

**Laboratory Directed
Research & Development
Program Assessment
For FY 2008**

Annual Report

**BROOKHAVEN NATIONAL LABORATORY
BROOKHAVEN SCIENCE ASSOCIATES
UPTON, NEW YORK 11973-5000
UNDER CONTRACT NO. DE-AC02-98CH10886
UNITED STATES DEPARTMENT OF ENERGY**

December 2008

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Introduction

Brookhaven National Laboratory (BNL) is a multidisciplinary Laboratory that carries out basic and applied research in the physical, biomedical, and environmental sciences, and in selected energy technologies. It is managed by Brookhaven Science Associates, LLC, (BSA) under contract with the U. S. Department of Energy (DOE). BNL's Fiscal Year 2008 spending was \$531.6 million. There are approximately 2,800 employees, and another 4,300 guest scientists and students who come each year to use the Laboratory's facilities and work with the staff.

The BNL Laboratory Directed Research and Development (LDRD) Program reports its status to the U.S. Department of Energy (DOE) annually in March, as required by DOE Order 413.2B, "Laboratory Directed Research and Development," April 19, 2006, and the Roles, Responsibilities, and Guidelines for Laboratory Directed Research and Development at the Department of Energy/National Nuclear Security Administration Laboratories dated June 13, 2006.

The goals and objectives of BNL's LDRD Program can be inferred from the Program's stated purposes. These are to (1) encourage and support the development of new ideas and technology, (2) promote the early exploration and exploitation of creative and innovative concepts, and (3) develop new "fundable" R&D projects and programs. The emphasis is clearly articulated by BNL to be on supporting exploratory research "which could lead to new programs, projects, and directions" for the Laboratory.

To be a premier scientific Laboratory, BNL must continuously foster groundbreaking scientific research and renew its research agenda. The competition for LDRD funds stimulates Laboratory scientists to think in new and creative ways, which becomes a major factor in achieving and maintaining research excellence and a means to address National needs within the overall mission of the DOE and BNL. By fostering high-risk, exploratory research, the LDRD program helps BNL to respond new scientific opportunities within existing mission areas, as well as to develop new research mission areas in response to DOE and National needs. As the largest expense in BNL's LDRD program is the support graduate students, post-docs, and young scientists, LDRD provides base for continually refreshing the research staff as well as the education and training of the next generation of scientists.

The LDRD Program Assessment Report contains a review of the program. The report includes a summary of the management processes, project peer review, and the portfolio's relatedness to BNL's mission, initiatives and strategic plans. Also included are a metric of success indicators and Self Assessment.

Management Process

PROGRAM ADMINISTRATION:

Overall Coordination:

Overall responsibility for coordination, oversight, and administration of BNL's LDRD Program resides with the Laboratory's Director. Day-to-day responsibilities regarding funding, oversight, proposal evaluation, and report preparation for the LDRD Program resides with the Assistant Laboratory Director for Policy and Strategic Planning (PSP). The Office of the Assistant Laboratory Director for Finance (ALDF) assists in the administration of the program. This includes administering the program budget, establishing project accounts, maintaining summary reports, and providing reports of Program activities to the DOE through the Brookhaven Site Office Manager.

At BNL, the DOE approved LDRD Program budget has been significantly increased over the past ten years from \$2.0 million to \$16 million. This allows the Laboratory to prepare itself for work in emerging areas of research.

Program Structure:

The overall objectives of the LDRD Program is met through the use of two broad methods for soliciting proposals. One is an open call for LDRDs and the other is through the development of Strategic LDRDs (S-LDRD).

Open call LDRDs – “Open call” LDRD projects are those that are competitively awarded based on an open call for proposals without restriction to the area of science being proposed. Proposals are typically solicited annually for review and approval concurrent with beginning of the fiscal year, October 1. The competition is open to all BNL staff in programmatic, scientific, engineering, and technical support areas. Researchers submit their project proposals through their respective chairperson and ALD to the ALD for PSP. An LDRD Selection Committee, comprised of the Associate Laboratory Directors (ALD) for the Scientific Directorates, an equal number of scientists recommended by the Brookhaven Council, and the Assistant Laboratory Director for Policy and Strategic Planning (PSP), review the proposals submitted in response to the solicitation against specific, documented review criteria.

Strategic LDRDs – Annually, a portion of the LDRD budget may be held for Strategic LDRD (S-LDRD) category. These funds are used to establish and enhance initiatives that are consistent with Laboratory priorities and are focused on specific research areas (e.g. Energy R&D, the physics of high-energy electron-ion collisions, etc.) Projects in this category focus on innovative R&D activities that are likely to develop new programmatic areas within BNL's mission responsibilities and enhance the Laboratory's science and technology base. The Laboratory Director entertains requests or articulates the need for S-LDRD funds at any time.

These Projects are driven by special opportunities, including

- Research project(s) in support of a Laboratory strategic hire,

- Evolution of Program Development activities into research and development activities,
- ALD proposal(s) to the Director to support unique research opportunities,
- Research project(s) in support of Laboratory strategic initiatives as defined and articulated in the BNL Laboratory Strategic Plan.

As an example, an open call for Fiscal Year 2009 was focused on BNL's Strategic Plan for Energy-Related R&D, whereby working groups had established plans for several areas of strategic interest for BNL. Proposals were solicited in support of this strategy.

Allocating Funds:

There are several decisions to be made each year concerning the allocation of funds for the LDRD Program.

These are: (1) the overall budget for the LDRD Program; (2) the amount to be allocated between the two categories, and (3) how much should go to each competing project or proposal. All of these decisions are made by senior-level management.

For each fiscal year the Laboratory Director, on recommendation by the Deputy Director for Science and Technology (DDS&T), the Assistant Laboratory Director for PSP and in consultation with the ALDF, develops an overall level of funding for the LDRD Program. The budgeted amount is incorporated into the Laboratory's LDRD Plan, which formally requests authorization from the DOE to expend funds for the LDRD Program up to the authorization.

Generally, projects are authorized for funding at the start of the fiscal year. In addition, projects can be authorized throughout the fiscal year, as long as funds are available and the approved ceiling for the LDRD Program is not exceeded.

The actual level expended in the LDRD program, which may be less than authorized, is determined during the course of the year and is affected by several considerations including: the specific merits of the various project proposals, as determined by Laboratory management and the members of the LDRD Program Committee; the overall financial health of the Laboratory; and a number of budgetary tradeoffs between LDRD and other overhead expenses.

Open call LDRD Selection Process:

Responsibility for the allocation of resources and the review and selection of proposals lies with a management-level group called the Laboratory Directed Research & Development Program Selection Committee. For Fiscal Year (FY) 2008, the Program Committee, which selected the new FY2009 programs, consisted of eleven members. The ALD for PSP chaired the Committee, and the other members were the five Associate Laboratory Directors (ALDs), and five members of the Brookhaven Council (BC).

2009 ENERGY STRATEGY LDRD PROGRAM SELECTION COMMITTEE

J. Patrick Looney	Assistant Laboratory Director for Policy and Strategic Planning (PSP)
Creighton Wirick	Interim Energy, Environment & National Security (ALD)
Steven Vigdor	Nuclear & Particle Physics (ALD)
Steven Dierker	Light Sources (ALD)
James Misewich	Basic Energy Sciences (Interim ALD)
Fritz Henn	Life Sciences (ALD)
Robert Bari	Energy Sciences & Technology (BC)
Peter Daum	Energy, Environment & National Security (BC)
Subramanyam Swaminathan	Biology (BC)
Dejan Trbojevic	Collider-Accelerator (BC)
Zhong Zhong	Light Source (BC)

Request for Proposals:

The availability of special funds for research under the LDRD Program is well publicized throughout the Laboratory. Each year a call letter is sent to the Scientific Staff and as a separate memorandum to all the Associate Laboratory Directors and Department Chairpersons. The email for the FY 2009 call, issued in June 2007, is attached as Exhibit A.

The call references the BNL LDRD Standards-Based Management System (SBMS) Subject Area, which is available to all employees on the web and is attached as Exhibit F. In addition to the solicitation email, the LDRD program is publicized through feature articles in The Bulletin or Monday Memo. The process that solicits and encourages the development of proposals also identifies the current Laboratory Strategic Focus Area, which is of special interest to Laboratory management.

The LDRD SBMS Subject Area specifies the requirements necessary for participation in the program. It states the program's purpose, general characteristics, procedures for applying, and restrictions. An application for funding, i.e., a project proposal, takes the form of a completed "Proposal Information Questionnaire (PIQ)," Exhibit B. An application must be approved through the appropriate management levels, which include the initiator's Department or Division Budget Administrator, the Department Chairperson or Division Head, and the ALD.

The Chairperson or Division Head reviews the Proposal Information Questionnaire for completeness, which includes the review of responses to questions on National Environmental Policy Act (NEPA) and Environmental Safety and Health (ES&H). He/she also ensures that the principal investigator's regularly funded programs are not impacted by the LDRD project.

Proposal Review:

Once the cognizant line managers approve the proposals, they are forwarded to the ALD for PSP who transmits a copy of the abstracts of all proposals received to the LDRD Program Selection Committee for review. Each member also receives a subset of proposals for full review and consideration for funding.

The Selection Committee considers all proposals that have met certain minimum requirements pertaining to the Department's and BNL's LDRD policies.

