innovative science and new research directions.

An important factor in judging proposals will be their support of competencies aligned with the Laboratory's and DOE's strategic directions. Multi-investigator and multi-divisional initiatives are particularly encouraged. For the FY 2014 cycle, we will review a first subset of proposals as Lab-initiatives, and a second subset as Area proposals.

Successful **Lab-initiative related proposals** will likely be:

- cross-disciplinary projects aimed at reducing human interference with the natural carbon cycle;
- projects from all divisions that advance the boundaries of ultrafast photon science;
- projects that address the development of a biological manufacturing capability to create advanced energy sources, chemicals, and materials; and,
- projects that address the use of large-scale computation and data science.

Additionally, the ALDs, Deputy Lab Director, and I have agreed on a set of high-priority topics for **Area LDRD submissions**:

- Biosciences: i) solutions to reduce the cost and impacts of energy production; ii) ecosystem research to improve environmental quality and sustainably optimize natural resource usage; and, iii) determining the interdependence between the environment and organismal health.
- Computing Sciences: i) mathematics applied to new science areas; ii) advanced networking for data-intensive sciences; and, iii) computing technology for "beyond CMOS" performance growth.
- Energy & Environmental Sciences: i) Mesoscale science; ii) sustainable chemistry and materials; iii) integrated assessment of water, energy, and climate; iv) technology for the developing world; and, v) ultrafast science.
- General Sciences: novel scientific ideas, interdivisional proposals, and those topics that could lead to a major new initiative in the General Sciences.
- Photon Sciences: light source science and advanced hardware concepts.

All projects should have: a clearly stated problem (addressing a challenging scientific question, DOE mission, or national need), coherent objectives, and a well-considered plan for leadership, organization, and budget. Lab initiative proposals should support the high-level strategic goals of the Lab. Area proposals will be evaluated on their novelty and scientific quality and may involve higher-gain, higher-risk ideas.

For the FY 2014 cycle, Lab-initiative related proposals will be reviewed by a broad representation of all senior managers. The Area LDRD submissions will be reviewed and assessed this year by scientific Area priority; i.e. the Associate Laboratory Director (ALD) and the Division Directors within each Area will rank proposals within that Area, and then make recommendations to the Deputy Laboratory Director and Laboratory Director. It will be important to read the full Call for Proposals for further guidance and detailed instructions.

The total funding level of the FY 2014 LDRD program should be about \$23M for operating and capital equipment expenses (including G&A). Capital equipment funding requests in LDRDs must support a project that receives LDRD operating funds. This Call for Proposals (CFP) will be announced in *Today at Berkeley Lab*, and a copy of this memo will be emailed directly to Berkeley Lab scientists and engineers. The complete call, schedule, guidance, and forms will be available on the Web (<http://www.lbl.gov/DIR/LDRD/>). All proposals are to be submitted through a web-based submission system that can be accessed via the CFP website.

Proposals should be put into the submission system by Monday, March 11, 2013. For any other questions or assistance, please e-mail Darren Ho (DHo@lbl.gov).

Attachments

C: Senior, Staff, and Faculty Scientists & Engineers via email (w/o Attachments)
Deputy Laboratory Director
Chief Operating Officer
Chief of Staff
Business Managers
Chief Financial Officer
D. Ho

Call for Proposals

FY 2014 Laboratory Directed Research and Development Program

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 FY2014 LDRD program will have two types of proposals:

Lab-initiative proposals should foster the development of new teams and activities in areas that directly support the high level strategic goals of the Laboratory, see <http://www.lbl.gov/LBL-Programs/>. These proposals will be submitted to one of the strategic areas (NGLS Science, CC2.0, Biomanufacturing, and Big Data Science). They will be evaluated based on their alignment with the Lab's strategic initiatives, the quality of the proposed research, and the ability to leverage the unique cross-divisional capabilities of the Lab. Lab-initiative proposals will be reviewed in two rounds, first by a committee formed and managed by the *Initiative Review Lead*, given below, and second by the Scientific Division Directors, Associate Laboratory Directors, and Senior Lab management. Proposals that are considered scientifically competitive by the first committee, but not well aligned with the Lab-initiative, will be automatically considered as an Area proposal.

Area proposals will be accepted in each of the scientific Areas of the Lab (Biosciences, Computing Sciences, Energy and Environment, General Sciences, and Photon Sciences). Area 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 high scientific impact are strongly encouraged.

