U.S. DEPARTMENT OF ENERGY

Fiscal Year 2018 Report to Congress: Laboratory Directed Research and Development at DOE National Laboratories

Report to Congress
January 2019

United States Department of Energy
Washington, DC 20585

Message from the Chief Financial Officer

As required by Section 3136 of the National Defense Authorization Act for Fiscal Year 1997 (Public Law 104-201; 50 U.S.C. 2793) and requested in the Conference Report accompanying the Department of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 2001, (H. Rept. 106-988), this is the Department of Energy (DOE)'s Report on Laboratory Directed Research and Development (LDRD), Plant Directed Research and Development (PDRD) and Site Directed Research and Development (SDRD) for FY 2018.

The report provides FY 2018 LDRD, PDRD and SDRD expenditures by laboratory, weapons production plant and site. In FY 2018 there were 1,986 LDRD projects with a total cost of $590.83 million, 268 PDRD projects with a total cost of $59.92 million and 41 SDRD projects with a total cost of $8.76 million.

Pursuant to statutory requirements, this report is being provided to the following Members of Congress:

- **The Honorable Nita M. Lowey**
  Chairman, House Committee on Appropriations

- **The Honorable Kay Granger**
  Ranking Member, House Committee on Appropriations

- **The Honorable Marcy Kaptur**
  Chairman, Subcommittee on Energy and Water Development House Committee on Appropriations

- **The Honorable Mike Simpson**
  Ranking Member, Subcommittee on Energy and Water Development House Committee on Appropriations

- **The Honorable Richard Shelby**
  Chairman, Senate Committee on Appropriations

- **The Honorable Patrick Leahy**
  Vice Chairman, Senate Committee on Appropriations

- **The Honorable Lamar Alexander**
  Chairman, Subcommittee on Energy and Water Development Senate Committee on Appropriations

- **The Honorable Dianne Feinstein**
  Ranking Member, Subcommittee on Energy and Water Development Senate Committee on Appropriations

- **The Honorable James Inhofe**
  Chairman, Senate Committee on Armed Services

- **The Honorable Jack Reed**
  Ranking Member, Senate Committee on Armed Services

- **The Honorable Deb Fischer**
  Chairman, Subcommittee on Strategic Forces
  Senate Committee on Armed Services

- **The Honorable Joe Donnelly**
  Ranking Member, Subcommittee on Strategic Forces
  Senate Committee on Armed Services

- **The Honorable Adam Smith**
  Chairman, House Committee on Armed Services

- **The Honorable Mac Thornberry**
  Ranking Member, House Committee on Armed Services

- Chairman, Subcommittee on Strategic Forces
  House Committee on Armed Services

- Ranking Member, Subcommittee on Strategic Forces
  House Committee on Armed Services

If you have any questions or need additional information, please contact Ms. Bridget Forcier, Office of the Chief Financial Officer, at 202-586-0176.

Sincerely,

John G. Vonglis
Chief Financial Officer

Executive Summary

The Laboratory Directed Research and Development (LDRD) Program at the Department of Energy (DOE) National Laboratories and analogous programs at DOE such as the nuclear weapons production Plant Directed Research and Development (PDRD) and Nevada National Security Site Directed Research and Development (SDRD) are active components of the DOE mission to promote scientific and technical (S&T) innovation that advances the economic, energy, and national security of the nation.

This report provides the DOE's FY 2018 expenditures for LDRD, PDRD, and SDRD and certifies that individual projects or activities are charged within the statutory maximum authorized for these programs. It also affirms that every LDRD activity derived from funds of other agencies benefits the programs of the sponsoring agencies and is consistent with the Appropriations Acts that provided funds to those agencies.

DOE National Laboratories LDRD projects address the nation's energy, environmental and nuclear challenges. LDRD is an institutional investment, part of the overhead rate charged by a DOE National Laboratory for work performed by the laboratory. LDRD is accrued in accordance with cost accounting standards and the terms of the laboratory management and operating contracts. FY 2018 LDRD projects were relevant to defense, non-defense, and homeland security mission categories. In FY 2018, the Field Chief Financial Officers certified that the 1,986 LDRD projects totaling $590.83 million which represents 4.35 percent of total cost base at the 16 laboratories were in compliance with statutory requirements.

Section 308 of Division C of the Omnibus Appropriations Act, 2009 (Public Law 111-8) authorizes the Secretary of Energy to expend an amount less than four percent for both PDRD and SDRD. In FY 2018, DOE's Site and Plants invested approximately $59.92 million and $8.76 million through the PDRD and SDRD programs, respectively, to fund science and technology projects with the potential to enhance the plants' mission-related manufacturing capabilities, operations, and core technical competencies. The Field Chief Financial Officers certify these programs were funded within the maximum authorized amount.

DOE continues to oversee the LDRD program in accordance with all Congressional requirements. DOE will continue to carefully review the management and administrative procedures and funding levels at each of the relevant laboratories.

FY 2018 REPORT ON LDRD[1] AT THE NATIONAL LABORATORIES

Table of Contents

[1] This report also includes SDRD and PDRD in accordance with all statutory report language requirements.

Legislative Language

This report responds to Section 3136 of the National Defense Authorization Act for Fiscal Year 1997 (Public Law 104-201; 50 U.S.C. 2793). It requires "a report [annually] on the funds expended during the preceding fiscal year on [LDRD] activities […] to permit an assessment of the extent to which such activities support the national security mission of the Department of Energy".

It also responds to the Conference Report accompanying the Department of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 2001, which requested that the DOE Chief Financial Officer develop and execute a financial accounting report of LDRD expenditures by laboratory and weapons production plant.

This report also addresses the Conference Report (H. Rept. No. 107-258) that accompanied the Energy and Water Development Appropriations Act, 2002. It requested that the Secretary of Energy affirms in the annual Report to Congress on LDRD expenditures that every LDRD activity derived from funds of other agencies is conducted in a manner that support science and technology development that benefits the programs of the sponsoring agencies and is consistent with the Appropriations Acts that provided funds to those agencies.

For the full list of statutory and legislative report language requirements, see **Appendix A and B**.

I. Background

Section 31 of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2051), directs the DOE to ensure the continued conduct of research and development (R&D) and assist in the acquisition of an ever-expanding body of theoretical and practical knowledge in the fields of energy, production, uses, handling, and effects. This mission was initially the responsibility of the Atomic Energy Commission (AEC), then that of the Energy Research and Development Administration, and subsequently DOE.

The AEC recognized that to maintain the laboratories' intellectual vitality, ability to respond immediately to developments at the cutting edge of science and technology**,** and ability to retain the best scientific, technological, and managerial talent, a certain amount of work is left to the laboratories' discretion. From inception, the AEC and successor agencies made available certain amounts of research derived from the ideas of the National Laboratory researchers themselves.

In 1985, in response to the recommendations of national panels and commissions, the Department established the Exploratory Research and Development Program to formalize the

practice of providing National Laboratories with the means to conduct laboratory-initiated R&D.[2] Six years later, DOE renamed the program Laboratory Directed Research and Development (LDRD) and formally established Department-wide policies for how it would be implemented at the DOE National Laboratories. Today, the LDRD Program at the DOE National Laboratories and analogous programs at the Department's nuclear weapons production plants (Plant Directed Research and Development, or PDRD) and Nevada National Security Site (NNSS) (Site Directed Research and Development, or SDRD) are active components of the DOE mission to promote scientific and technical (S&T) innovation that advances the economic, energy, and national security of the United States (U.S.).

Every LDRD activity conducted at the DOE National Laboratories is governed by DOE policy (DOE Order 413.2C, *Laboratory Directed Research and Development*), which provides guidance on effective management and oversight of the LDRD Program, while at the same time supporting the laboratories' statutory authority to pursue innovative, self-selected projects in support of the DOE mission. DOE's LDRD policy is consistent with the Department's management practices for R&D activities including annual planning and reporting requirements, as well as program and peer reviews to verify the investments reflect highly innovative and of the highest quality research projects. DOE concurs with each proposed LDRD project before a laboratory commences work to guarantee the project complies with DOE policy. The remainder of this report responds to the LDRD, PDRD, and SDRD Program financial reporting requirements required by law (see **Appendix A and B** for the list of statutory and report language requirements).

[2] See, among others, the *Report of the White House Science Council*, Office of Science and Technology Policy, Executive Office of the President, Washington, DC, May 1983; and Guidelines, Energy Research Advisory Board, December 1985.