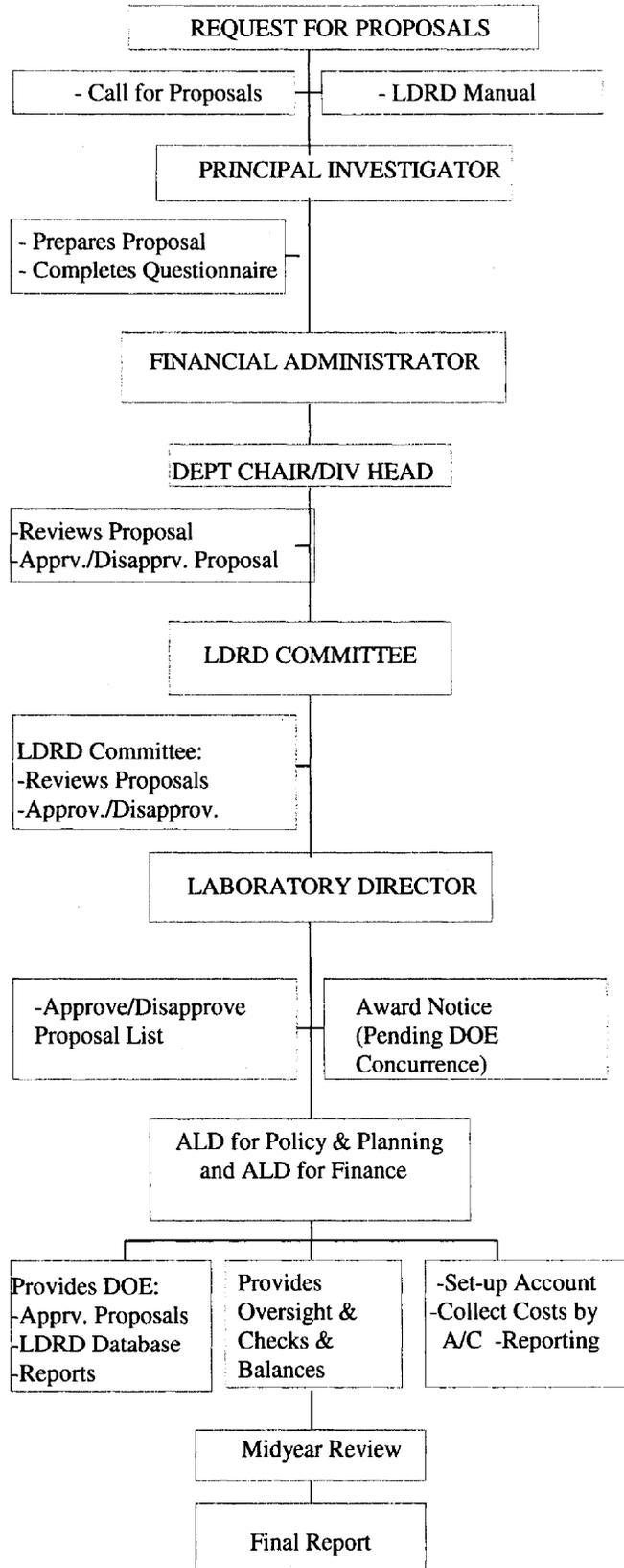
A description of the process is outlined in the Figure on the next page. See Exhibit D for the instructions to the LDRD Energy Selection Committee. All members have several weeks to review the proposals and prepare for a full debate on each proposal. The DOE Project Manager is present during the Committee evaluation sessions as a non-voting member.

Selection Criteria:

Minimum requirements for each proposal are: (1) consistency with program purpose; (2) consistency with missions of BNL, DOE, and NRC; (3) approval by Department Chairperson and/or Division Head, and cognizant Associate/Assistant Director; (4) assurance of satisfactory continuation of principal investigator's regularly funded programs; (5) limited to no more than 3 years; (6) will not substitute for, supplement, or extend funding for tasks normally funded by DOE/NNSA; (7) will not create a commitment of future multi-year funding to reach a useful stage of completion; and (8) will not fund construction of line-item projects, facility maintenance, or general purpose capital equipment.

The selection criteria used to evaluate and rank individual proposals are stated in broad terms. The LDRD SBMS Subject Area clearly states that selection is based on (1) scientific or technological merit, (2) innovativeness, (3) compliance with minimum requirements, (4) proposal cost as compared to the amount of available funding, and (5) its potential for follow-on funding. The requirements of DOE Order 413.2B are also carefully considered during the selection process to ensure that proposals are consistent with DOE criteria.

Open Call LDRD Projects Program Process



Project Selection:

All proposals are rated by the full Committee and then discussed with the discussion of the lower rated proposals kept to a minimum. The Committee selects the highest priority proposals, by concurrence, for detailed discussion. Final selections are made by a vote of the ALDs as recommended for funding. Some funding may be held in reserve earlier in the fiscal year so that funds remain available for proposals submitted at later dates. The funding amount requested in any one specific proposal may be changed or adjusted during the approval process. The Committee's recommendation is then submitted to the Laboratory Director for approval. After approval by the Director all new projects are submitted to the DOE-Brookhaven Site Office (DOE-BHSO) for concurrence by the DOE Project Manager prior to start. The ALDF then sets up a separate laboratory overhead account to budget and collect the costs for the project.

Open Call Energy Initiative

The open call, Exhibit A, was released for energy-related R&D in support of the Laboratory's strategy in this area. The open call for Energy Initiative was started in FY 2007 and carried through FY 2008 for starts in FY 2009. The challenges that the Laboratory seeks to address are outlined in the Laboratory Energy Strategy and in a series of white papers that were developed in support of this strategy. We funded projects aimed at the development of new competencies at BNL. Hence they were funded at somewhat higher levels than in the past, and for the full 36 months. The business case, including the potential for follow-on funding for these proposals, was held to a high standard.

Proposals submitted in response to this call utilize a different format and were reviewed using criteria and a process that is somewhat different than for the normal open LDRD call, especially insofar as internal and external written reviews were required. See Exhibit B-2, which is a special Proposal Information Questionnaire, giving explicit instructions. Also see Exhibit E Energy call web page.

Strategic LDRDs Selection Process:

Responsibility for the allocation of resources and the review and selection of proposals lies with the Assistant Laboratory Director for Policy and Strategic Planning, Deputy Director for Science and Technology, and the Laboratory Director.

Request for Proposals:

The availability of special funds for research under the Strategic LDRD Program is disseminated by the Laboratory Director to the Associate Laboratory Directors.

The LDRD SBMS Subject Area specifies the requirements necessary for participation in the program. It states the program's purpose, general characteristics, procedures for applying, and restrictions. An application for funding, i.e., a project proposal, takes the form of a completed "Proposal Information Questionnaire (PIQ)", Exhibit B. An application must be approved through the appropriate management levels, which includes the initiator's Department or Division Budget Administrator, the Department Chairperson or Division Head, and the ALD.

The Chairperson or Division Head reviews the PIQ for completeness. This includes the review of responses to questions on National Environmental Policy Act (NEPA) and Environmental Safety and Health (ES&H).

Proposal Review:

Once the cognizant line managers approve the proposals, they are forwarded to the ALD for PSP. The ALD for PSP examines the proposal for compliance with the LDRD requirement as stated in DOE Order 413.2B and the LDRD SBMS Subject Area.

This includes the ALD for PSP arranging for the appropriate peer review in accordance with the Director's guidance utilizing the S-LDRD Review Instructions.

Project Approval:

After completion of review the projects are then submitted to the Laboratory Director for approval. After approval by the Director, all new projects are submitted to the DOE-Brookhaven Site Office (DOE-BHSO) for concurrence by the DOE Project Manager prior to start. The ALDF then sets up a separate Laboratory overhead account to budget and collect the costs for the project.

Project Supervision:

The ALD for PSP for LDRD carries out overall supervision of projects for all LDRD categories. Supervision over the actual performance of LDRD projects is carried out in the same way as other research projects at the Laboratory. Each principal investigator is assigned to an organizational unit (Department, Division) that is supervised by a chairperson or manager.

Each chairperson or manager is responsible for seeing that the obligations of the principal investigator are satisfactorily fulfilled and that the research itself is carried out according to standard expectations of professionalism and scientific method. The ALD for PSP monitors the project's status, schedule, and progress and coordinates with the chairperson or manager as necessary.

The ALD for PSP organizes a mid-year review of selected projects. Each PI presents a progress report on the status of his/her project. In attendance are the ALD for PSP, the DDS&T, the cognizant ALD and Department Chair, and a representative from the ALDF and DOE-BHSO. This review checks on the progress of the projects including its funding schedule. This allows the ALD for PSP to ensure that the work be completed in a timely manner. If adequate progress has not been made, projects can be terminated at this time.

In addition, the ALD for PSP conducts a meeting as necessary with the DOE LDRD Project Manager to update the progress of the program and to solicit assistance to verify that the BNL LDRD Program is meeting the overall LDRD requirements. This includes providing the DOE-BHSO with copies of all funded proposals, an LDRD Program database, and a project funding and schedule summary report.

Project Reporting:

Routine documentation of each project funded under the LDRD Program consists of a file containing: (1) a copy of the written proposal; (2) all interim status reports; (3) notifications of changes in research direction, if any; (4) midyear review presentations and (5) reports on costs incurred. Also, a formal LDRD Plan, Program Assessment Report, and the Annual Report on the LDRD Program are submitted to BNL management and the DOE summarizing work progress, accomplishments, and project status on all projects.

Documentation for the overall Program consists of (1) various program history files, (2) a running list of all proposals with their acceptance/rejection status, (3) funding schedule and summary reports for all approved projects, (4) permanent records on cost accounting, and a database containing information on each funded project (description, funding by fiscal year, status and accomplishments, follow-on funding, publications, etc.), (5) midyear review progress reports. A Data Collection Form (Exhibit C) is also utilized to formally collect information on the impacts of the projects. Each project is tracked for two years after its completion so as to gather a complete set of data on the impact of the project. Also, we input LDRD data into the DOE-Chief Financial Officer's Laboratory/ Plant Directed Research and Development Web Site (<https://ldrd.rpt.doe.gov>) to support DOE reporting of LDRD to Congress.

Some of the projects may involve animals or humans. Those projects will have received approval from the Laboratory's appropriate review committees. The projects which involve animals or humans are identified in this report as follows:

“Note: This project involves animal vertebrates or human subjects.”

All projects selected for approval are reviewed by the BNL Operations Security (OPSEC) Working Committee Chair for classification review and operational security considerations.

Peer Review

LDRD projects have peer reviews performed in several different ways. Primarily, LDRD research is managed and reviewed by the cognizant Department and Division manager. These projects are a part of the activities of their respective Department and Divisions in which they reside. For the open call LDRD projects, the members of the LDRD Section Committee are considered to have sufficient technical knowledge to perform peer reviews of projects during the initial selection process.