For additional information about the purpose and implementation of the LDRD program at Berkeley Lab, please click the link below:

Requirements and Review Process

Proposals must be a maximum of 3 pages of text with up to 1 additional page for figures and references. *Continuing project* proposals must include within the 3 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 FY14 is two years, with a third year available in outstanding and exemplary circumstances.*

Lab-initiative proposals, as described above, will be reviewed in two rounds. Both rounds involve evaluation of the written proposal and an in-person presentation to a review team. The proposal text and presentation may be modified after the first round based on input from the review committee. The following *LDRD Initiative Review Leads* will organize and manage the first round of review, including selection of other experts for the review committee. For the second review round, the set of related Lab-initiative proposals will be presented as a portfolio to a review committee of the Scientific Division 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.

Initiative Topic	LDRD Initiative Review Lead / Deputy
Advanced Photon Science	Bob Schoenlein
CC2.0	Don De Paolo / Melissa Summers
Biomanufacturing	Jay Keasling / Ed Turano
Big Data Science	David Brown / Jonathan Carter

Area Proposals: The Associate Laboratory Director and the Area 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 a presentation to Area and Division management. The highly ranked Area Proposals will be presented by ALD or Division Director to the Lab Director and Deputy Lab Director for final ranking and funding level recommendations.

Proposals should be prepared carefully following the given specifications and requirements. **Detailed Proposal Guidance** is included with this Call. Proposals must have a Cover Sheet, Budget Request form, and NEPA/CEQA, Human Subject and Animal Use, and Intellectual Property forms. 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. Additional information about the Laboratory LDRD proposal process can be found at the following web address:

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

FY14 Lab-Initiative Priorities

As described above, Lab-initiative proposals must be aligned with one of the topics of the Lab Strategic Plan:

Carbon Cycle 2.0 (CC2.0): This year, we continue to encourage proposals that enhance the technical basis for the Carbon Cycle 2.0 initiative. (<http://carboncycle2.lbl.gov>). The CC2.0 initiative is entering a second phase where emphasis will be placed on fundamental science that may serve as a basis for radically new future technologies, and on translational research that can potentially accelerate the adoption of existing technology or move promising discoveries to a higher level of technology readiness. Cross-disciplinary and cross-Divisional projects continue to be encouraged

Photon Science: Proposals from all divisions that advance the boundaries of ultrafast photon science are also encouraged. These projects are expected to seed new science programs, initially using existing facilities, but eventually exploiting the unique capabilities of the proposed Next Generation Light Source (NGLS). Further details for the latter can be found at:

<http://sites.google.com/a/lbl.gov/ngp> (for use only inside lbl.gov).

Biomanufacturing: We will also solicit proposals that address the integration of capabilities in the biosciences and the focused application of biological tools to solving problems in energy, environment, health, and manufacturing. These would include developing a biological manufacturing capability to create advanced energy sources, chemicals, and materials

Big Data Science: We also intend to fund proposals that address the use of large-scale computation and data science in areas of strategic importance to the lab. Of particular interest are topics related to the management and analysis of large-scale data from the laboratory's scientific facilities. Proposals are encouraged in foundational area of computing research related to Scientific Data analysis, as well as cross-area collaborations to apply advanced computing and data analysis to scientific problems throughout the Lab.

FY14 Area Priorities

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

- Biosciences: i) solutions to reduce the cost and impacts of energy production, ii) ecosystem research to improve environmental quality and sustainably optimize natural resource usage, iii) determining the interdependence between the environment and organismal health.
- Computing Sciences: i) mathematics applied to new science areas, ii) advanced networking for data-intensive sciences, iii)

- computing technology for “beyond CMOS” performance growth.
- Energy & Environmental Sciences: i) Mesoscale science, ii) sustainable chemistry and materials, iii) integrated assessment of water, energy, and climate, iv) technology for the developing world, v) ultrafast science
 - General Sciences: novel scientific ideas, interdivisional proposals, and those topics that could lead to a major new initiative in the General Sciences.
 - Photon Sciences: light source science and advanced hardware concepts.

Schedule and Support

The nominal schedule for the FY 2014 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 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).

FY 2014 Laboratory Directed R&D (LDRD) Proposal Schedule

<i>December 18, 2012</i>	Director issues call for proposals and guidance for FY 2014 LDRD to Division Directors and staff scientists.
<i>January 7, 2013</i>	Deputy Director re-issues call for proposals and guidance for FY 2014 LDRD to Division Directors and staff scientists as a reminder.
<i>March 11, 2013</i>	Principal investigators submit and lock FY 2014 LDRD proposals in the web-based submission system for Division processing. Associate Laboratory Directors (ALDs) initiate review processes.
<i>March 25, 2013</i>	ALDs complete initial “Lab-initiative” reviews and send non-selected proposals back to the appropriate Area for consideration
<i>April 19, 2013</i>	ALDs complete “Area” reviews
<i>April 26, 2013</i>	Associate Laboratory Directors finalize their recommendations for the “Lab-initiative” proposals and rankings for “Area” proposals submitted.
<i>May 9 & 10, 2013</i>	Review Meetings for all FY 2014 Lab-wide and Divisional proposals.
<i>July 1, 2013</i>	Director or Deputy Director notifies Associate Laboratory Directors and Division Directors of preliminary FY 2014 awards. Awards will also be announced after the start of the fiscal year in <i>Today at Berkeley Lab</i> after DOE approval and authorization to proceed, and after final allocations are made.