II. FY 2018 LDRD Financial Reporting

Table 1 enumerates DOE's FY 2018 LDRD costs, total funded amount, and the LDRD rate charged by laboratory. In accordance with Section 311 of Division D of the Consolidated and Further Continuing Appropriations Act, 2015, (Public Law 113-235) and DOE Order 413.2 C, individual projects and activities are charged within the statutory maximum authorized amount for LDRD by the Secretary of Energy. The total funded work in the table represents a laboratory's total operating and capital equipment budgets, including non-DOE funded work, less exemptions and LDRD. DOE Field Chief Financial Officers certify that each laboratory is in compliance with statutory requirements and certify the accuracy of the total funded work.

Table 1. FY 2018 Laboratory Costs and LDRD Costs at DOE Laboratories

Laboratory	DOE-Funded Work ($M)	SPP Funded Work ($M)	Total Funded Work ($M)	LDRD Costs ($M)	LDRD Rate (%)	Projects
Ames Lab	53.18	1.55	54.73	1.07	1.96%	10
Argonne National Lab	548.17	130.92	679.09	27.31	4.02%	138
Brookhaven National Lab	477.00	47.00	524.00	11.16	2.13%	57
Fermi National Accelerator Lab	312.75	1.87	314.62	4.64	1.47%	31
Idaho National Lab	789.47	292.35	1,081.82	21.66	2.00%	106
Los Alamos National Lab	1,960.88	201.19	2,162.07	123.71	5.72%	343
L. Berkeley National Lab	651.00	122.57	773.57	20.32	2.63%	81
L. Livermore National Lab	1,409.59	260.28	1,669.87	98.33	5.89%	235
National Renewable Energy Lab	319.50	47.68	367.18	15.68	4.27%	95
Oak Ridge National Lab	1,023.89	252.91	1,276.80	54.00	4.23%	191
Pacific Northwest National Lab	633.52	265.76	899.28	32.79	3.65%	198
Princeton Plasma Physics Lab	89.41	1.31	90.72	2.71	2.99%	22
SLAC National Accelerator Lab	302.49	17.20	319.69	4.46	1.40%	36
Sandia National Labs	2,069.57	973.62	3,043.19	162.73	5.35%	371
Savannah River National Lab	188.91	20.24	209.15	9.80	4.69%	67
Thomas Jefferson National Accelerator Facility	121.09	2.83	123.92	0.46	0.37%	5
TOTAL LDRD	**$10,950.42**	**$2,639.28**	**$13,589.70**	**$590.83**	**4.35%**	**1,986**

LDRD is an institutional investment, part of the overhead rate charged by a laboratory, which funds cutting edge, creative work that benefits laboratory programs. Consistent with Public Law 113-235, LDRD is accumulated through a percentage of the total project cost, excluding LDRD and line-item construction, for work performed by a laboratory. LDRD is accrued in accordance with cost accounting standards and with the terms of the laboratory management and operating contracts.

The total FY 2018 LDRD program cost at the national laboratories was $590.83 million, which represents 4.35 percent of total cost base at these laboratories.

Each National Laboratory conducted a review of the FY 2018 LDRD projects to determine the relevance of those projects to the missions of the various laboratory customers that provided funds for LDRD. For this review, laboratory consumers are considered in three mission categories – defense, non-defense, and homeland security (i.e., Department of Homeland Security (DHS)). The review concluded that FY 2018 LDRD projects were relevant to one, two or three mission categories. Further, the review indicated that funds contributed by each consumer category were invested in LDRD projects relevant to the respective mission areas at a level at least equal to the LDRD funds provided by the customers.

III. LDRD and Strategic Partnership Projects (SPP)

SPP creates opportunities with non-DOE Federal and non-Federal resources to accelerate scientific discovery and deploy solutions that benefit both DOE and sponsoring entity missions and goals. SPP plays an important role in the laboratories' efforts to develop, strengthen, and sustain unique S&T capabilities deemed critical by the Government and, in most cases, represents a coordinated set of activities that seek to address large and complex national needs. This use of DOE facilities and capabilities for SPP activities provides the laboratories an opportunity to deliver national solutions in a cost-effective manner.

Congress provided language in Conference Report 107-258 accompanying the Energy and Water Development Appropriations Act, 2002, which requested that DOE notify other Federal agencies that a portion of SPPs will be used to fund LDRD projects. Additionally, with the creation of DHS in the FY 2002 Homeland Security Act, Congress enacted a requirement that LDRD funding provided by DHS must benefit DHS missions. In response to the FY 2002 Conference Report, the Secretary of Energy issued guidance requiring every LDRD laboratory to notify other Federal agencies of LDRD charges before funding work at the laboratories. Specifically, each SPP proposal DOE provides to a Federal agency must indicate the amount of LDRD charges that the project will collect. Also, the proposal notifies the sponsor that, by providing funding, the agency is acknowledging that LDRD activities are beneficial to the organization and are consistent with the appropriation acts that provided funds to the agency. In February 2003, the Secretary of Energy and the Secretary of Homeland Security entered into

a Memorandum of Agreement to implement key provisions of the Homeland Security Act. Additionally, the Deputy Secretary of Energy issued DOE Order 484.1 on Reimbursable Work for the Department of Homeland Security. The Order provides information on the process by which the DHS may place orders for reimbursable work activities at the DOE laboratories. In the Order, there are provisions for notification of LDRD charges in the cost proposal as well as requirements for acknowledgements regarding the benefits of LDRD before final approval.

In December 2003, the DOE Office of the Chief Financial Officer provided other Federal agency Chief Financial Officers who are customers and sponsors of work at the Department's laboratories with applicable guidance and policy documents to explain the Department's processes. Collectively, the implementation and execution of these policies provide the basis for the Secretary's affirmation that the LDRD Program is managed in accordance with the Congressional requirements cited above.

IV. FY 2018 PDRD and SDRD Programs – Financial Reporting

Plant Directed Research and Development (PDRD) - Fiscal Year Expenditures

Section 308 of Division C of the Omnibus Appropriations Act, 2009 (Public Law 111-8) authorizes the Secretary of Energy to authorize an amount less than four percent for PDRD. Table 2 enumerates the Department's FY 2018 PDRD costs, total funded amount, and the PDRD rate charged by site. The total funded work in the table represents a plant's total operating and capital equipment budgets, including non-DOE funded work, less exemptions and PDRD. DOE Field Chief Financial Officers certify that each plant is in compliance with statutory requirements and certify the accuracy of the total funded work figure

Table 2. FY 2018 PDRD Expenditures

Plant	DOE-Funded Work ($M)	SPP Funded Work ($M)	Total Funded Work ($M)	PDRD Costs ($M)	PDRD Rate (%)	Projects
Kansas City National Security Campus	671.10	419.00	1,090.10	28.49	2.61%	186
Pantex Plant	720.71	0.00	720.71	7.89	1.09%	34
Savannah River Site	305.66	0.00	305.66	1.90	0.62%	12
Y-12 National Security Complex	945.83	0.00	945.83	21.64	2.29%	36
TOTAL PDRD	**$2,643.30**	**$419.00**	**$3,062.30**	**$59.92**	**1.96%**	**268**

Site Directed Research and Development (SDRD) - Fiscal Year Expenditures

Section 308 of Division C of the Omnibus Appropriations Act, 2009 (Public Law 111-8) authorizes the Secretary of Energy to authorize an amount less than four percent for SDRD. Table 3 enumerates the Department's FY 2018 SDRD costs, total funded amount, and the SDRD rate charged by site. The total funded work in the table represents the site's total operating and capital equipment budgets, including non-DOE funded work, less exemptions and SDRD. DOE Field Chief Financial Officers certify that the site is in compliance with statutory requirements and certify the accuracy of the total funded work figure

Table 3. FY 2018 SDRD Expenditures

Site	DOE-Funded Work ($M)	SPP Funded Work ($M)	Total Funded ($M)	SDRD Costs ($M)	SDRD Rate (%)	Projects
Nevada National Security Site	**388.59**	**50.84**	**439.43**	**8.76**	**1.99%**	**41**

V. Conclusion

The Department continues to oversee the LDRD, PDRD and SDRD programs in accordance with all Congressional requirements. LDRD, PDRD and SDRD provides the laboratories with the means to explore pioneering and cutting edge research concepts to support current and future DOE/NNSA and other national missions. LDRD, PDRD and SDRD research projects are uniquely able to bridge disciplinary boundaries to find synergistic solutions to science and technology challenges and build capabilities that can support multiple cross cutting interests. DOE has and will continue to carefully review the management and administrative procedures and funding levels at each of the relevant laboratories for compliance with statutory requirements.

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Secretarial Affirmation

As required by Section 3136 of the National Defense Authorization Act of 1997 (Public Law 104-201; 50 U.S.C. 2793) and requested in the Conference Report accompanying the Department of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 2001, (H. Rept. 106-988), the following is the affirmation by the Secretary of the Department of Energy (DOE) on the ***Report on Laboratory Directed Research and Development (LDRD) for FY 2018****.*

Based on the information and acknowledgments provided to the Department and DOE contractors by the Federal agencies that are funding LDRD activities in Fiscal Year 2018, I affirm that every LDRD activity derived from funds of other Federal agencies (1) is conducted in a manner supporting scientific and technical development that benefits the programs of those agencies, and (2) is consistent with the appropriations acts that provided funds to those agencies.