For the Strategic LDRD projects, a formal peer review is performed on each project prior to final approval. In addition, for the Energy Initiative projects, internal and external written reviews were required given the size and scope of the individual projects and the need to bring broader technical perspective

Also, all LDRD projects go through one formal mid-year review (described in the previous section under project supervision) conducted by the ALD for PSP that the Deputy Director for Science and Technology, the cognizant Department Chair and Associate Laboratory Director, a representative from the ALDF and the DOE-BHSD LDRD Program Manager attend. Other scientists and subject matter experts will assist in reviews, as necessary.

In addition to these peer reviews of the BNL LDRD projects, they are subject to various advisory committees that consist of subject matter experts from academia and industry who conduct peer reviews of LDRD projects as part of a Department's or Laboratory's program review. One such group is the Brookhaven Science Associates' Science and Technology Steering Committee, which performs peer reviews of different Laboratory programs on a rotating basis. There are also periodic reviews of the science at the Laboratory performed by various offices of DOE.

Financial Overview

Operating expenses for the LDRD program are funded through the Laboratory's overhead budget, which is derived from a uniform assessment against all programmatic and Work for Other (WFO) activities performed at the Laboratory. In March of 2006, the DOE-CFO issued guidance that the LDRD Program will be "treated in a manner consistent with the method for distributing the general and administrative (G&A) expenses of a site." Therefore, BNL removed LDRD from the G&A pool and implemented a separate LDRD burden in order to obtain its funds.

At BNL, the LDRD Program was historically a much smaller portion of the total budget than at comparable National Laboratories. Accordingly, the LDRD budget has been significantly increased over the past ten years from \$2.0 million to \$16 million, see Exhibit G, or from less than 1% to almost 3.4 % of the Laboratory cost of \$477 million, which does not include construction costs. The target level is to increase the level to about 4%, which would still be less than the DOE maximum ceiling of 8%. This better enables the Laboratory for preparing itself for work in emerging areas of research.

In FY 2008, the BNL LDRD Program funded 69 projects, 10 of which were new starts, at a total cost of \$12,028,272. See Appendix A for a complete list of FY 2008 active projects. The majority of the planned LDRD budget is allocated at the beginning of the fiscal year. Approximately 20% of the funds were allocated to the Strategic LDRD pool and the remaining 80% was awarded to open call LDRD projects. A summary of the history of LDRD projects is show below.

FY	DOE AUTH. \$K	BNL AUTH. \$K	COSTED \$K	NO. RECD.	NEW STARTS	TOTAL FUNDED
1985	4,000	1,842	1,819	39	13	13
1986	4,500	2,552	2,515	22	15	25
1987	4,000	1,451	1,443	29	8	17
1988	4,000	1,545	1,510	46	14	23
1989	4,000	2,676	2,666	42	21	29
1990	4,000	2,008	1,941	47	9	26
1991	2,000	1,353	1,321	23	14	21
1992	2,500	1,892	1,865	30	14	25
1993	2,500	2,073	2,006	35	14	28
1994	2,500	2,334	2,323	44	15	27
1995	2,500	2,486	2,478	46	13	31
1996	3,500	3,500	3,050	47	17	31
1997	4,500	4,500	3,459	71	10	28
1998	3,500	4,000	2,564	53	4	20
1999	4,750	4,612	4,526	67	25	33
2000	6,000	6,000	5,534	93	21	45
2001	6,000	6,000	5,345	97	38	70
2002	7,000	7,000	6,732	87	29	70
2003	8,500	8,482	7,830	153	44	83
2004	9,500	8,550	7,209	107	19	72
2005	10,500	9,073	8,379	114	41	78
2006	11,500	9,127	11,102	96	28	85
2007	15,500	13,600	10,223	99	36	74
2008	16,000	12,876	12,028	62	10	69
TOTALS	143,250	119,532	109,868	1549	472	1023

Relatedness of LDRD to Laboratory Programs and Initiatives

BNL's mission is to produce excellent science in a safe, environmentally benign manner with the cooperation, support, and appropriate involvement of our many communities. The Laboratory's core competencies lie in five areas:

1. Conceptualization, design, construction, and operation of advanced accelerator systems, detectors, magnets, and instrumentation
2. Synchrotron radiation science and technology
3. Imaging (including radiotracer chemistry, biological structure, and instrumentation)
4. Development and application of advanced software and computing facilities to high energy and nuclear physics experiment and theory
5. Synthesis and characterization of complex and nano-structured materials.

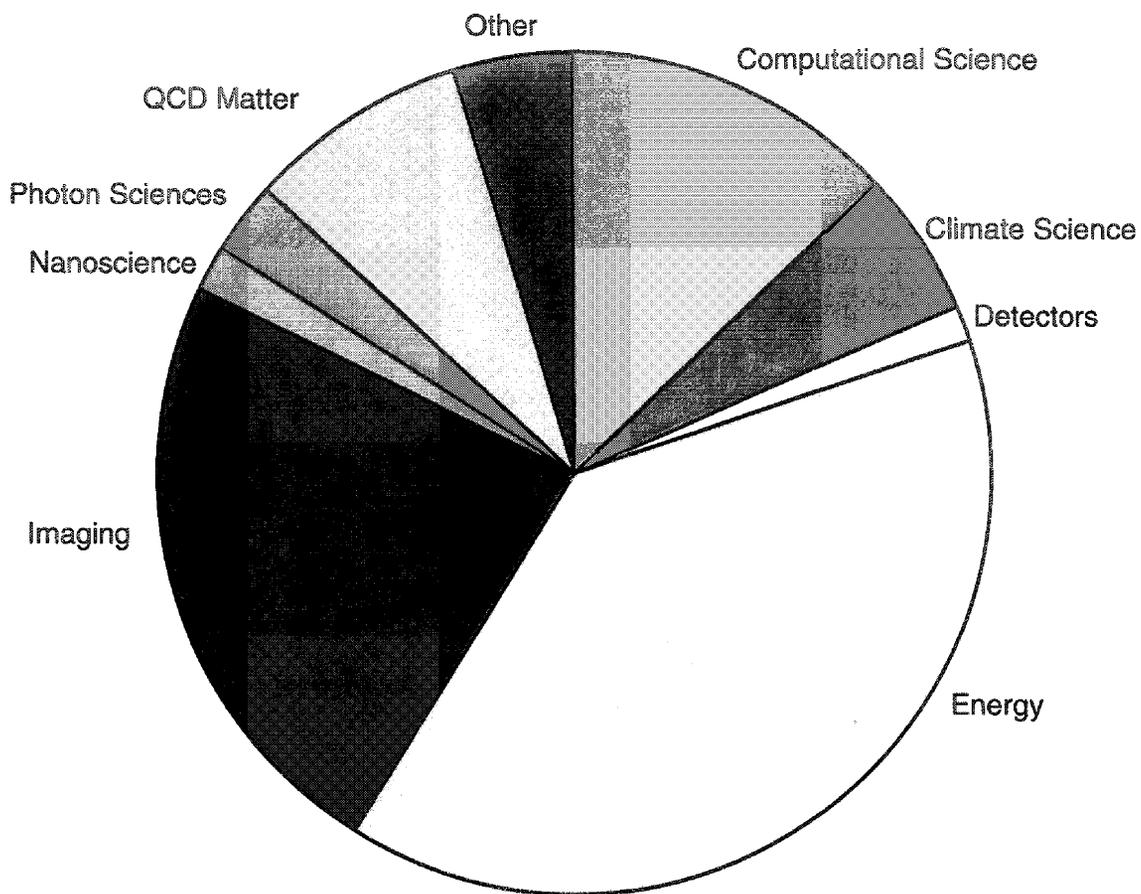
Research initiatives are a primary tool by which the Laboratory builds core competencies and capabilities in particularly promising areas of science and technology and to meet anticipated National needs. The LDRD plays an important role in realizing successful outcomes for its initiatives by providing resources in key areas of initiative development. Each year Laboratory management carefully reviews both existing research initiatives and proposed new areas for progress, scientific and technological promise, their match to BNL's strengths and mission roles, and relevance to DOE missions and evolving national needs. As part of the review process, management identifies the needs for each initiative. These areas are subsequently included in the annual LDRD call for proposals and given high priority for funding. Development of capabilities in these areas is essential to realizing successful outcomes for our initiatives.

Building on its suite of core competencies, the major initiative, which the Laboratory undertook to achieve these goals for FY 2009, was:

Energy - A call for proposals was issued in the late spring of 2007, in support of the Laboratory's strategic plan in Energy R&D. The areas for the Energy R&D call were Biofuels, Solar Energy, Advanced Materials, Catalysis, and Nuclear Energy.

A list of projects by initiative is presented as Exhibit H. Below is a chart reflecting the distribution of projects by laboratory initiative.

Targeted FY09 LDRD Allocation (December 08)



Self Assessment

BNL supports the concept of continual improvement as part of its management of the Laboratory. To achieve this goal, every year BNL performs self-assessments of various functions at the Laboratory. One of the programs for which the Laboratory conducts a yearly self-assessment is the LDRD program.

In FY 2008, many aspects of the program were reviewed. The following activities contributed to the Laboratory's self-assessment of the LDRD program in FY 2008:

- Annual Program Review at Oak Ridge National Laboratory (ORNL) in May 2008
- Review of BNL's selection process for the Energy-related LDRD Projects
- Battelle process modeling initiative in May 2008

LDRD Program Review in May 2008

ORNL hosted the annual LDRD program review conducted by John LaBarge of the Office of Science (SC) of the U.S. Department of Energy (DOE). The review took place on May 20 and 21, 2008 in two phases and was attended by representatives from across the DOE complex, including BNL. A review of the ORNL program including management, administration, and a sampling of LDRD projects comprised day one and part of day two. The morning of the second day focused on the other DOE SC Laboratory LDRD programs and system-wide topics that included the following items:

- Overview of LDRD statistics
- LDRD and strategic planning

At the conclusion of the review, DOE conducted an out-briefing, which did not contain any actions for BNL.