Laboratory Directed Research and Development

Detailed Proposal Guidance

Cover Sheet

Project titles should be complete, and indicate what is new and innovative. They should enable reviewers to differentiate between the project and other ongoing research. Generic titles should be avoided, such as “Ceramic Studies” or “Data Acquisition Electronics.” Titles should be technically informative and up to 12 words in length. An example is: “Experimental Testing of Novel Mismatch Repair Enzymes for Mapping Natural Genetic Polymorphisms.”

Typically, the location of the research should not be included in the title unless the scope of the project bears directly on the facility. Phrases such as “at Berkeley Lab,” “at RHIC at Brookhaven,” or “at the ALS” normally are not useful. If the project location does have such bearing, it is important to make clear in the proposal the difference between the project and the existing operating program, including the reason the project does not augment the facility’s budget. Because LDRD is for conducting actual research rather than establishing organizations, titles and proposals need not refer to the creation of centers or institutes, but rather address the technical context of the project itself.

The purpose and approach statements of the proposal cover sheet will be used for the approval submissions and reports sent to DOE. Thus, these paragraphs should be self-contained and complete, and must fit in the space provided. The form is to be prepared and submitted electronically through the web-based proposal submission system.

Projects that may extend beyond one year should describe what is achievable during each fiscal year. Multi-year projects must compete each year with all other new and continuation proposals, and resubmissions should indicate what is being accomplished during the current year and what is being proposed for the fiscal year under proposal review.

Budget

Narratives and budgets must be consistent. If staff effort and activities are described in the narrative, they must be covered in the budget. LDRD projects cannot be supported by other funds, either DOE or Work For Others. LDRD projects may utilize existing equipment or facilities of the laboratory, and they may acquire or fabricate additional equipment. However, if the scope of the project is to fabricate new innovative equipment, both the operational effort of personnel and purchase of items must be completely covered in the LDRD project budget. LDRD budgets must be able to achieve a self-contained scientific purpose and scope. Thus LDRD projects cannot be proposed solely for the purchase of equipment, since this equipment must be operated to achieve some purpose. However, the preliminary design or prototype fabrication of new equipment may be proposed to extend or develop some new technique, process, capability, etc.

For approved projects, divisions must retain notes or documentation of cost estimates provided in the proposed budgets, following budgetary guidance issued by the Chief Financial Officer. These notes should include the estimates of staffing levels and notes of vendor quotes or catalog references. Notes for funded projects should be held in division files for potential cost validations to be performed by the Department of Energy or other auditors. During proposal preparation, Principal Investigators should retain notes in anticipation of these cost validation requirements. Divisional organization burden is to be included, which is around 16-22%, as well as appropriate indirect costs. The Laboratory’s General and Administrative (G&A) and site support burdens are included in LDRD costs, and are not to be redirected to other cost categories.

Please consult with division staff or the Budget Office for specific details of your division's burden rate and indirect charges. LDRD projects have overhead accounts monitored by the Directorate and are not a part of other budget units of the Laboratory. Nevertheless, all staff administering the LDRD accounts must adhere to all financial and cost accounting principles as well as other programmatic requirements applicable to the Laboratory and their division. Monthly cost profiles will be required of all successful projects at the start of the fiscal year.

Proposal Narrative

The proposal narrative is to be a maximum of three pages, though a fourth page of figures and references may be included. It should be a brief, stand alone description of the scientific goal(s) or problem(s), the hypothesis for a solution, and the work to be performed to test the hypothesis. Descriptions should also include the significance and value of the work if successful. There should also be a short discussion of who will conduct the work, and continuing projects must include a statement of progress to-date and future plans within the three-page limit. The proposal will be photocopied in black-and-white and so should be readable, and any figure(s) informative, in such a reproduction. There should be adequate 1" margins for readability and three-hole punch.

A lab-wide Linux cluster computer named Lawrencium is available to the Lab scientific community for general use. Details about the cluster can be found at <http://lrc.lbl.gov>. If you require access to this cluster for your proposed project, you should include this information in the proposal and estimate the number of node-hours you will be requesting for the fiscal year.