Rick Perry

Rick Perry
Secretary of Energy
January 2019

Appendix A. Statutory Language Requirements

Section 3115 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92)
FUNDING OF LABORATORY-DIRECTED RESEARCH AND DEVELOPMENT PROGRAMS.
(a) IN GENERAL.—Section 4811(c) of the Atomic Energy Defense Act (50 U.S.C. 2791(c)) is amended—
(1) by striking ''to such laboratories'' and inserting ''to a national security laboratory'';
(2) by striking ''not to exceed 6 percent'' and inserting ''of not less than 5 percent and not more than 7 percent''; and
(3) By striking ''by such laboratories'' and inserting ''by the laboratory''.
(b) BRIEFING REQUIRED.—Not later than February 28, 2016, the Administrator for Nuclear Security shall provide a briefing to the congressional defense committees on—
(1) all recent or ongoing reviews of the laboratory-directed research and development program, including such reviews initiated by the Secretary of Energy;
(2) costs and accounting practices associated with laboratory-directed research and development; and
(3) how laboratory-directed research and development projects support the mission of the National Nuclear Security Administration.

Section 311 of the Consolidated and Further Continuing Appropriations Act, 2015 (Public Law 113-235)
Of the funds authorized by the Secretary of Energy for laboratory directed research and development, no individual program, project, or activity funded by this or any subsequent Act making appropriations for Energy and Water Development for any fiscal year may be charged more than the statutory maximum authorized for such activities: Provided that this section shall take effect not earlier than October 1, 2015.

Section 309 of Division D of the Consolidated Appropriations Act, 2014 (Public Law 113-76)
Notwithstanding section 307 of Public Law 111-85, of the funds made available by the Department of Energy for activities at Government owned, contractor operated laboratories funded in this or any subsequent Energy and Water Development Appropriations Act for any fiscal year, the Secretary may authorize a specific amount, not to exceed 6 percent of such funds, to be used by such laboratories for laboratory directed research and development.

Section 307 of the Energy and Water Development and Related Agencies Appropriations Act, 2010 (Public Law 111-85) Of the funds made available by the Department of Energy for activities at Government-owned, contractor-operated laboratories funded in this Act or subsequent Energy and Water Development Appropriations Acts, the Secretary may authorize a specific amount, not to exceed 8 percent of such funds, to be used by such laboratories for laboratory directed research and development: Provided, That the Secretary may also authorize

a specific amount not to exceed 4 percent of such funds, to be used by the plant manager of a covered nuclear weapons production plant or the manager of the Nevada Site Office for plant or site directed research and development.

Section 308 of Division C of the Omnibus Appropriations Act, 2009 (Public Law 111-8) LABORATORY DIRECTED RESEARCH AND DEVELOPMENT. Of the funds made available by the Department of Energy for activities at government-owned, contractor-operated laboratories funded in this Act or subsequent Energy and Water Development Appropriations Acts, the Secretary may authorize a specific amount, not to exceed 8 percent of such funds, to be used by such laboratories for laboratory directed research and development: Provided, That the Secretary may also authorize a specific amount not to exceed 4 percent of such funds, to be used by the plant manager of a covered nuclear weapons production plant or the manager of the Nevada Site Office for plant or site directed research and development: Provided further, That notwithstanding Department of Energy order 413.2A, dated January 8, 2001, beginning in fiscal year 2006 and thereafter, all DOE laboratories may be eligible for laboratory directed research and development funding.

Section 309 of Division C of the Consolidated Appropriations Act, 2008 (Public Law 110-161) LABORATORY DIRECTED RESEARCH AND DEVELOPMENT. Of the funds made available by the Department of Energy for activities at government-owned, contractor-operated laboratories funded in this Act or subsequent Energy and Water Development Appropriations Acts, the Secretary may authorize a specific amount, not to exceed 8 percent of such funds, to be used by such laboratories for laboratory-directed research and development: Provided, That the Secretary may also authorize a specific amount not to exceed 4 percent of such funds, to be used by the plant manager of a covered nuclear weapons production plant or the manager of the Nevada Site Office for plant or site-directed research and development: Provided further, That notwithstanding Department of Energy order 413.2A, dated January 8, 2001, beginning in fiscal year 2006 and thereafter, all DOE laboratories may be eligible for laboratory directed research and development funding.

Section 311 of the Energy and Water Development Appropriations Act, 2006 (Public Law 109-103) Of the funds made available by the Department of Energy for activities at government-owned, contractor-operator operated laboratories funded in this Act or subsequent Energy and Water Development Appropriations Acts, the Secretary may authorize a specific amount, not to exceed 8 percent of such funds, to be used by such laboratories for laboratory-directed research and development: Provided, That the Secretary may also authorize a specific amount not to exceed 3 percent of such funds, to be used by the plant manager of a covered nuclear weapons production plant or the manager of the Nevada Site Office for plant or site-directed research and development: Provided further, That notwithstanding Department of Energy order 413.2A, dated January 8, 2001, beginning in fiscal year 2006 and thereafter, all DOE laboratories may be eligible for laboratory directed research and development funding.

Section 310 of the Energy and Water Development Appropriations Act, 2002 (Public Law 107-66) The Administrator of the National Nuclear Security Administration may authorize the manager of the Nevada Operations Office to engage in research, development, and demonstration activities with respect to the development, test, and evaluation capabilities necessary for operations and readiness of the Nevada Test Site: Provided, That of the amount allocated to the Nevada Operations Office each fiscal year from amounts available to the Department of Energy for such fiscal year for national security programs at the Nevada Test Site, not more than an amount equal to 2 percent of such amount may be used for these activities.

Section 309(f) of the Homeland Security Act of 2002 (Public Law 107-296, 6 USC 189(f)
Laboratory Directed Research and Development by the Department of Energy.--No funds authorized to be appropriated or otherwise made available to the Department in any fiscal year may be obligated or expended for laboratory directed research and development activities carried out by the Department of Energy unless such activities support the missions of the Department of Homeland Security.

Section 310 of the Energy and Water Development Appropriations Bill, as enacted by the Department of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act, 2001 (Public Law 106-377)
The Administrator of the National Nuclear Security Administration may authorize the plant manager of a covered nuclear weapons production plant to engage in research, development, and demonstration activities with respect to the engineering and manufacturing capabilities at such plant in order to maintain and enhance such capabilities at such plant: Provided, That of the amount allocated to a covered nuclear weapons production plant each fiscal year from amounts available to the Department of Energy for such fiscal year for national security programs, not more than an amount equal to 2 percent of such amount may be used for these activities: Provided further, That for purposes of this section, the term ‘‘covered nuclear weapons production plant’’ means the following:
(1) The Kansas City Plant, Kansas City, Missouri.
(2) The Y–12 Plant, Oak Ridge, Tennessee.
(3) The Pantex Plant, Amarillo, Texas.
(4) The Savannah River Plant, South Carolina.

Section 3156 of the National Defense Authorization Act for Fiscal Year 2000 (Public Law 106-398) ENGINEERING AND MANUFACTURING RESEARCH, DEVELOPMENT, AND DEMONSTRATION BY PLANT MANAGERS OF CERTAIN NUCLEAR WEAPONS PRODUCTION PLANTS
(a) Authority for Programs at Nuclear Weapons Productions Facilities.--The Administrator for Nuclear Security shall authorize the head of each nuclear weapons production facility to establish an

Engineering and Manufacturing Research, Development, and Demonstration Program under this section.

(b) Projects and Activities.--The projects and activities carried out through the program at a nuclear weapons production facility under this section shall support innovative or high-risk design and manufacturing concepts and technologies with potentially high payoff for the nuclear weapons complex. Those projects and activities may include--

(1) replacement of obsolete or aging design and manufacturing technologies;

(2) development of innovative agile manufacturing techniques and processes; and

(3) training, recruitment, or retention of essential personnel in critical engineering and manufacturing disciplines.

(c) Funding.--The Administrator may authorize the head of each nuclear weapons production facility to obligate up to $3,000,000 of funds within the Advanced Design and Production Technologies Campaign available for such facility during fiscal year 2001 to carry out projects and activities of the program under this section at that facility.

(d) Report.--The Administrator for Nuclear Security shall submit to the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives, not later than September 15, 2001, a report describing, for each nuclear weapons production facility, each project or activity for which funds were obligated under the program, the criteria used in the selection of each such project or activity, the potential benefits of each such project or activity, and the Administrator's recommendation concerning whether the program should be continued.