Battelle Process Improvement Review May 2008

Battelle Memorial Institute hosted a Process Modeling Initiative review for the LDRD process in May 2008. The review included representatives from BNL, PNNL, ORNL and NREL. The review was conducted to compare the various LDRD processes at each Laboratory and solicit best practices that could be shared with other Laboratories. One best practice that BNL is interested in pursuing is to move the BNL LDRD program to a more electronic work flow process. This would improve efficiencies in the review and selection process as well as data collection.

Background on the FY 2009 Selection Process

For FY 2009, BNL made a significant change to the overall Selection Process by issuing a focused open call for LDRD proposals. It solicited energy related R&D projects in support of the Lab's strategic plan in energy R&D whose aim is to conduct basic/applied research underlying breakthroughs in the effective use of renewable energy through improved conversion, transmission, and storage.

Review of BNL's Selection Process for the Energy-related LDRD Projects (a new process)

For the Energy projects, BNL made significant changes to the selection criteria, in terms of their overall scope and timeline. The projects were expected to support the Lab's energy strategy in areas of solar energy, catalysis, biofuels, and complex materials, although other innovative energy-related ideas were not discounted. They were also expected to be interdisciplinary, team-oriented, and extend for three years.

- This will enable the development of new BNL core competencies.

Since these proposals are critical to furthering the Lab's energy strategy, more comprehensive in nature, and funded at higher levels, BNL implemented, on a trial basis, external peer reviews of every energy-related LDRD that was received.

- Although it took longer than expected to obtain the external reviews (with the process continuing into FY 2008), they provided critical feedback to the LDRD Committee that was helpful in their initial selection to identify the best proposals.

For all proposals, the Selection Committee provided written feedback based on the reviewers' comments and the Committee's discussion to the Principal Investigators (PIs).

- The added value was threefold. The comments reinforced the proposals' creative nature and offered suggested improvements. For those proposals not selected, the comments were intended to help the PIs rethink and refocus their ideas.

The PIs of those proposals selected for further consideration were invited to defend their proposed research to the Selection Committee.

- This gave the Selection Committee the opportunity to hear directly from the PIs (rather than the ALDs) about the aims of the proposed work, the research plan, and the expected outcomes of the proposed research via a direct dialogue.

Since the Selection Committee Members agreed that these additional steps resulted in a set of superb proposals, this process will likely be used again for a future focused LDRD selection. Similar to the general proposals, BNL envisions reviewing these proposals annually to ensure that they are meeting the Lab's overall expectations.

Conclusions

In summary, BNL concludes from its self assessment of the LDRD program that it is working effectively. BNL will maintain its support of any new LDRD requirements and strive to continually improve by:

- Participating in any new DOE SC LDRD working group to develop new guidelines
- Implementing any changes to the DOE Chief Financial Officer (CFO) LDRD database
- Ensuring that all projects support the DOE security missions and missions of other federal agencies
- Continuing to include the DOE-BHSO LDRD Program Manager in all LDRD selection meetings
- Conducting an annual Program Self Assessment.

Summary of Success Indicators

Statistical data is collected on all projects for the annual report. Since the LDRD Program is intended to promote high-risk research, the data collected has nominal value on a project-by-project basis. It does provide a general overall picture of the productivity of the LDRD Program.

Some of the more common indicators/measures of success are: 1) the number of proposed, received and approved projects, 2) amount of follow-on funding, 3) the number of patents applied for, and 4) the number of articles published in peer-reviewed journals.

Historically, statistics on the number of projects approved, compared to those rejected, show an overall approval rate of about 30 percent for new starts. Essentially all of the scientific departments were represented in the FY 2008 LDRD Program. The LDRD Program at BNL is expanding and is generating interest from across the entire Laboratory population.

An analysis of the FY 2008 projects shows that many of the projects were reported to have submitted proposals for grants or follow-on funding (several received funding), and a multitude of articles or reports were reported to be in publication or submitted for publication. A summary of success indicators for the FY 2008 projects is shown in the Table. It is noteworthy that only those accomplishments that occurred during FY 2008 and are provided not a complete summary of all the accomplishments from the projects.

SUCCESS INDICATORS FY 2008	QTY
Total number of publications originating in whole or part that were published or submitted this fiscal year	216
Total number of formal presentations originating in whole or in part including those that have been accepted for presentation but not yet presented during this fiscal year	317
Total number of reports originating in whole or in part during this fiscal year.	25
Total number of patents and licenses originating in whole or in part during this fiscal year.	10
Total number of copyrights issued/granted during this fiscal year, including those from follow on funding.	0
Total number of invention disclosures submitted during this fiscal year to the Laboratory's Office of Intellectual Property & Sponsored Research that were either directly derived from the LDRD or from any follow-on efforts.	3
Total number of formal review presentations conducted during this fiscal year.	25
Total number of postdoctoral researchers and graduate students supported in full or in part during the fiscal year.	105
Total number of scientific and technical research staff hired during this fiscal year.	5
Total number of requests for follow on funding submitted this fiscal year.	77

<p style="text-align: center;">SUCCESS INDICATORS FY 2008</p>	<p style="text-align: center;">QTY</p>
<p>Total number of national awards or recognitions received this fiscal year that are attributable in whole or in part from the project.</p>	<p style="text-align: center;">8</p>

In conclusion, the overall LDRD Program has been successful. In FY 2008, the LDRD Program has improved on the level established in FY 2007 which already was at a high level. This increase in size is a consequence of the identification of the LDRD Program by Laboratory Management to be an important part of its future. The LDRD Program is a key component for developing new areas of science for the Laboratory. In FY 2008 the Laboratory continued to experience a significant scientific gain by the achievements of the LDRD Projects.

Funding Table of LDRD Projects Approved FY 2008

Appendix A

LDRD Proj. No.	Project Title	P.I.	Dept./Bldg.	Actual FY06	Actual FY07	Actual FY08	FY09	FY10	Total
06-004	Detector Development for Very Long Baseline Neutrino Exp.	Diwan, M.	PHYS/510E	66,230	101,110	97,125			264,465
06-012	Detector for High Quality Images of Electron Microscopy	Rehak, P.	INST/535B	70,180	140,791	70,813			281,784
06-017	Transmission Photocathode Development	Smedley, J.	INST/535B	67,470	134,846	66,788			269,104
06-021	Synthesis and Characterization of Band-Gap-Narrowed TiO ₂ Thin Films and Nanoparticles for Solar Energy Conversion	Sutter, E.	CFN/480	69,484	208,731	137,350			415,565
06-030	Development of Gadolinium-Loaded Liquid-Scintillators with Long-Term Chemical Stability for a New High-Precision Measurement of the Neutrino Mixing Angle, Theta-13	Hahn, R. L.	CHEM/555A	199,946	190,494	100,825			491,265
06-037	Electronic Properties of Carbon Nanotubes and Novel Multicomponent Nanomaterials	Hill, J. P.	CMPMSD/510B	45,590	179,435	84,458			309,483
06-038	Growth and Characterization of CdZnTe Crystals for Improved Nuclear Radiation Detectors	Gu, G.	CMPMSD/510A	24,292	150,529	129,948			304,769
06-046	Novel Materials for Hard X-Ray Optics	Evans-Lutterodt, K.	NSLS/725D	24,809	157,550	118,812			301,171
06-047	Nano-Crystallography of Individual Nanotubes and Nanoparticles	Nelson, C.	NSLS/725D	62,673	142,182	72,509			277,364
06-056	Epigenetics: Methamphetamine (MAP)-Induced Brain Dysfunction and Methylation of DNA	Dunn, J. J.	BIO/463	76,620	115,760	159,496			351,876
06-060	Molecular Mechanism of Chromosomal Replication Initiation in Eukaryotic System	Li, H.	BIO/463	101,859	210,492	106,850			419,201
06-061	Diversification of Isoflavonoid Biosynthesis	Liu, C. -J.	BIO/463	437,328	477,915	194,158			1,109,401

Funding Table of LDRD Projects Approved FY 2008

Appendix A

LDRD Proj. No.	Project Title	P.I.	Dept./Bldg.	Actual FY06	Actual FY07	Actual FY08	FY09	FY10	Total
06-071	Development of a Cloud Condensation Nucleus Separator	Wang, J.	ESD/815E	69,661	139,591	69,217			278,469
06-092	Nanoparticle Labeled Neural Stem Cell Tracking In Vivo by Magnetic Resonance Microscopy	Foerster, B. (leaving Lab) Benveniste, H.	MED/490	109,022	69,428	50,433			228,883
06-094	MicroCT Methods of Quantitative Adipose Imaging: Development of a Long-Term Assessment Technique for Studying Obesity in a Rodent Model	Wang, G. J.	MED/490	77,143	197,924	76,612			351,679
06-097	Photocatalytic Reduction of CO2 in Supercritical CO2	Grills, D.	CHEM/555	80,098	155,011	71,104			306,213
07-001	QCD Thermodynamics at Non-zero Temperature and Density	Karsch, F.	PHYS/510A		389,374	407,278	200,000		996,652
07-002	Lattice QCD Simulations on BlueGene/L	Karsch, F.	PHYS/510A		147,308	188,617	49,000		384,925
07-004	Proof-of-Principle Laser System for ILC Positron Source	Pogorelsky, I.	PHYS/820M		30,202	139,899	78,000		248,101
07-005	Sensitive Searches for CP-Violation in Hadronic Systems	Semertzidis, Y.	PHYS/510A		22,183	127,642	92,000		241,825
07-006	Feasibility and Design Studies for a Detector for e+p, e+A, p+p, p+A, and A+A Collisions at BNL	Ullrich, T.	PHYS/510A		33,626	87,632	72,375		193,633
07-007	A Novel and Compact Muon Telescope Detector for QCD Lab	Xu, Zhangbu	PHYS510A		34,591	76,376	85,000		195,967
07-010	Design Optimization of a Reactor Neutrino Experiment	Jaffe, D.	PHYS/510E		72,262	119,276	31,000		222,538
07-019	Development of Laser beam Shaper for Low Emittance Electron Beams	Rao, T.	INST/535B		148,086	248,235	50,000		446,321

