OFFICE OF THE DIRECTOR

TO: Bruce Dunham, Mike Dunne, Michael Fazio, Tony Heinz, JoAnne Hewett, Paul McIntyre

FROM: Chi-Chang Kao

DATE: March 13, 2020

SUBJECT: FY2021 LDRD Call for Proposals (Proposal due date April 21, 2020)

The LDRD program is a mechanism for aligning our forefront scientific research and technical capabilities towards addressing vital and emerging challenges at the national level. By allocating investment for rapid and significant contributions, the LDRD program contributes to our scientific staff capability and vitality, transforms our existing programs, and broadens our mission and its impact. Ultimately, the LDRD program is a source of enrichment for SLAC’s core competencies, new areas of discovery, and lab growth.

LDRD projects are typically conducted with a scale of effort that utilizes existing experimental facilities (i.e. bench-scale research and development) or computational facilities at SLAC or Stanford University. Consistent with DOE policy, LDRD awards cannot be used to co-fund new or existing research projects or for construction line-item, maintenance projects, or for general purpose equipment acquisitions. External to SLAC partnerships, including partnerships with industry, that would contribute unique capabilities or expertise to the efforts proposed should be considered. Multi-disciplinary collaborations are also encouraged. For FY2021, LDRD proposals are invited under the following two categories:

1. **Category 1- Major Initiatives**: proposals in this category should target preliminary efforts that would enable the development of new research programs and/or capabilities in support of SLAC’s major initiatives. Within SLAC’s major initiatives, we solicit proposals with emphasis on the following:
   a. **X-ray and Ultrafast Sciences**: Emerging scientific opportunities in X-ray and ultrafast sciences where LCLS-II, LCLS-II-HE and SSRL can play a unique role. Engagement with the Stanford University scientific community in these areas is highly encouraged, as are other engagements that would explore the application of SLAC’s X-ray facilities in new scientific domains. Potential future links to Silicon Valley and industry through the application of X-ray and ultrafast science methods are also of interest.
   b. **Physics of the Universe**: Novel scientific opportunities in high energy physics, which are being broadly discussed at SLACmass in preparation for the upcoming “Snowmass” community study, and where SLAC can lead new initiatives or play a unique role in addressing the most pressing scientific questions. This includes new dark matter and dark energy initiatives, advances in liquid noble gas detector technology, and innovative experiments making use of the Sector30 transfer line.
   c. **Massive-Scale Data Analytics**: Development of new algorithmic approaches that can scale to the data rates and low latency requirements of the emerging generation...
of scientific tools such as LCLS-II and LSST. This includes applications of scientific machine learning, edge-ML, and other approaches to address compelling scientific or technological challenges across the major initiatives above. LDRD proposals should address innovative concepts from domain-specific applications to broadly applicable methodologies.

d. **High Energy Density Science**: Development of theory, modeling and new experimental concepts and technologies that respond to the scientific drivers identified for the MEC Upgrade project, including relativistic plasma physics using petawatt-scale lasers, extreme material science using kilojoule-scale lasers, and enabling capabilities for high repetition rate and multi-pulse burst mode operation.

e. **Biosciences**: New scientific concepts in bioimaging, including those that integrate both X-ray and cryo-electron microscopy/tomography methods. Applications of bioimaging in synthetic biology leveraging collaborations between SLAC and Stanford University are encouraged.

f. **Quantum Information Science**: Novel scientific or technological concepts in the area of Quantum Information Science leveraging the unique capabilities and expertise of SLAC and Stanford University while targeting areas of interest to the Office of Science and other agencies.

2. **Category 2- Exploratory R&D**: proposals in this category should explicitly address high-risk, proof-of-concept investigations with potential for significant impact towards:

a. **All current mission areas of SLAC**

b. **Emerging areas of science and technology**, in particular:

1. **Use-Inspired Materials Research**: materials research relevant to energy technologies, advanced manufacturing, microelectronics and advanced accelerator development


Funding in category 2 projects will be limited to $180K per year.

For timely assessment of project feasibility and to allow a vibrant program that accommodates new ideas each year, LDRD projects are required to have a maximum duration of 2 years. In rare cases, exceptions to the 2-year project duration requirement may be granted. Flexibility in the planning of funds may be allowed to accommodate hiring timetables.

Each directorate should select qualified proposals using a suitable internal selection process before submitting to the LDRD program. Multi-directorate proposals should be coordinated with the relevant Associate Lab Directors before submitting to the LDRD program. Please plan for your internal process such that it allows investigators sufficient time for narrative and budget development prior to the LDRD proposal due date of **April 21, 2020**. A maximum of 30 proposals across the lab will be considered for evaluation by the LDRD program review. The
percentage of proposals awarded will depend on the FY2021 LDRD budget.

All SLAC scientific and engineering staff and faculty are eligible to apply for LDRD funding through their directorate’s internal selection process. The call is open to Stanford University faculty only as part of a collaboration with SLAC staff. Stanford University faculty interested in submitting a joint proposal must consult with their SLAC collaborator and ALD to ensure that the LDRD criteria are satisfied, discuss alignment and benefit to SLAC's mission and agenda, and participate in the internal selection process of the relevant SLAC directorate.

The LDRD program will initially review the scientific merit and feasibility of the proposed efforts through external reviews solicited from subject matter experts and internal peer-review panels. Lead Investigator presentations will take place in front of internal peer-review panels (SLAC/Stanford University staff and faculty) on May 18, 2020. Highly ranked proposals from this phase will advance to a strategic review where proposal impact on the mission areas and the lab’s growth strategy will be evaluated. Ongoing LDRD projects will be reviewed by the mission ALDs in June and will receive approval to continue at the same time as newly awarded projects, no later than end of August. More information about the LDRD program and proposal templates can be found here (https://ldrd.slac.stanford.edu).

cc:  
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