(e) Definition.--For purposes of this section, the term ``nuclear weapons production facility'' has the meaning given that term in section 3281(2) of the National Nuclear Security Administration Act (title XXXII of Public Law 106-65; 113 Stat. 968; 50 U.S.C. 2471(2)).

Section 3136 of the National Defense Authorization Act for Fiscal Year 1997 (Public Law 104-201)

(a) Limitation— No funds authorized to be appropriated or otherwise made available to the Department of Energy for fiscal year 1997 under section 3101 may be obligated or expended for activities under the Department of Energy Laboratory Directed Research and Development Program, or under any Department of Energy technology transfer program or cooperative research and development agreement, unless such activities support the national security mission of the Department of Energy.

(b) Annual Report— (1) The Secretary of Energy shall annually submit to the congressional defense committees a report on the funds expended during the preceding fiscal year on activities under the Department of Energy Laboratory Directed Research and Development Program. The purpose of the report is to permit an assessment of the extent to which such activities support the national security mission of the Department of Energy. (2) Each report shall be prepared by the officials responsible for Federal oversight of the funds expended on activities under the program. (3) Each report shall set forth the criteria utilized by the officials preparing the report in determining whether or not the activities reviewed by such officials support the national security mission of the Department.

Appendix B. Conference Report Language

109th Congress Conference Report regarding the Energy & Water Development Appropriations Bill, 2006 (H. Rept. Report 109-275) The conferees are concerned with the level of overhead charges applied to programs funded in this bill and urge the Department to continue to work to minimize the overhead burden on all program activities. In order to guarantee an equitable allocation of overhead costs the Secretary should apply overhead charges to LDRD activities consistent with cost accounting practices applied to program activities that are direct funded. The conference agreement increases the allowable percentage for LDRD, PDRD and SDRD activities to allow this accounting change without harming the underlying discretionary research activities. The change in accounting practices should be implemented with no net reduction in LDRD levels below 6 percent of the funds provided by the Department of Energy to such labs for national security activities and 2 percent for PDRD and SDRD activities at the appropriate plants and sites. Within 90 days after the date of enactment of this Act, the Secretary of Energy shall submit a report to the Committees on Appropriations detailing how the accounting change will be implemented without effecting the basic research and the change shall be implemented within 180 days of enactment.

108th Congress - House Report Regarding the Energy & Water Development Appropriations Bill, 2004 (H. Rept. Report 108-212) The Committee recognizes the value of conducting discretionary research at DOE's National Laboratories. Such research provides valuable benefits to the Department and to other Federal agencies, and is crucial to attracting and retaining scientific talent at the laboratories. However, the Committee continues to have concerns about the financial execution of this program. One concern centers on the manner in which DOE levies the LDRD ''tax'' on all DOE and Work for Other programs, and then accumulates the funds into an overhead pool. This Committee typically deals with defense and non-defense allocations within the Energy and Water Development bill, and the line between those two allocations is not easily crossed. Under LDRD, however, the laboratory directors are able to pool defense and non-defense appropriations at will. The only obvious solution to this concern is to require DOE to establish and track separate LDRD accounts for defense and non-defense funding sources, and the Committee is not yet ready to direct that change. The other principal concern deals with the application of LDRD to work being performed for other agencies (Work for others). The conference report accompanying the Energy and Water Development Appropriations Act, 2002 (P.L. 107–66) directed the Secretary to ''include in the annual report to Congress on LDRD activities an affirmation that all LDRD activities derived from funds of other agencies have been conducted in a manner that support science and technology development that benefits the programs of the sponsoring agencies and is consistent with the Appropriations Acts that provided funds to those agencies.'' The Department has implemented this guidance by including the following language into its standard project proposal and funding acceptance documents that it requires the funding WFO agencies to sign: ''The Department of

Energy believes that LDRD efforts provide opportunities in research that are instrumental in maintaining cutting edge science capabilities that benefit all of the customers at the laboratory. The Department will conclude that by providing funds to DOE to perform work, you acknowledge that such activities are beneficial to your organization and consistent with appropriations acts that provide funds to you.'' This is too facile a solution for the Department. According to a review conducted by this Committee's investigative staff, only a little more than half of the WFO customers indicated they could reliably certify that DOE's LDRD activities are consistent with the funding agencies' appropriations acts. Nevertheless, most agencies sign the required certification letter to DOE because they see no real alternative. The Committee fully expects that there are terms and conditions attached to the appropriations acts for these other agencies that are being ignored through this so-called ''certification'' process for LDRD work.

The Committee is considering changing the arrangement by which LDRD activities are funded to eliminate these concerns. The results of an ongoing General Accounting Office review will help to inform the Committee's choice. The Committee is receptive to streamlining the annual LDRD report to Congress, which is undoubtedly a significant burden for the Department to prepare and is of little value to this Committee in resolving the concerns identified above. The Department should work with Committee staff to develop a simpler and more useful LDRD report.

107th Congress Conference Report regarding the Energy & Water Development Appropriations Bill, 2002 (H. Rept. Report 107-258) The conference agreement does not include bill language proposed by either the House or the Senate regarding the Laboratory Directed Research and Development (LDRD) program. The conferees recognize the benefits of LDRD and expect LDRD activities to continue at previously authorized levels. However, when accepting funds from another Federal agency that will be used for LDRD activities, the Department of Energy shall notify that agency in writing how much will be used for LDRD activities. In addition, the conferees direct the Secretary of Energy to include in the annual report to Congress on all LDRD activities an affirmation that all LDRD activities derived from funds of other agencies have been conducted in a manner that supports science and technology development that benefits the programs of the sponsoring agencies and is consistent with the Appropriations Acts that provided funds to those agencies.

106th Congress – House Report Regarding the Energy & Water Development Appropriations Bill, 2001 (H. Rept. Report 106-693) The Committee has retained the limitation of four percent on laboratory directed research and development (LDRD) that was included in the fiscal year 2000 appropriations bill. This program allows each laboratory director to use four percent of all operating funds provided to the laboratory to conduct research and development projects selected at the discretion of the laboratory directors. For fiscal year 2001, the Department estimates that the laboratories will spend $300,000,000 on LDRD and additional funds on Director's Discretionary Research and Development (DDRD). The Committee recommendation would provide approximately $200,000,000 for LDRD, the same level as fiscal year 2000. Rather

than allowing each laboratory to tax all operating dollars that are sent to the laboratory, the Committee directs the Department to submit a separate line item for LDRD funding in each appropriation account in the fiscal year 2002 budget request. This will provide the visibility and accountability for this type of funding that the Committee believes has been lacking in prior years. It also addresses another concern of the Committee that LDRD funding is automatically taken off the top of each program performed at the laboratory. This has the effect of placing LDRD funding in a completely protected funding category at the expense of all other programs in the Department. The Committee supports some LDRD funding, but believes it should be placed on equal terms with other important programs. The Department is directed to submit a specific request for laboratory directed research and development funding in each program in the annual budget submission.