Funding Table of LDRD Projects Approved FY 2008

Appendix A

LDRD Proj. No.	Project Title	P.I.	Dept./Bldg.	Actual FY06	Actual FY07	Actual FY08	FY09	FY10	Total
07-023	Surface Engineered and Core-Shell Nanowires: Nanoscale Building Blocks for Third Generation Photovoltaics	Sutter, P.	CFN/555		39,534	164,803	125,000		329,337
07-025	Precision Assembly of Nano-Objects – Approaching Artificial Photosynthesis	Sherman, W.	CFN/463		40,443	133,404	90,000		263,847
07-027	Photocatalytic Carbon Dioxide Reduction to Methanol using Metal Complexes with an NADH Model Ligand	Fujita, E.	CHEM/555A		78,581	169,622	86,000		334,203
07-030	Structure of Mass-Size Selected Nanoparticles by Scanning Transmission Electron Microscopy	White, M.	CHEM/555A		96,768	125,005	31,000		252,773
07-032	Synthesis of Conjugated Polymers for Fundamental Questions in Solar Energy	Miller, J.	CHEM/555A		112,702	148,744	37,000		298,446
07-035	Ultra-thin Graphite Analog Compounds	Valla, T.	CMPMSD/480		86,876	119,786	65,000		271,662
07-036	Lipid-Coated Nanoparticles and Their Interactions with Lipid Membrane Surfaces	Fukuto, M.	CMP/510B		26,982	127,190	100,000		254,172
07-038	Angle-Resolved Time-of-Flight Ion Scattering Spectroscopy from MBE-Grown Oxide Thin Film Surfaces	Gozar, A.	CMP/480			201,848	213,000		414,848
07-047	Characterization of Enzymatic O-acylation to Facilitate Biomass and Bioenergy Production	Liu, C.-J.	BIO/463		8,653	171,145	164,000		343,798
07-048	Functional Neurochemistry	Tomasi, D.	MED/490		4,185	125,705	120,000		249,890
07-054	Miniaturized RF Coil Arrays for MicroMRI	Smith, D.	MED/490		85,274	120,736	30,000		236,010
07-055	<i>Neurocomputation at BCTN: Developing Novel Computational Techniques to Study Brain Function in Health and Disease</i>	Goldstein, R.	MED/490		150,000	149,829			299,829

Funding Table of LDRD Projects Approved FY 2008

Appendix A

LDRD Proj. No.	Project Title	P.I.	Dept./Bldg.	Actual FY06	Actual FY07	Actual FY08	FY09	FY10	Total
07-059	A Non-Fermentation Route to Convert Biomass to Bioalcohols	Mahajan, D.	ES&T/815		91,924	125,870	30,000		247,794
07-062	Fate and Reactivity of Carbon Nanoparticles (CNPs) Exposed to Aqueous Environmental Conditions	Panessa-Warren, B.	ES&T/475C		93,987	129,231	31,000		254,218
07-073	Development of Room-temperature CdMnTe Gamma-ray Detectors	Cui, Y.	NNS/535B		93,736	124,687	31,000		249,423
07-075	Developing a New Framework for Investigating Earth's Climate and Climate Change	Liu, Y.	ESD/815E		98,260	123,795	31,000		253,055
07-080	A Novel Approach for Efficient Biofuel Generation	Chidambaram, D.	ESD/490A		79,625	105,745	27,000		212,370
07-084	Investigations of Hygroscopic Growth and Phase Transitions of Atmospheric Particles by Noncontact Atomic Force Microscopy	Schwartz, S.	ESD/815E		26,682	80,585	133,000		240,267
07-089	Chemical Imaging of Living Cells in Real Time	Miller, L.	NSLS/725D		43,643	115,131	69,000		227,774
07-090	Coherent Bragg Rod Analysis of High-Tc Superconducting Epitaxial Films	Pindak, R.	NSLS/725D		22,691	114,691	92,000		229,382
07-091	Development of a Planar Device Technology for Hyperpure Germanium X-ray Detectors.	Siddons, D.P.	NSLS/725D		8,514	174,048	112,000		294,562
07-096	Study of Epigenetic Mechanisms in a Model of Depression	Henn, F.	LIFE/490		321,258	340,913	450,000		1,112,171
07-097	Polarized Electron SRF Gun	Ben-Zvi, I.	CAD/911B		149,879	198,518	50,000		398,397
07-098	New Approach to H Production, Stages and use	Han, W.	CFN		384,523	304,389			6,381,327

Funding Table of LDRD Projects Approved FY 2008

Appendix A

LDRD Proj. No.	Project Title	P.I.	Dept./Bldg.	Actual FY06	Actual FY07	Actual FY08	FY09	FY10	Total
07-101	High End Scientific Computing	Davenport, J.	CSC/463B		361,016	1,733,139	1,667,000	1,200,000	4,961,155
08-001	How Does Color Flow in a Large Nucleus: Exploring the Chromo-Dynamics of QCD through Diffractive and Jet Measurements at eRHIC	Venugopalan, R.	PHYS/510A			123,006	118,000		241,006
08-002	Strongly Correlated Systems: From Graphene to Quark-Gluon Plasma	Kharzeev, D. & Tsvetik, A.	PHYS/CMP			33,967	150,000	125,000	273,088
08-004	Getting to Know Your Constituents: Studies of Partonic Matter at the EIC	Vogelsang, W.	PHYS/510A			19,688	131,000	122,400	273,088
08-005	Development of the Deuteron EDM Proposal	Semertzidis, Y.	PHYS/510A			306,308	337,000	26,300	669,608
08-008	Development of a Small Gap Magnets and Vacuum Chamber for eRHIC	Litvinenko, V.	C-AD/911B			119,378	163,000	21,674	304,052
08-022	Novel Methods for Microcrystal Structure Determination at NSLS and NSLS-II	Orville, A. M.	BIO/463			8,722	163,000	64,300	236,022
08-025	Combined PET/MRI Multimodality Imaging Probe	Schlyer, D.	MED/490			108,709	96,100	36,300	241,109
08-028	Genomic DNA Methylation: The Epigenetic Response of <i>Arabidopsis Thaliana</i> Genome to Long-term Elevated Atmospheric Temperature and CO ₂ in Global Warming	Liu, Q.	MED/490 & BIO/463			22,033	154,000	42,700	218,733
08-034	Fabry-Perot Interferometer & Hard X-ray Photoemission	Vescovo, E.	NSLS/725D			38,309	110,000	25,000	173,309

Funding Table of LDRD Projects Approved FY 2008

Appendix A

LDRD Proj. No.	Project Title	P.I.	Dept./Bldg.	Actual FY06	Actual FY07	Actual FY08	FY09	FY10	Total
08-037	Ultrafast Electron Diffraction for Transient Structure and Phase Transition Studies at the NSLS SDL	Wang, X.	NLSL/725D			39,831	188,000	24,745	252,576
08-039	The Development of a Laser Based Photoemission Facility for Studies of Strongly Correlated Electron Systems	Johnson, P. D.	CMPMSD/510B			26,532	131,000	107,500	265,032
08-042	Theory of Electronic Excited States in Heterogeneous Nanosystems	Hybertsen, M. S.	CFN/480			29,645	129,000	25,000	183,645
08-043	Nanofabrication Methods using Solution-Phase Nanomaterials	Black, C.	CFN/480			32,737	142,000	112,800	287,537
08-051	Identification of Organic Aerosols and their Effectson Radiative Forcing	Lee, Y.-N.	ESD/815E			124,635	168,000	42,000	334,635
08-060	Computational Climate Science	Vogelmann, A.	ESD/815E			185,030	250,000	62,800	497,830
08-062	A Novel Spintronic Room-Temperature High Purity Germanium X- and Gamma-Ray Spectrometer	Bolotnikov, A.	NNS/197C			116,140	155,000	39,000	310,140
08-080	Tracer Development-Improving PET and MR Imaging	Fowler, J.	MED/555A			1,149,581	1,290,000		2,439,581
08-081	New MR Technology for Studies of Human Biology	Henn, F.	LIFE/490			1,105,469	1,000,900		2,106,369
08-082	Biofuels and Nanotech for Improvement of Oil Heat Combustion Systems	Butcher, T. A.	ES&T/475C			3,690	56,300		59,990
08-083	Solar Water Splitting: Quantum Theory of Photocatalytic Processes at the Water/Semiconductor Interface	Allen, P. B.	Stony Brook/BNL			4,850	44,700		49,550

Funding Table of LDRD Projects Approved FY 2008

Appendix A

LDRD Proj. No.	Project Title	P.I.	Dept./Bldg.	Actual FY06	Actual FY07	Actual FY08	FY09	FY10	Total
						12,028,272			

E-mail call for LDRD Proposals in Energy-related Research and Development

We are now soliciting proposals for energy-related LDRD projects in support of the Laboratory's strategy in this area. A webpage has been established to provide information related to this call, including the energy strategy and white papers as well as review procedures and criteria. Please see: http://www.bnl.gov/ldr/FY08_EnergyRelated_LDRD/. It is important to note that proposals submitted in response to this call will utilize a different format and will be reviewed using criteria and a process that is somewhat different than for the open LDRD call. **Please pay close attention to these changes!**

The deadline for receipt of proposals is COB July 31, 2007. We ask that you submit your proposal electronically through your respective Chairperson/Division Head and ALD to Sabrina Parrish (Sabrina@bnl.gov). In drafting your proposal, utilize the Proposal Information Questionnaire (PIQ) for Energy-Related LDRD, which is linked to the website listed above. If you have questions, please contact the LDRD Director Lenny Newman (newman@bnl.gov)

**BROOKHAVEN NATIONAL LABORATORY
PROPOSAL INFORMATION QUESTIONNAIRE
LABORATORY DIRECTED RESEARCH AND DEVELOPMENT PROGRAM**

PRINCIPAL INVESTIGATOR

PHONE

DEPARTMENT/DIVISION

DATE

OTHER INVESTIGATORS

TITLE OF PROPOSAL

PROPOSAL TERM (month/year)

From

Through

SUMMARY OF PROPOSAL

Description of Project:

Expected Results:

INSTRUCTIONS

Under **Description of Project**, provide a summary of the scientific concept of the proposed project including the motivation for the undertaking and the approach that will be used to conduct the investigation. Also indicate how the project meets the general characteristics of the LDRD Program and how it is tied to the DOE Mission.