Annual Report

Information for the Annual Report will be requested during the first two months of the following fiscal year. The purpose of the report is to give a brief overview of the project and its general scope of accomplishments to the Department of Energy and senior laboratory managers. The request will call for a Project Description, typically an update and revision to the "purpose and approach" paragraphs of the proposal coversheet, and an additional one to three paragraphs to describe the findings/outcomes for the year. Long, elaborate narratives of methodological details, extensive tabular data, or detailed scientific justification or results, will not be appropriate to this report. Other requirements are a list of published, submitted, or draft papers and reports that are the direct result of project funding, and answers to a questionnaire on program metrics such as people hired and/or invention disclosures. This report is not considered a "publication," rather it is a short synopsis for reporting to government entities on the use of taxpayers funds. Information should not be included in this report that is appropriately reserved for a scientific publication or patent disclosure. The final report is made available to the National Technical Information Service and posted on the World Wide Web.

Process

The process for LDRD will initially be similar to FY 2013, with proposals to be completed and submitted through the web-based proposal submission system. Oversight responsibility is delegated to the Deputy Director. Administrative questions on LDRD may be addressed to dho@lbl.gov.

1. Investigators, with assistance from division support staff as needed, prepare and lock their LDRD forms and pdf of the scientific proposal in the web-based proposal submission system following the Call Schedule. Included at this time are EH&S, NEPA/CEQA, and Human and Animal Use forms.
2. The final proposal will be a pdf file generated in this system consisting of the coversheet, budget page, 3-page scientific proposal narrative, and EH&S forms. The proposals will be available for review and use by divisional LDRD Point of Contacts, Business Managers, and Division Directors. The system provides options for reviewers at the division level to rank and add comments as desired and specified by the Division Director. The final proposal pdf files will also be accessible to laboratory senior managers and staff for review.
3. Associate Laboratory Directors will choose a review procedure to evaluate and rank proposals in their area. They may solicit expert scientific advice inside and outside of their area in their proposal review. Proposals for all continuing projects must be submitted and ranked along with proposals for new research. In addition, Division Directors and Associate Laboratory Directors must analyze the budget for each proposal and recommend a revised budget if appropriate.
4. Occasionally a proposal will be submitted that is outside the main ongoing interests of a division's research area. These proposals should be flagged to insure they receive attention from relevant laboratory scientists.
5. A subset of the proposals should be proposed by Associate Laboratory Directors to the Deputy Director to be considered as major new directions for a broader "Laboratory-initiative" review and selected proposals will receive a special review separate from the balance of the proposals.
6. An ordinal ranking of all other proposals for the Area proposal reviews will be submitted by Associate Laboratory Directors as an outcome of their internal area review process.
7. Associate Laboratory Directors will give a presentation of the area proposals to a review committee composed of the Laboratory Director, Deputy Laboratory Director, and Division Directors from the same program area. The presentations will be open to all Division Directors. If deemed necessary, the Laboratory Director or Deputy Laboratory Director may also request the presence and/or advice of other scientific experts. Each Associate Laboratory Director must be

- prepared to answer questions about all aspects of highly ranked proposals, and make recommendations on final funding level for supported proposals.
8. The Laboratory Director and Deputy Laboratory Director confer with Associate Laboratory Directors for final selection recommendations. They will also ask for additional assessments from scientific managers and experts, possibly external as well as internal to the lab, on the scientific relevance of self-identified proposals related to the laboratory's major initiatives.

Required Information

Proposals should be prepared carefully following the given specifications and requirements. A Detailed Proposal Guidance is included with this Call. Proposals must meet the following requirements:

- Proposal length cannot exceed three pages. Figures and references may be included as a fourth page. Any other material exceeding the three-page limit will *not* be forwarded to the reviewers.
- The Cover Sheet, Budget Request, NEPA/CEQA review, Human Subjects/Animal Use, and Intellectual Property forms must be filled out and submitted as instructed through the web-based submission system. Because of external reporting and approval requirements for the LDRD program, it is especially important that all fields on the coversheet are completed.
- Proposals must contain clear statements of goals, work to be performed, how work will be done, and who will conduct the research.
- Proposals should describe the significance and value of the work, if successful.
- Proposals for continuing projects must include a statement of progress to date and current fiscal year plans within the three-page limit.
- Budget Requests must include payroll burden and support burden if applicable. Scientific organization burden and procurement burdens must also be included. General laboratory overhead (e.g., general and administrative overhead and site support) estimate should be included as a separate line item.