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
AMES - Ames Laboratory							
FY2015-MPR-3	Studies of Novel Materials Using Dynamic Nuclear Polarization Nuclear Magnetic Resonance Spectroscopy	$0	$34,309	$34,309	1/1/2015	12/31/2017	
FY2016-FZHA-3	Graphics Processing Unit-accelerated Software for Materials Simulation and Discovery	$0	$62,476	$62,476	8/15/2016	9/30/2018	
FY2016-SBUD-3	Resonance Ultrasound Spectroscopy of Correlated Materials and Materials at the Edge of Stability	$0	$126,597	$126,597	7/25/2016	12/31/2018	
FY2016-SGUP-3	In-situ Characterization of Mechanochemical Reactions	$0	$24,133	$24,133	10/1/2015	9/30/2018	
FY2017-AKAM-2	Computationally Aided Search for New Topological Quantum Materials and Phases.	$0	$156,929	$156,929	10/1/2016	9/30/2018	
FY2017-ISLO-2	Catalytic Deconstruction of Lignocellulosic Components of Wet Waste	$0	$159,040	$159,040	10/1/2016	9/30/2018	
FY2017-LKE-2	Theoretical Tools to Accelerate Discovery and Exploit Novel 2-Dimensional Spintronic Materials	$0	$40,128	$40,128	8/20/2017	9/30/2018	
FY2017-LZHO-2	In situ Advanced Electron Microscopy of Phase Transitions for Energy Conversion Materials	$0	$118,679	$118,679	10/1/2016	9/30/2018	
FY2018-PCAN-1	Development and Implementation of and Integrated, Data-Rich, Materials Synthesis and Characterization Laboratory	$0	$166,828	$166,828	10/1/2017	9/30/2019	
FY2018-VBAL-1	New Horizons in the Atomic Scale Design of two dimensional and three dimensional Hetero - Structures	$0	$139,541	$139,541	10/1/2017	9/30/2019	
	Total # of Projects for AMES: 10	**Total Equipment Cost for AMES: $0**		**Total Other Cost for AMES: $1,028,660**		**Total Cost for AMES: $1,028,660**	
ANL - Argonne National Lab							
2018-002	Development of a Hard X-ray Spectrometer Based on Transition Edge Sensors for Advanced Spectroscopy	$0	$207,530	$207,530	4/1/2018	9/30/2020	
2018-003	Atoms to Additive Manufacturing: Machine Learning Structure-Property-Process Triangle In Metals Additive Manufacturing	$0	$373,454	$373,454	10/1/2017	9/30/2019	
2018-011	Enabling Flame Spray Pyrolysis as a Transformational Manufacturing Technology	$0	$666,587	$666,587	11/1/2017	9/30/2019	
2018-012	A High Precision Superconducting Detector for Next Generation Neutrinoless Double Beta Decay Search Experiments	$0	$151,951	$151,951	11/1/2017	9/30/2020	
2018-016	Development of Zoom Optics Using Deformable Mirrors with in situ Wavefront Sensing and a Closed-loop Control System	$0	$400,638	$400,638	1/1/2018	9/30/2020	
2018-019	Atomistically Informed Coherent Diffraction Imaging	$0	$199,538	$199,538	10/1/2017	9/30/2019	
2018-022	Continuous Flow Synthesis: A Platform to Accelerate the Transition of Nanomaterials to Manufacturing	$0	$609,822	$609,822	11/1/2017	9/30/2019	
2018-026	Advanced Composite Materials Development for Nuclear Energy Applications	$0	$304,735	$304,735	11/1/2017	9/30/2019	
2018-027	Dark-Field Imaging of Multiscale Structures and Their Role at Phase Transition, Hysteresis, and Relaxation, Tuned by Magnetic Field and Temperature	$0	$201,248	$201,248	3/1/2018	9/30/2019	
2018-028	Integrated Approach to Unravel Four Dimensional Spatiotemporal Correlation in Highly Transient Phenomena: Ultrafast X-ray Imaging and High-Performance Computing	$0	$279,086	$279,086	10/1/2017	9/30/2020	
2018-030	Novel Capabilities for Ultra-fast and Ultra-low-dose Three-dimensional Scanning Hard X-ray Microscopy	$0	$315,352	$315,352	10/1/2017	9/30/2020	
2018-031	Building an Open Platform to Advance and Simplify Deep Learning Adoption	$0	$398,336	$398,336	10/1/2017	9/30/2020	
2018-051	High-Efficiency, Low-cost Oxygen Reduction Reaction and Oxygen Evolution Reaction Catalysts Derived from Metal-Organic Frameworks	$0	$180,725	$180,725	10/1/2017	9/30/2020	
2018-052	Exploring Lossy Quantum Computation	$0	$123,058	$123,058	1/1/2018	12/30/2020	
2018-053	A High Pressure Xenon Gas Time Projection Chamber for Next Generation Neutrinoless Double Beta Decay Search Experiments	$0	$260,655	$260,655	10/1/2017	9/30/2019	
2018-054	Development of a Compact 352-Megahertz High Efficiency Solid State Radio-frequency Amplifier System Utilizing Enhanced Digital Control	$0	$378,088	$378,088	4/1/2018	9/30/2020	
2018-055	Variability and Trends in Land Surface Properties: Effects on boundary layer physics and Extremes Onset	$0	$140,447	$140,447	12/1/2017	9/30/2020	
2018-056	Linking Microbial Interactions to Biogeochemical Variability in Wetlands	$0	$111,279	$111,279	12/1/2017	9/30/2018	
2018-057	High Dimensional Single Cell Transcriptomic and Proteomic Analysis and Comparison at High Throughput	$0	$99,994	$99,994	12/1/2017	9/30/2018	
2018-058	Modeling and Quantifying Tradeoffs among Execution Time, Power, and Resilience of Parallel Application to Efficiently Exploit System Heterogeneity	$0	$348,133	$348,133	1/1/2018	9/30/2020	
2018-063	Development of Non-Platinum Group Metal Filter Regeneration Catalysts for Diesel-powered Equipment	$0	$49,558	$49,558	4/1/2018	9/30/2018	
2018-064	Real Time Nucleation and Particle Growth Microscale X-ray Analysis	$0	$48,738	$48,738	4/1/2018	9/30/2018	
2018-067	Cooperative Multitasking for Stochastic Particle Transport Simulations	$0	$49,206	$49,206	3/1/2018	9/30/2018	
2018-068	Nuclear Data Applications of Atom Trap Trace Analysis	$0	$48,027	$48,027	3/1/2018	9/30/2018	
2018-069	Performance-based Design, Testing, and Modeling of Biomaterials	$0	$37,427	$37,427	4/1/2018	9/30/2018	
2018-071	Machine Learning for Large-Scale Power System Optimization	$0	$49,887	$49,887	3/1/2018	9/30/2018	
2018-073	An Additive Manufactured All-flexible Wireless Two-dimensional Strain Sensor	$0	$19,374	$19,374	4/1/2018	9/30/2018	
2018-076	Magnetic-Enabled Self-Heating Membrane for Efficient Water Desalination	$0	$25,223	$25,223	3/1/2018	9/30/2018	
2018-081	High Temperature Reactor for Methane Conversion on Clusters	$0	$71,628	$71,628	3/1/2018	9/30/2018	
2018-088	Integrated Simulation Capabilities for Versatile Test Reactor Design and Analysis	$0	$207,290	$207,290	5/1/2018	9/30/2019	
2018-089	Optimizing Urban Transportation Systems Energy Using Large-Scale Simulation and Machine Learning	$0	$198,693	$198,693	5/1/2018	9/30/2019	
2018-090	Strategic Assessment of Future Energy Needs and Emerging Technologies	$0	$242,838	$242,838	5/1/2018	9/30/2019	
2018-093	Real-Time Characterization of Versatile Test Reactor Coolant Variables by High Resolution Distributed Sensing	$0	$186,879	$186,879	5/1/2018	9/30/2019	
2018-095	Towards the Creation of an Advanced Mobility Cybersecurity Testbed	$0	$171,505	$171,505	3/1/2018	9/30/2019	
2018-097	Mission-Driven Unmanned Aerial System and Design Center	$0	$125,146	$125,146	5/1/2018	9/30/2019	
2018-099	Syntheses and Evaluation of New Single Ion Electrolytes	$0	$78,563	$78,563	6/1/2018	9/30/2020	
2018-100	High-Density Energy Storage in Solvent-Free Redox Flow Batteries for Flexible Electric Grid	$0	$75,094	$75,094	6/1/2018	9/30/2020	
2018-104	Complex Fluids from Chemical Separations: A New Entry to Battery Electrolytes	$0	$158,902	$158,902	6/1/2018	9/30/2020	
2018-105	Electrode Contamination Investigation to Advance Direct Recycling	$0	$79,374	$79,374	7/1/2018	9/30/2020	
2018-106	Synergistic Multi-Site Catalysts For Dry Reforming Processes	$0	$82,526	$82,526	5/1/2018	9/30/2019	
2018-107	Creating Next-Generation Quantum Electronics with Topological Insulator/Ferromagnetic Insulator Heterostructures	$0	$72,771	$72,771	5/1/2018	9/30/2019	