Under **Expected Results**, clearly enunciate what are the expected results and how they will impact the science.

These items should not exceed the space remaining on this page, using the given font and size. The content should be understandable by the non-expert. Do not use jargon (defined by Webster as the "technical or secret vocabulary of a science"), as this has no meaning or utility to the non-expert. Submit this Summary of Proposal for review by your ALD. Upon concurrence and possible modification of your summary, follow it with an extended Proposal of no more than three (3) pages in length. In addition, include a one-page Vita of the Principal Investigator; fill out the page with citations to recent pertinent publications. Do not include any additional attachments, as these will be discarded. Complete the Questionnaire, obtain the required approvals, and provide a budget in the format on the form supplied. Break down the funding by fiscal year and by the broad categories of labor, materials and supplies, travel (foreign & domestic), services and subcontracts. LDRD funds cannot be used to purchase capital equipment. Indicate the intent to use collaborators, postdoctoral research associates, and/or students. Identify the various burdens applied, i.e., organizational, materials, contracts, and any other charges. Include the Laboratory G&A in the budget statement. Go to the LDRD web site (www.bnl.gov/ldr/) for further information. **The Instructions should be removed before proceeding.**

PROPOSAL

VITA (Principal Investigator)

1. HUMAN SUBJECTS (Reference: DOE Order 1300.3)

Are human subjects involved from BNL or a collaborating institution?

If yes, attach copy of the current Institutional Review Board Approval and Informed Consent Form from BNL and/or collaborating institution.

Y/N _____

2. VERTEBRATE ANIMALS

Are vertebrate animals involved?

Y/N _____

If yes, has approval from BNL's Animal Care and Use Committee been obtained?

Y/N _____

3. NEPA REVIEW

Are the activities proposed similar to those now carried out in the Department/Division which have been previously reviewed for potential environmental impacts and compliance with federal, state, local rules and regulations, and BNL's Environment, Safety, and Health Standards? (Therefore, if funded, proposed activities would require no additional environmental evaluation.)

Y/N _____

If no, has a NEPA review been completed in accordance with the Subject Area National Environmental Policy Act (NEPA) and Cultural Resources Evaluation and the results documented?

Y/N _____

(Note: If a NEPA review has not been completed, submit a copy of the work proposal to the BNL NEPA Coordinator for review. No work may commence until the review is completed and documented.)

4. ES&H CONSIDERATIONS

Does the proposal provide sufficient funding for appropriate decommissioning of the research space when the experiment is complete?

Y/N _____

Is there an available waste disposal path for project wastes throughout the course of the experiment?

Y/N _____

Is funding available to properly dispose of project wastes throughout the course of the experiment?

Y/N _____

Are biohazards involved in the proposed work? If yes, attach a current copy of approval from the Institutional Biosafety Committee.

Y/N _____

Can the proposed work be carried out within the existing safety envelope of the facility (Facility Use Agreement, Nuclear Facility Authorization Agreement, Accelerator Safety Envelope, etc.) in which it will be performed?

Y/N _____

BUDGET REQUEST BY FISCAL YEAR

Department

Title

PI

(Note: Funding for more than 2 years is unlikely and cannot exceed 3 years)

COST ELEMENT	FISCAL YEAR _____	FISCAL YEAR _____	FISCAL YEAR _____	TOTAL COST
Labor* Fringe Total Labor Organizational Burden @ ____ %				
DISTRIBUTED TECHNICAL SERVICES				
Materials Supplies Travel Services Total MST Materials Burden @ ____ %				
TECHNICAL COLLABORATORS/ CONSULTANTS				
Sub-contracts Contracts Burden @ ____ %				
Electric Power Other (specify)				
Traditional G&A @ ____ % Common Support G&A @ ____ %				
TOTAL PROJECT COST				
*Labor (give levels of effort with names, or if unknown indicate TBD) <u>Scientific & Professional</u> <u>Post Doc</u> <u>Other</u>				
<u>Note:</u> The Budget Office covers 20% of the Post Doc's salary/fringe.				
List all Materials Costing Over \$5,000				

**BROOKHAVEN NATIONAL LABORATORY
PROPOSAL INFORMATION QUESTIONNAIRE FOR ENERGY-RELATED
LABORATORY DIRECTED RESEARCH AND DEVELOPMENT PROGRAM**

GENERAL INSTRUCTIONS

Proposals must conform to the following requirements in the attached Energy LDRD PIQ:

Font: Times New Roman, 12 point. **Line spacing:** No smaller than single space, 0 point before & after line. **Margins:** 1" in all directions.

Proposals that do not follow the format will be rejected.

1. Cover Page

A cover page must precede each proposal.

2. Summary of Proposal

The proposal must contain a summary of the proposed activity, not more than one page in length. The summary should be a self-contained description of the activity that would result if the proposal were funded and include a statement of the objectives and methods to be employed. It should not be an abstract. The summary should be informative to persons from the same field, yet understandable to the more general scientifically literate audiences who are not experts in the field.

3. Description of Project:

The Project Description should provide a clear statement of the work to be undertaken and include: the objectives for the period of the proposed work and expected significance; relation to longer-term goals, to the present state of knowledge in the field, to work in progress at BNL under other support, and to work in progress elsewhere; inside or outside of BNL.

The Project Description should outline the general plan of work, including the broad design of activities to be undertaken. As an integral part of the narrative, it must describe the broader impacts resulting from the proposed activities, addressing as appropriate, one or more of the following:

- How the project will further the Laboratory's strategic aims in energy-related R&D
- How the project will enhance the infrastructure for research at BNL, such as development of new facilities, instrumentation, networks, and partnerships
- How the project relates to the goals of research sponsors at the DOE or elsewhere
- The potential for intellectual property resulting from the research.

Any substantial collaboration with individuals not included in the budget should also be described. The Project Description may not exceed 10 pages.

4. References

The proposal may also include a list of references that substantiate assertions of need, scientific or technical barriers, or research results on which the proposed work relies.

5. Equipment

If the proposal includes a request for equipment over \$5000, a statement of justification is needed for each piece of equipment that is being requested. The statement of justification should include information about the relationship to the proposed work and a statement of the potential impact on the proposed statement of work, if the equipment were not made available, as well as potential alternative solutions (if any).

6. Biographical Information

For each of the principal investigators, the proposal must include a one-page CV that lists their education, history of employment and other appointments, areas of expertise, and publications relevant to the proposed work (not to exceed 10).

7. Reviewers

Please provide the names and contact information (address, email address, phone number) of three qualified external reviewers who we may contact for a review by mail.

8. Information about the Proposal

The questions must be answered and the proposal must be approved by the Department/Division Administrator, the Department Chair/Division Manager, and the Cognizant Associate Laboratory Director.

9. Budget

The LDRD Budget Request by Fiscal Year form must be completed. The requested budget should be commensurate with the proposed scope of work and will be considered as one of the review criteria.

Please do not include the instructions with the proposal.

**BROOKHAVEN NATIONAL LABORATORY
 PROPOSAL INFORMATION QUESTIONNAIRE FOR ENERGY-RELATED
 LABORATORY DIRECTED RESEARCH AND DEVELOPMENT PROGRAM**

COVER PAGE (item 1)

**PRINCIPAL
 INVESTIGATOR**

PHONE

DEPARTMENT/DIVISION

DATE

OTHER INVESTIGATORS

TITLE OF PROPOSAL

PROPOSAL TERM (month/year)

From

Through

**FUNDING REQUEST (duration
 cannot exceed thirty six months)**

FY08

FY09

FY10

FY11

SUMMARY OF PROPOSAL (item 2; not to exceed one page)

DESCRIPTION OF PROJECT (item 3; not to exceed 10 pages)

REFERENCES (item 4)

EQUIPMENT (item 5)

BIOGRAPHICAL INFORMATION (item 6)

REVIEWERS (item 7)

INFORMATION ABOUT THE PROPOSAL (item 8)

1. HUMAN SUBJECTS (Reference: DOE Order 1300.3)

Are human subjects involved from BNL or a collaborating institution?

If **yes**, attach copy of the current Institutional Review Board Approval and Informed Consent Form from BNL and/or collaborating institution.

Y/N _____

2. VERTEBRATE ANIMALS

Are vertebrate animals involved?

Y/N _____

If **yes**, has approval from BNL's Animal Care and Use Committee been obtained?

Y/N _____

3. NEPA REVIEW

Are the activities proposed similar to those now carried out in the Department/Division which have been previously reviewed for potential environmental impacts and compliance with federal, state, local rules and regulations, and BNL's Environment, Safety, and Health Standards? (Therefore, if funded, proposed activities would require no additional environmental evaluation.)

Y/N _____

If **no**, has a NEPA review been completed in accordance with the Subject Area National Environmental Policy Act (NEPA) and Cultural Resources Evaluation and the results documented?

Y/N _____

(Note: If a NEPA review has not been completed, submit a copy of the work proposal to the BNL NEPA Coordinator for review. No work may commence until the review is completed and documented.)

4. ES&H CONSIDERATIONS

Does the proposal provide sufficient funding for appropriate decommissioning of the research space when the experiment is complete?

Y/N _____

Is there an available waste disposal path for project wastes throughout the course of the experiment?

Y/N _____

Is funding available to properly dispose of project wastes throughout the course of the experiment?

Y/N _____

Are biohazards involved in the proposed work? If yes, attach a current copy of approval from the Institutional Biosafety Committee.

Y/N _____

Can the proposed work be carried out within the existing safety envelope of the facility (Facility Use Agreement, Nuclear Facility Authorization Agreement, Accelerator Safety Envelope, etc.) in which it will be performed?

Y/N _____

If **no**, attach a statement indicating what has to be done and how modifications will be funded to prepare the facility to accept the work.