2018-108	Towards Predictive Simulations of Rotating Detonation Engines Using Supercomputing	$0	$51,896	$51,896	5/1/2018	9/30/2018	
2018-109	High Precision Synthesis for Energy Conversion and Storage	$0	$63,573	$63,573	5/1/2018	4/30/2021	
2018-110	Negative Capacitance in Ferroelectric Nanostructures	$0	$51	$51	9/1/2018	5/31/2020	
2018-111	Bio-inspired Smart Soft-Robots	$0	$50,257	$50,257	6/1/2018	5/31/2021	
2018-112	Engineered Materials for Additive Manufacturing	$0	$9,365	$9,365	9/4/2018	9/3/2021	
2018-113	Precise Tailoring of an Electron Beam's Temporal Distribution	$0	$45,573	$45,573	7/8/2018	7/7/2021	
2018-114	Computing Expedition 2018	$0	$732,799	$732,799	7/1/2018	9/30/2018	
2018-115	Health and Environmental Effects of Unconventional Natural Gas Development	$0	$16,590	$16,590	7/1/2018	6/30/2019	
2018-116	Long-Lived Rare-Earth Qubits on Silicon	$0	$9,845	$9,845	7/1/2018	6/30/2019	
2018-117	Dynamic Cross-linked Polymers for Silicon-based Electrodes in Lithium-Ion Batteries	$0	$11,042	$11,042	7/1/2018	6/30/2019	
2018-118	Efficient Quantum Computing with Unreliable Quantum Hardware Facilitated by Lightweight Error Correction and Use of Multiple Quantum Processors	$0	$74,980	$74,980	8/15/2018	7/31/2021	
P/ANL2015-179	Illuminating Linkages Between Microbial Diversity and Biogeochemical Cycling in a Redox Dynamic Environment	$0	$234,241	$234,241	8/1/2015	7/23/2018	
P/ANL2015-180	Functional Analysis of Proteins from a Key Signaling Network Involved in Plant Growth Promoting Bacteria	$0	$269,102	$269,102	7/1/2015	6/30/2018	
P/ANL2015-181	Fine Resolution Reconstruction of Large Volumes of Brain	$0	$437,307	$437,307	8/1/2015	7/31/2018	
P/ANL2016-001	Structure and Dynamics of Chiral Molecules and Radicals	$0	$101,033	$101,033	10/1/2015	9/30/2018	
P/ANL2016-010	A Theory of Out-of-Equilibrium Phase Transitions	$0	$153,868	$153,868	10/1/2015	9/30/2018	
P/ANL2016-023	Real-time Monitoring of Material Structure Evolution in Additive Manufacturing Processes	$0	$146,525	$146,525	11/1/2015	9/30/2018	
P/ANL2016-054	Perovskite Halide-based Intermediate-Band Solar Cells	$0	$215,629	$215,629	10/1/2015	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
P/ANL2016-063	Efficient Droplet-Based Environmental Mechanical Energy Harvesting Through Reverse Electrowetting	$0	$177,724	$177,724	12/1/2015	9/30/2018	
P/ANL2016-069	Genetic algorithm Optimization of Interface structure from Electron Microscopy	$0	$161,305	$161,305	11/1/2015	9/30/2018	
P/ANL2016-092	Spin Vortex-based Non-volatile Superconducting Memory	$0	$197,748	$197,748	10/1/2015	9/30/2018	
P/ANL2016-094	Ordered Core-shell Nanostructure for Transverse Thermoelectric Applications	$0	$209,589	$209,589	10/1/2015	9/30/2018	
P/ANL2016-098	Images from Inner Space: Exposing Quantum Mechanics within Nucleons and Nuclei	$0	$202,882	$202,882	2/1/2016	9/30/2018	
P/ANL2016-120	New Thin Film Oxide, Chalcogenide and Oxy-chalcogenide Materials Discovery	$0	$333,247	$333,247	11/1/2015	9/30/2018	
P/ANL2016-123	New Lithium-6 Rich Semiconductors for Neutron Detection	$0	$217,626	$217,626	10/1/2015	9/30/2018	
P/ANL2016-126	Advanced Control Algorithms For Improving Energy Consumption of Connected and Automated Vehicles	$0	$35,533	$35,533	11/1/2015	9/30/2018	
P/ANL2016-133	Managing Emission and Thermal Absorption	$0	$252,411	$252,411	11/1/2015	9/30/2018	
P/ANL2016-150	A Conveyer Belt of Nanoliter to Picoliter Droplets for Hard X-ray Pump-probe Experiments	$0	$174,449	$174,449	10/1/2015	9/30/2018	
P/ANL2016-152	Integrated Water-Energy Systems Assessment Framework for Water-Energy Sustainability and Resilience	$0	$173,121	$173,121	11/1/2015	9/30/2018	
P/ANL2016-158	Developing a Program for the Production of Medical Isotopes using the Argonne Electron Linear Accelerator	$0	$351,899	$351,899	10/1/2015	9/30/2018	
P/ANL2016-159	Additive Manufacturing for Nuclear Energy Applications	$0	$346,598	$346,598	12/1/2015	9/30/2018	
P/ANL2016-180	In situ Polarized Spectroscopy of Optically Transparent Thermally Reduced Graphene Oxide-Polymer Solar Cells	$0	$94,855	$94,855	10/1/2015	3/30/2018	
P/ANL2016-183	Understanding and Controlling Charge, Spin, Pseudospins and Lattice Degrees of Freedom in Layered Transition Metal Dichalcogenides	$0	$180,077	$180,077	11/1/2015	10/31/2018	
P/ANL2016-184	Investigation of Solid-Liquid Interfaces in Energy Materials Interfacing Multi-scale Modeling with Experimental Characterization	$0	$147,473	$147,473	10/1/2015	9/30/2018	
P/ANL2016-185	Charge Transport in Nanostructured Materials from ab initio Simulations	$0	$88,228	$88,228	12/1/2015	9/30/2018	
P/ANL2016-191	Exploring Next Generation Coherent X-ray Science	$0	$253,540	$253,540	5/23/2016	5/1/2018	
P/ANL2017-002	Developing Superconducting Magnesium Diboride Films on Copper Radio-Frequency Accelerating Structures	$0	$257,608	$257,608	12/1/2016	9/30/2018	
P/ANL2017-004	The Missing Link in X-ray Scanning Tunneling Microscopy: Synergy of Experiments and Theory for Argonne's Global Leadership	$0	$237,126	$237,126	10/1/2016	9/30/2018	
P/ANL2017-007	A Novel Method of Longitudinal Bunch Shaping by Double Emittance Exchange	$0	$102,585	$102,585	2/1/2017	9/30/2018	
P/ANL2017-012	Integrating High Throughput Computation and Wet-chemistry Synthesis for Functional Supercrystals	$0	$175,731	$175,731	11/1/2016	9/30/2018	
P/ANL2017-013	Atomic Layer Deposition of Silicon Carbide for Nuclear Applications	$0	$185,538	$185,538	10/1/2016	9/30/2018	
P/ANL2017-016	A widely used directive-based parallel programming model for shared-memory programming for next-machine architectures, and future exascale machines. This will enable a lower-overhead and more-scalable runtime, which will in turn enable exposure of more parallelism in scientific computing applications, allowing faster science across a variety of domains.	$0	$201,069	$201,069	10/1/2016	9/30/2018	
P/ANL2017-017	A Continuously Refinable Mesh, Limited Area Atmospheric Model	$0	$194,537	$194,537	10/1/2016	9/30/2018	
P/ANL2017-019	Bonding Dissimilar Materials using Nanoparticles/Nanofilm as Eutectic Compounds	$0	$155,808	$155,808	10/1/2016	3/31/2019	
P/ANL2017-022	Engineered Interfaces for Gallium Oxide Power Semiconductor Devices	$0	$172,955	$172,955	11/1/2016	9/30/2018	
P/ANL2017-023	New Techniques to Manipulate Rare Isotopes using Adaptive Optics	$0	$222,881	$222,881	10/1/2016	9/30/2018	
P/ANL2017-026	Realizing a Gate Tunable Kinetic Inductance for a Transmon Qubit using Strontium Titanate	$0	$199,021	$199,021	12/1/2016	1/9/2019	
P/ANL2017-028	Universal Superconducting Undulator	$0	$178,485	$178,485	10/1/2016	9/30/2018	
P/ANL2017-029	Novel Devices and Systems for Neuromorphic Computing	$0	$88,418	$88,418	10/1/2016	9/30/2018	
P/ANL2017-031	Ecological Organic Photovoltaics using Water-borne Semiconductor Nanoparticles	$0	$174,194	$174,194	10/1/2016	9/30/2019	
P/ANL2017-032	Catalysts Modeled After Nature's Enzymes	$0	$398,736	$398,736	11/1/2016	9/30/2018	
P/ANL2017-033	Advanced Materials for the Energy-Water Nexus	$0	$350,732	$350,732	2/1/2017	9/30/2018	
P/ANL2017-034	The Perfect Thermodynamics of Imperfect Materials	$0	$207,336	$207,336	10/1/2016	9/30/2018	
P/ANL2017-035	Self-assembling Soft Nanostructures with Ultra-Slow Dissociation Kinetics	$0	$237,946	$237,946	6/1/2017	9/30/2018	
P/ANL2017-040	Development of Molten-Salt Reactor Analysis Computation Tools to Support Emerging Markets	$0	$245,578	$245,578	10/1/2016	9/30/2018	
P/ANL2017-042	Metal Additive Manufacturing Modeling	$0	$163,030	$163,030	10/1/2016	9/30/2018	
P/ANL2017-049	Scalable Machine Learning Infrastructure for Knowledge Discovery	$0	$283,548	$283,548	10/1/2016	9/30/2018	
P/ANL2017-050	Oxides for Novel Computational Approaches	$0	$367,520	$367,520	10/1/2016	9/30/2018	
P/ANL2017-055	Improving Cost and Energy Efficiency of Nontraditional Water Desalination through Innovative Material and Process Integration	$0	$352,052	$352,052	11/1/2016	9/30/2018	
P/ANL2017-057	An Exascale Application for Simulating Urban Boundary Layers	$0	$163,077	$163,077	10/1/2016	9/30/2018	
P/ANL2017-058	A Strategic Scientific Program to Establish Argonne Leadership in the Development of the Future Electron-Ion Collider	$0	$715,406	$715,406	10/1/2016	9/30/2019	
P/ANL2017-061	Towards an Artificial Neuron - Non-Covalent Synaptic Assemblies	$0	$294,401	$294,401	11/1/2016	9/30/2018	
P/ANL2017-063	Enabling Multidimensional X-ray Nano-Tomography	$0	$208,460	$208,460	10/1/2016	9/30/2018	
P/ANL2017-066	End-to-End Genome Annotation and Phenotype Prediction with Deep Learning	$0	$164,082	$164,082	1/1/2017	9/30/2018	
P/ANL2017-073	Developing Advanced Coherent Surface Scattering Reconstruction Method Incorporating Dynamical Scattering Theory	$0	$179,454	$179,454	1/1/2017	9/30/2019	
P/ANL2017-076	Miniaturized High-Efficiency Radio Frequency Energy Harvesting	$0	$263,866	$263,866	11/1/2016	9/30/2019	
P/ANL2017-080	Coherence for High-Energy Diffraction	$0	$259,864	$259,864	11/1/2016	9/30/2019	
P/ANL2017-082	Developing Hierarchical Multi-functional Hybrid Polymer-Proteins Structures for Energy Applications	$0	$333,155	$333,155	10/1/2016	9/30/2018	
P/ANL2017-084	Advancing Additive Manufacturing of Metal Alloys; from Fundamental Principles to Durable Components	$0	$214,793	$214,793	11/1/2016	9/30/2018	
P/ANL2017-087	Linking Climate to Water: Implementing a 4 kilometer Regional Climate Model with hydrologic Model Coupling using Argonne's High Performance Computing Resources	$0	$222,806	$222,806	10/1/2016	9/30/2019	
P/ANL2017-088	Understanding Resilient Infrastructure Dependencies and Interdependencies through Advanced Optimization and Simulation	$0	$338,076	$338,076	10/1/2016	9/30/2018	
P/ANL2017-091	Development of a Compact Accelerator for A High Repetition Rate Free-Electron Laser	$0	$343,306	$343,306	10/1/2016	9/30/2019	
P/ANL2017-092	Quantum Optics with Phonons	$0	$252,911	$252,911	11/1/2016	9/30/2019	
P/ANL2017-093	Beehive: A Dynamic Execution Environment for Performance, Power, and Resilience on Extreme-Scale Computing Systems	$0	$182,091	$182,091	10/1/2016	9/30/2019	
P/ANL2017-094	Microstructural Simulations of Stable Conjugated Polymer Glasses	$0	$165,630	$165,630	10/1/2016	9/30/2019	
P/ANL2017-095	Combining Electrochemistry and Ultrafast Spectroscopies: Real Time Characterization of Multi-Electron/Proton Intermediates in Hydrogen and Oxygen Evolving Catalysts	$0	$90,047	$90,047	11/1/2016	9/30/2018	
P/ANL2017-096	On the Colloidal Suspension of Lithium Clusters in Molten Lithium Chloride	$0	$66,449	$66,449	11/1/2016	5/3/2018	
P/ANL2017-097	A Universal Data Analytics Platform for Science	$0	$34,228	$34,228	11/1/2016	9/30/2019	
P/ANL2017-104	Integrated Imaging - Most materials and systems are spatially complex and heterogeneous, and their behavior is typically linked to this heterogeneity. Imaging and microscopy offer a way to see a material in all of its complexity and explore its local behavior; when combined with spectroscopy, diffraction, or other analytical methods, they allow one to understand what one sees. This project is an approach (1) to promulgate an integrated, top-down approach wherein expertise is applied to selecting an imaging tool and a methodology on the basis of the scientific question and (2) to developing and integrating new tools, methods, and algorithms to efficiently perform hypothesis-driven investigations.	$0	$205,092	$205,092	10/1/2016	9/30/2018	
P/ANL2017-105	Superconducting Detectors for Future Cosmic Microwave Background Experiments	$0	$783,945	$783,945	11/1/2016	9/30/2018	
P/ANL2017-106	Exploring the Universe: Large Scale Structure to the First Stars	$0	$829,830	$829,830	10/1/2016	9/30/2018	
P/ANL2017-108	Validating Replicability of Waggle Urban Deployments	$0	$93,960	$93,960	7/1/2017	6/30/2018	
P/ANL2017-110	Argonne Extended Range Friction Tribometer	$0	$34,637	$34,637	6/1/2017	5/31/2018	
P/ANL2017-113	Ultra-High Efficiency Fuel Cell-Heat Engine Hybrids	$0	$42,148	$42,148	5/1/2017	4/30/2018	
P/ANL2017-131	Argonne's Unmanned Aircraft System Capability: Application Framework Development and Benchmarking	$0	$97,237	$97,237	7/1/2017	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
P/ANL2017-137	Accurate, Real-time Categorization of Unmanned Aircraft Systems in an Urban Environment Through Application of Deep Learning Strategies Leveraging Distributed Computing Technology	$0	$65,268	$65,268	8/1/2017	9/30/2018	
P/ANL2017-141	Applying Community Network Analysis to Generalize Microbial Assembly Rules	$0	$9,931	$9,931	7/1/2017	6/30/2018	
P/ANL2017-153	Soft Matter Visualization and Characterization by Electron Optical Beam Lines	$0	$188,216	$188,216	3/1/2017	9/30/2019	
P/ANL2017-155	Coherent X-ray Studies of Phase Transitions in the Complex Oxides	$0	$10,072	$10,072	6/1/2017	9/30/2018	
P/ANL2017-156	Scalable Data Movement for Data-centric Supercomputing	$0	$8,434	$8,434	7/1/2017	9/30/2019	
P/ANL2017-157	Transport and Photophysical Processes in Hybrid Perovskites for Energy Applications	$0	$163,898	$163,898	7/1/2017	9/30/2019	
P/ANL2017-158	Real-time Control of Urban Drainage Systems	$0	$174,286	$174,286	5/1/2017	4/30/2020	
P/ANL2017-159	Production of Cellulose Nanocrystals from Miscanthus hybrid Giganteus	$0	$165,002	$165,002	7/1/2017	9/30/2018	
P/ANL2017-161	A Mechanically-based Antenna for Radio Frequency Incompatible Environments	$0	$73,423	$73,423	7/1/2017	6/30/2018	
P/ANL2017-163	Biofilms and Human-made Surfaces: How Microorganisms Attach to and Influence the World Around Us	$0	$94,990	$94,990	7/1/2017	6/30/2018	
P/ANL2017-164	Simulating The Dynamics of Gene Drive Propagation Through Populations	$0	$104,134	$104,134	7/1/2017	9/30/2018	
P/ANL2017-165	Global Survey of Genomic Systems in Archaeal and Bacterial Species	$0	$112,784	$112,784	7/1/2017	6/30/2018	
	Total # of Projects for ANL: 138	**Total Equipment Cost for ANL: $0**		**Total Other Cost for ANL: $26,953,109**		**Total Cost for ANL: $26,953,109**	
BNL - Brookhaven National Lab							
BNL14-005	1st Light: Elucidating Solid-Solid Interfaces in Energy Storage Systems	$0	$272,274	$272,274	3/1/2015	2/28/2018	
BNL15-006	Design, fabrication and test of a Superconducting Radio Frequency cavity prototype for the Electron Ion Collider Energy Recovery Linear Accelerator - The objective of this project was to design, prototype, and test a 422 MegaHertz high current superconducting radio frequency cavity for a linear accelerator for the Relativistic Heavy Ion Collider	$0	$67,046	$67,046	11/1/2014	1/31/2018	3-month extension requested of Brookhaven Site Office (BHSO) Department Of Energy through January 2018 due to vendor-related issues. BHSO approved on 9/11/17. Vendor work requires additional time for required tooling to be constructed/tested and for the actual processing to be executed on the Superconducting Radio Frequency cavity.
BNL15-009	Nanoconfined Polymer Electrolytes for Rechargeable Lithium-Metal Batteries	$0	$80,055	$80,055	2/1/2015	1/31/2018	