5. TYPE OF WORK

Select Basic, Applied _____

6. LINK TO LABORATORY STRATEGIC INITIATIVES

Identify below which energy-related R&D area your proposal supports,
http://www.bnl.gov/ldrd/FY08_EnergyRelated_LDRD/

7. POTENTIAL FUTURE FUNDING

Identify below the Agencies and the specific program/office, which may be interested in supplying future funding. Give some indication of time frame.

APPROVALS

Department /Division Administrator _____

Print Name

Department Chair/Division Manager _____

Print Name

Cognizant Associate Director _____

Print Name

BUDGET REQUEST BY FISCAL YEAR (item 9)

Department

Title

PI

(Note: Funding duration cannot exceed 36 months.)

COST ELEMENT	FISCAL YEAR _____	FISCAL YEAR _____	FISCAL YEAR _____	FISCAL YEAR _____	TOTAL COST
Labor* Fringe Total Labor Organizational Burden @ ____ %					
DISTRIBUTED TECHNICAL SERVICES					
Materials Supplies Travel Services Total MST Materials Burden @ ____ %					
TECHNICAL COLLABORATORS/ CONSULTANTS					
Sub-contracts Contracts Burden @ ____ %					
Electric Power Other (specify)					
Traditional G&A @ ____ % Common Support G&A @ ____ %					
TOTAL PROJECT COST					
*Labor (give levels of effort with names, or if unknown indicate TBD) <u>Scientific & Professional</u> <u>Post Doc</u> <u>Other</u>					
Note: The Budget Office covers 20% of the Post Doc's salary/fringe.					
List all Materials and Equipment Costing Over \$5000					

LDRD DATA COLLECTION FORM

Read and then remove the instructions before completing this form; return it electronically to Sabrina Parrish (sabrina@bnl.gov)

LDRD PROJECT NUMBER:

PROJECT TITLE:

PRINCIPAL INVESTIGATOR (S):

PUBLICATIONS

TOTAL _____

List all refereed publications originating in whole or in part from this LDRD, during the fiscal year, including those that have been submitted, but do not include any that are in preparation. Provide the total number above.

MEETINGS, PROCEEDINGS, AND ABSTRACTS

TOTAL _____

List all formal presentations originating in whole or in part from this LDRD presented during the fiscal year. Provide the total number above.

REPORTS

TOTAL _____

List all formal reports originating in whole or in part from this LDRD including those that have been published during the fiscal year. Provide the total number above.

PATENTS AND LICENSES

TOTAL _____

List all patents and licenses originating in whole or in part from this LDRD during the fiscal year. Provide the total number above.

COPYRIGHTS

TOTAL _____

List all copyrights (other than publications) originating in whole or in part from this LDRD granted during the fiscal year. Provide the total number above.

INVENTION DISCLOSURES

TOTAL _____

List all invention disclosures submitted during the fiscal year to the Laboratory's Office of Intellectual Property & Sponsored Research that were either directly derived from this LDRD or from any follow-on efforts. Provide the total number above.

PROJECT REVIEWS**TOTAL** _____

List all formal review presentations that pertain to this work conducted during the fiscal year. Include the name of the reviewing body and date of review, title of presentation, and names of presenters. Provide the total number above. Do not include the mid-year LDRD program reviews.

STUDENTS AND RESEARCH ASSOCIATES**TOTAL** _____

Provide names of all graduate students and Research Associates supported during the fiscal year and give the number of months that they were supported. Provide the total number above combined as full-time equivalents, rounded to the nearest month.

NEW HIRES**TOTAL** _____

Provide names of any new staff who were hired during the fiscal year as a direct result of this LDRD. Provide the total number above.

FOLLOW-ON FUNDING**TOTAL** _____

List all requests for funding submitted during the current and prior fiscal years including any that have been rejected. Give the title of the project, the Principal Investigator, date of submission, the name of the agency, action taken, amount funded or requested per year, and the duration. Provide the total number above.

AWARDS**TOTAL** _____

Provide information on any national awards or recognitions received during the fiscal year that are attributable in whole or in part to the LDRD project. For each award, describe (in 150 words or less) its significance and the role that LDRD played in achieving it. Provide the total number above.

Instructions for LDRD Energy Selection Committee

All,

As you know, Sabrina scheduled the first meeting for the Energy-Related LDRD Selection Process on Friday, November 16th. At this meeting, we will select a subset of the 17 proposals for oral presentation by the PI. You should have received from Sabrina a compendium of information for this meeting, which for each proposal contains:

1. The cover page with the proposed budgets
2. The summary of the proposal
(The full proposals can be found at http://intranet.bnl.gov/ldrd/Energy_LDRDs/)
Two to three reviews with authors unidentified, including one from a BNL Council member, and one or two from external reviewers
3. A commentary from the Intellectual Property Office

Also attached is a Table designating individuals to serve as Discussion Leaders (DL). The function of the DL is to lead a short discussion on the proposal(s) they have been assigned. The DL will lead a general discussion of the relative merits of the proposal, including the scientific questions that the proposal addresses, its alignment to BNL's Energy Strategy, its positive and negative attributes, based on the comments of the reviewers, and how it could lead to new core competencies at BNL. The DL should begin by summarizing the proposal and the reviews in an objective manner. We expect to spend approximately ten minutes per proposal.

In the Table you will also find suggestions on which proposals should be selected for oral presentation (A), those that could be considered for oral presentation (C), and those that should be rejected (R). These tentative selections are based on the reviewers' comments and the proposal's relevance to the Laboratory's Energy Strategy. It will be the function of the Selection Committee to finalize, by a vote of those Members present, the list of proposals that will advance to the next stage.

During the oral presentation, the PI will be given the opportunity to elaborate on the subject matter and address comments that appeared in the reviews and any other points that were raised at the Selection Committee meeting.

Ultimately we will probably fund 3 or 4 proposals. If you have further questions, I'll be happy to answer them.

FY08 Energy Related LDRD

[View Energy Presentations](#)

Call for LDRD Proposals in Energy-related Research and Development

We are now soliciting proposals for energy-related R&D in support of the Laboratory's strategy in this area. The challenges that the Laboratory seeks to address are outlined in the Lab energy strategy and in a series of white papers that were developed in support of this strategy. We anticipate funding projects aimed at the development of new competencies at BNL. Hence they will be funded at somewhat higher levels than in the past, and for the full 36 months. The business case, including the potential for follow-on funding for these proposals, will held to a high standard.

This webpage has been established to provide information related to this call, including the energy strategy and white papers as well as review procedures and criteria. It is important to note that proposals submitted in response to this call will utilize a different format and will be reviewed using criteria and a process that is somewhat different than for the open LDRD call, so please pay close attention to these changes!

The deadline for receipt of proposals is COB July 31, 2007. We ask that you submit your proposal electronically through your respective Chairperson/Division Head and ALD to S. Parrish (sabrina@bnl.gov). In drafting your proposal, utilize the Proposal Information Questionnaire (PIQ) for Energy-Related LDRD, which is linked to this page.

Proposals that **do not** follow the Energy LDRD PIQ format will be **rejected**.

Guidelines for Proposal Development for Energy R&D LDRD Requests

Proposal Due Date: July 31, 2007

Award Notifications: September 30, 2007

Target Funding Start: January 1, 2008

The proposal should present:

- The objectives and scientific or technological significance of the proposed work
- The relationship to fundamental barriers associated with the acceptance and/or deployment of renewable/alternative energy sources and/or the efficiency of the conversion, storage, transmission, and/or use of energy sources
- The suitability of the approach and the methods employed
- The effect of the activity on BNL's core competencies
- The qualifications of the principal investigators
- The amount of funding required
- The names of potential external reviewers.

Please read the review process, criteria for evaluation, and use the energy LDRD PIQ.

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[\[Keywords\]](#)

Management System: Science and Technology Program Management

Subject Area: Laboratory Directed Research and Development (LDRD) Program

 **VIEW/PRINT ALL (No Exhibits and Forms)**

Effective Date: **Nov 4, 2004** (Rev 3.11)
 Periodic Review Due: **Nov 4, 2009**

Subject Matter Expert:
[Kevin Fox](#)

Management System Steward:
[Doon Gibbs](#)

Introduction

This subject area describes the procedures for preparing, submitting, reviewing, and approving proposals for the Laboratory Directed Research and Development (LDRD) Program. It also describes the procedures for reporting on the status of LDRD projects.

The purpose of the LDRD Program is to encourage and support the development of ideas that could lead to new programs, projects, and directions for the Laboratory. The LDRD program focuses on early exploration and exploitation of creative and innovative concepts, which enhance the ability of the Laboratory to carry out its current and future mission objectives in line with the goals of the Department of Energy (DOE). This discretionary research and development tool is viewed as one important way of maintaining the scientific excellence of the Laboratory. It is a means to stimulate the scientific-technological community (foster new science and technology ideas), which is a factor in achieving and maintaining staff excellence, and is a means to address National needs within the overall mission of the DOE.

The LDRD program includes all discretionary research and development activities other than those provided for in a DOE/NNSA program or by specific designation in the Prime Contract.

Program Structure

The program consists of two categories, open call LDRDs and Strategic LDRDs which, combined, meet the overall objectives of the LDRD Program.

Open Call LDRD Proposals

Proposals are solicited annually for review and approval concurrent with the start of the next fiscal year, October 1. An LDRD Selection Committee, comprised of the Associate Laboratory Directors for the Scientific Directorates, an equal number of scientists recommended by the Brookhaven Council and the Assistant Laboratory Director (ALD) for Policy and Strategic Planning (PSP), review the proposals submitted in response to the solicitation.

The open call LDRD category emphasizes innovative research concepts to encourage the creativity of individual researchers. The competition is open to all BNL staff in programmatic, scientific, engineering, and technical support areas. Researchers submit their project proposals to the ALD for PSP.

Strategic LDRD Proposals

A portion of the LDRD budget is held for the Strategic LDRD (S-LDRD) category. These funds are used to establish and enhance initiatives that are consistent with Laboratory priorities. Projects in this category focus on innovative R&D activities that are likely to develop new programmatic areas within BNL's mission responsibilities and enhance the Laboratory's science and technology base. The Laboratory Director entertains requests or articulates the need for S-LDRD funds at any time.

These Projects are driven by special opportunities, including:

- Research project(s) in support of a Laboratory strategic hire
- Evolution of Program Development activities into research and development activities
- ALD proposal(s) to the Director to support unique research opportunities

- Research project(s) in support of Laboratory strategic initiatives as defined and articulated by the Director.

Contents

Section	Overview of Content (see section for full process)
<u>1. Preparing, Submitting, Reviewing, and Approving Open Call LDRD Proposals</u>	<ul style="list-style-type: none"> • Complete Proposal Information Questionnaire. • Review and approve proposals. • Authorize funding.
<u>2. Preparing, Submitting, Reviewing, and Approving Strategic LDRD Proposals</u>	<ul style="list-style-type: none"> • Complete Proposal Information Questionnaire. • Review and approve proposals. • Authorize funding.
<u>3. Preparing and Submitting Reports on LDRD Projects</u>	<ul style="list-style-type: none"> • Submit status reports.

Definitions

Exhibits

Examples of Projects for LDRD Funding
Restrictions on LDRD Awards
Sample Interim Status Report

Forms

LDRD Data Collection Form
Proposal Information Questionnaire
Strategic LDRD Proposal Review with Instructions

Training Requirements and Reporting Obligations

This subject area does not contain training requirements.

This subject area contains the following reporting obligations:

- Principal Investigators (PIs) submit an annual status report by November 1 to the ALD for PSP.
- PIs present an Annual LDRD Mid-year Project Review.
- For each year that the program is active and for two years after the completion of the project, PIs submit a LDRD Data Collection Form to the ALD for PSP.
- ALD for PSP submits an Annual Program Plan to the DOE BHSO by August 15
- ALD for PSP submits an Annual Report to the DOE BHSO by March 31
- ALD for PSP annually submits Project Data Sheets to the DOE BHSO by August 31
- ALD for PSP annually submits the required information to OMBE/CFO Database
- ALD for PSP annually submits to DOE Laboratory Policy Division data for Congressional report
- ALD for PSP annually submits performance indicators data to DOE Laboratory Policy Division

See the section Preparing, Submitting, Reviewing, and Approving Strategic LDRD Proposals.

External/Internal Requirements

Requirement Number	Requirement Title
<u>BSA Contract No. DE-AC02-98CH10886 - Clause C.4</u>	Statement of Work
<u>O 413.2B</u>	Laboratory Directed Research and Development

References

Laboratory Directed Research and Development (LDRD) Web site

Standards of Performance

Provide for strategic growth and investment in the Laboratory's programmatic mission and supporting assets through the following:

- Using Laboratory Directed Research and Development (LDRD);
- Maintaining an Annual Laboratory Plan through a process for formal strategic planning; and
- Maintaining a supportive work environment that fosters innovative scientific and technological research and analysis to serve customers needs, and staff development to address long-term organizational needs and staff career goals.

All staff shall ensure that the scientific and technical information resulting from BNL research is available to the maximum permissible extent for future use by the scientific community and the public within BNL's and the customer's requirements.

The only official copy of this file is the one on-line in SBMS.

Before using a printed copy, verify that it is the most current version by checking the *effective date*.

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Department of Energy

Washington, DC 20585

September 20, 2007

Dr. Samuel Aronson
Director
Brookhaven National Laboratory
P.O. Box 5000
Upton, New York 11973-5000

THRU: Michael D. Holland
Manager
Brookhaven Site Office

Dear Dr. Aronson:

Based on the Brookhaven Site Office's recommendation, a review of the Brookhaven National Laboratory's FY 2008 laboratory directed research and development (LDRD) plan, and the Laboratory's ability to manage the LDRD program effectively, this letter provides approval of your FY 2008 LDRD plan and associated maximum funding level of \$16.0 million. Approval of the Brookhaven National Laboratory's funding level is contingent upon the Site Office's concurrence on each proposed LDRD project to ensure compliance with the requirements of DOE Order 413.2B and subsequent Departmental and Office of Science guidance documents.

We recognize how essential the LDRD program is to the health and vitality of the Laboratory, and how this program clearly enhances your ability to support the missions of the Department. As always the Laboratory needs to continue to conduct its LDRD program in full compliance with Departmental policy.

If you have any questions, please contact John LaBarge on (202) 586-9747.

Sincerely,

A handwritten signature in black ink that reads "Raymond L. Orbach".

Raymond L. Orbach
Under Secretary for Science

cc: N. Narain, Brookhaven Site Office
L. Newman, BNL
K. Fox, BNL



Printed with soy ink on recycled paper

Relationship of LDRD Projects* to Laboratory Initiatives and Related Opportunities for Growth

**Project
Number** **Title**

Biological Imaging

07-048 Functional Neurochemistry
 07-054 Miniaturized RF Coil Arrays for MicroMRI
 07-089 Chemical Imaging of Living Cells in Real Time
 07-096 Study of Epigenetic Mechanisms in a Model of Depression
 08-025 Combined PET/MRI Multimodality Imaging Probe
 08-080 Tracer Development-Improving PET and MR Imaging
 08-081 Development of MR Research at BNL

Climate Science

07-075 Developing a New Framework for Investigating Earth's Climate and Climate Change
 07-084 Investigations of Hygroscopic Growth and Phase Transitions of Atmospheric Particles
 by Noncontact Atomic Force Microscopy
 08-028 Genomic DNA Methylation: The Epigenetic Response of Arabidopsis Thaliana
 Genome to Long-term Elevated Atmospheric Temperature and CO₂ in Global
 Warming
 08-051 Identification of Organic Aerosols and their Effects on Radiative Forcing
 08-060 Computational Climate Science

Complex and Nano Materials

07-035 Ultra-thin Graphite Analog Compounds
 07-036 Lipid-Coated Nanoparticles and Their Interactions with Lipid Membrane Surfaces
 07-062 Fate and Reactivity of Carbon Nanoparticles (CNPs) Exposed to Aqueous
 Environmental Conditions

Computational Science

07-002 Lattice QCD Simulations on BlueGene/L

Detectors for National Security

07-073 Development of Room-temperature CdMnTe Gamma-ray Detectors
 08-062 A Novel Spintronic Room-Temperature High Purity Germanium X- and Gamma-Ray
 Spectrometer

Energy

07-023 Surface Engineered and Core-Shell Nanowires: Nanoscale Building Blocks for Third

Generation Photovoltaics

- 07-025 Precision Assembly of Nano-Objects – Approaching Artificial Photosynthesis
- 07-027 Photocatalytic Carbon Dioxide Reduction to Methanol using Metal Complexes with an NADH Model Ligand
- 07-055 Neurocomputation at BCTN: Developing Novel Computational Techniques to Study Brain Function in Health and Disease
- 07-030 Structure of Mass-Size Selected Nanoparticles by Scanning Transmission Electron Microscopy
- 07-032 Synthesis of Conjugated Polymers for Fundamental Questions in Solar Energy
- 07-038 Angle-Resolved Time-of-Flight Ion Scattering Spectroscopy from MBE-Grown Oxide Thin Film Surfaces
- 07-047 Characterization of Enzymatic O-acylation to Facilitate Biomass and Bioenergy Production
- 07-059 A Non-Fermentation Route to Convert Biomass to Bioalcohols
- 07-080 A Novel Approach for Efficient Biofuel Generation
- 07-090 Coherent Bragg Rod Analysis of High-Tc Superconducting Epitaxial Films
- 08-039 The Development of a Laser Based Photoemission Facility for Studies of Strongly Correlated Electron Systems
- 08-042 Theory of Electronic Excited States in Heterogeneous Nanosystems
- 08-043 Nanofabrication Methods Using Solution-Phase Nanomaterials
- 08-082 Biofuels and Nanotech for Improvement of Oil Heat Combustion Systems
- 08-083 Solar Water Splitting: Quantum Theory of Photocatalytic Processes at the Water/Semiconductor Interface
- 09-001 Nanoscale Anode Materials for Lithium Batteries
- 09-002 Bioconversion of Lignocellulose to Ethanol and Butanol Facilitated by Ionic Liquid Preprocessing
- 09-003 Organic Photovoltaics: Nanostructure, Solvent Annealing and Performance
- 09-004 Surface Chemistry and Electrochemistry of Ethanol
- 09-005 Synergistic Interactions Between Poplar and Endophytic Bacteria to Improve Plant Establishment and Feedstock Production on marginal Soils

Photon Sciences

- 07-091 Development of a Planar Device Technology for Hyperpure Germanium X-ray Detectors.
- 08-022 Novel Methods for Microcrystal Structure Determination at NSLS and NSLS-II
- 08-034 Fabry-Perot Interferometer & Hard X-ray Photoemission

QCD Matter

- 07-001 QCD Thermodynamics at Non-zero Temperature and Density

- 07-005 Sensitive Searches for CP-Violation in Hadronic Systems
- 07-006 Feasibility and Design Studies for a Detector for e+p, e+A, p+p, p+A, and A+A Collisions at BNL
- 07-007 A Novel and Compact Muon Telescope Detector for QCD Lab
- 07-019 Development of Laser beam Shaper for Low Emittance Electron Beams
- 07-097 Polarized Electron SRF Gun
- 08-001 How Does Color Flow in a Large Nucleus: Exploring the Chromo-Dynamics of QCD through Diffractive and Jet Measurements at eRHIC
- 08-002 Strongly Correlated Systems: From Graphene to Quark-Gluon Plasma
- 08-004 Getting to Know Your Constituents: Studies of Partonic Matter at the EIC
- 08-008 Development of a Small Gap Magnets and Vacuum Chamber for eRHIC

Other

- 07-004 Proof-of-Principle Laser System for ILC Positron Source
- 07-010 Design Optimization of a Reactor Neutrino Experiment
- 08-005 Development of the Deuteron EDM Proposal
- 08-037 Ultrafast Electron Diffraction for Transient Structure and Phase Transition Studies At the NSLS SDL

*Although some projects are related to more than one initiative, only one connection is listed.