BNL15-010	Hydrocarbon chemistry on zeolite model systems: towards a detailed understanding of energy-relevant chemical transformations	$0	$86,643	$86,643	5/1/2015	4/30/2018	
BNL16-006	Serial Micro Crystallography at Full Flux	$0	$62,420	$62,420	2/1/2016	1/31/2019	
BNL16-007	Three-Dimensional Ptychography imaging without rotation using highly convergent X-ray beam	$0	$83,200	$83,200	3/1/2016	2/28/2019	
BNL16-010	100 femtosecond single-shot electron beam slicing technology towards ultra-fast imaging	$0	$362,000	$362,000	1/1/2016	12/31/2018	
BNL16-019	In situ synchrotron studies of subsurface material interfaces using X-ray fluorescence mapping and X-ray tomography at National Synchrotron Light Source II	$0	$211,191	$211,191	11/1/2015	10/31/2018	
BNL16-023	Analog to Digital Converter and Giga bit per second Link in Complementary Metal-Oxide-Semiconductor for large data generation and in operando analysis	$0	$441,889	$441,889	11/1/2015	10/31/2018	
BNL16-026	Microwave Kinetic Inductance Detectors: from Cosmology to National Synchrotron Light Source II	$0	$223,722	$223,722	2/1/2016	1/31/2019	
BNL16-029	Higher-Order-Mode damping for full luminosity of the Electron Ion Collider	$0	$32,546	$32,546	1/1/2016	12/31/2018	
BNL16-034	Advanced Silicon Detectors Research and Development	$0	$280,554	$280,554	3/1/2016	2/28/2019	
BNL16-037	Exploring hadron structure with ab initio lattice Quantum Chromo Dynamics calculations and making predictions for an addition of an electron ring to existing Relativistic Heavy Ion Collider complex	$0	$151,336	$151,336	8/1/2016	7/31/2019	
BNL16-038	Preconceptual Design Study for Large Scale Structure Experiment post Large Synoptic Survey Telescope/Dark Energy Spectroscopic Instrument	$0	$144,931	$144,931	9/1/2016	8/31/2019	
BNL16-039	Machine Learning Assisted Material Discovery	$0	$180,976	$180,976	12/1/2015	11/30/2018	
BNL16-041	Dynamic Visualization and Visual Analytics for Scientific Data at National Synchrotron Light Source II	$0	$222,356	$222,356	11/1/2015	10/31/2018	
BNL16-043	Deep Structured Analysis for Image Datasets from Center for Functional Nanomaterials and National Synchrotron Light Source II	$0	$293,014	$293,014	10/1/2015	9/30/2018	
BNL16-045	Catalysis Program in Carbon Dioxide Activation	$0	$428,869	$428,869	1/1/2016	12/31/2018	
BNL17-002	High-Powered Erbium Doped Fiber Laser for 50 milliamp Highly Polarized Electron Beam	$0	$611,102	$611,102	5/1/2017	4/30/2020	
BNL17-003	Integrated Low-Noise and Low Drop-Out Voltage Regulator for Front-End Application Specific Integrated Circuit	$0	$305,533	$305,533	2/1/2017	1/31/2020	
BNL17-004	Next Generation Pad Readout for Neutron Detectors	$0	$311,682	$311,682	1/1/2017	12/31/2019	
BNL17-005	Investigation of Novel Materials for Generating Polarized Electron Beams	$0	$274,421	$274,421	1/1/2017	12/31/2019	
BNL17-011	Engineered Protein Arrays for Structural and In-Operando Studies	$0	$369,586	$369,586	6/1/2017	5/31/2020	
BNL17-015	National Synchrotron Light Source II High Brightness Upgrade Design Studies	$0	$246,006	$246,006	2/1/2017	1/31/2020	
BNL17-016	Diffraction-limited and wavefront preserving reflective optics development	$0	$197,327	$197,327	5/1/2017	4/30/2020	
BNL17-017	Development of Compact, High Efficiency Nanofocusing Optics for Hard X-Ray Nano-Imaging	$0	$213,484	$213,484	4/1/2017	3/31/2020	
BNL17-018	Genomes to Predictive Biology: Machine Learning for the Integration of Inter-Species Functional Genomics Data	$0	$187,422	$187,422	6/1/2017	5/31/2020	
BNL17-023	Molecular Mechanisms of Alkane Hydroxylation	$0	$187,874	$187,874	9/1/2017	8/31/2020	
BNL17-024	Development of a New Approach to Remotely Measure Limitations on Plant Growth	$0	$353,038	$353,038	8/1/2017	7/31/2020	
BNL17-029	High Performance X-ray Diffraction Simulation Toolkit Using Graphics Processing Unit and Central Processing Unit Clusters	$0	$274,050	$274,050	4/1/2017	3/31/2020	
BNL18-002	Analysis on the Wire -Develop a hardware and software framework to enable specific forms of computation on streaming data while they are "on the wire," i.e., being transported in the network.	$0	$236,310	$236,310	3/1/2018	2/28/2021	
BNL18-005	Provenance-enabled sample measurements and tracking for multi-modal analysis and predictive synthesis	$0	$337,303	$337,303	11/1/2017	10/31/2020	
BNL18-009	Visualization toward White-Box Machine Learning for Image Registration in Multi-modal imaging and Analysis	$0	$176,828	$176,828	10/1/2017	9/30/2020	
BNL18-015	Operando Studies of 3-Dimensional Printing with Nanostructured Inks	$0	$72,558	$72,558	12/1/2017	11/30/2020	
BNL18-017	Electrolyte Flow Battery for Smart Grid Application	$0	$322,931	$322,931	4/1/2018	3/30/2021	
BNL18-020	Novel Development of Deep Learning and Radar Data Assimilation for Energy Resilience and Grid Reliability	$0	$154,343	$154,343	3/1/2018	2/28/2021	
BNL18-022	Interdisciplinary Cyber-Security Framework	$0	$87,220	$87,220	6/1/2018	5/31/2021	
BNL18-026	Electron Beam Formation via Ionization Injection for Next Generation Accelerator Research and Development	$0	$115,992	$115,992	7/1/2018	6/30/2021	
BNL18-028	Tunable High Power Fundamental power coupler for Storage Superconducting Radio Frequency Cavity	$0	$395,534	$395,534	2/1/2018	1/31/2021	
BNL18-030	Investigation of Surface Charge Limit of Gallium Arsenide	$0	$233,093	$233,093	12/1/2017	1/31/2020	
BNL18-033	Micro-pattern gas detectors	$0	$204,570	$204,570	2/1/2018	1/31/2021	
BNL18-036	Finding a Lifshitz Point with the Beam Energy Scan II	$0	$9,800	$9,800	7/1/2018	6/30/2021	
BNL18-037	Forward and Backward Tracking at the Electron-Ion Collider using small strip thin gap chamber detector	$0	$62,704	$62,704	8/1/2018	7/31/2021	
BNL18-038	Ultra-fast High-Granularity Silicon Sensor Technology for Photon Science	$0	$205,250	$205,250	3/1/2018	2/28/2021	
BNL18-039	Studying Confinement and Nuclear Structure through Correlations and Quantum Entanglement at an Electron-Ion Collider	$0	$76,082	$76,082	7/1/2018	6/30/2021	
BNL18-044	Interplay of the many body dynamics of parton spins with gluon saturation at Electron-Ion Collider	$0	$38,211	$38,211	3/1/2018	2/28/2021	
BNL18-045	Jets at the Electron Ion Collider	$0	$95,484	$95,484	2/1/2018	1/31/2021	
BNL18-046	Enabling Sustainable Ammonia Synthesis through Ambient and High Pressure Synchrotron Techniques	$0	$184,132	$184,132	10/1/2017	9/30/2020	
BNL18-047	Functional Descriptors of Single Atom Catalysts	$0	$438,493	$438,493	10/1/2017	9/30/2020	
BNL18-048	Studying matrix models of Quantum Chromodynamics with Quantum Computers	$0	$71,373	$71,373	6/1/2018	5/31/2021	
BNL18-050	A Domain Specific Language for Quantum Computing	$0	$105,460	$105,460	6/1/2018	5/31/2021	
BNL18-051	Spatial Imaging of Quantum Entanglement	$0	$70,571	$70,571	6/1/2018	5/31/2021	
BNL18-052	Quantum Ultraviolet Sensors based on Superconducting Nanowire Single Photon Detector	$0	$92,643	$92,643	6/1/2018	5/31/2021	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
BNL18-054	Catalyzing Strategic Partnerships for Impacting Materials for Next-Generation Quantum Information Science	$0	$9,801	$9,801	6/1/2018	5/31/2021	
BNL18-056	Coherence in Charge Pairs for Quantum Information Science	$0	$44,998	$44,998	6/1/2018	5/31/2021	
BNL18-057	Quantum Machine Learning	$0	$111,470	$111,470	6/1/2018	5/31/2021	
BNL18-058	Effective Hamiltonians for Metalloenzyme Catalysis	$0	$49,613	$49,613	7/1/2018	6/30/2021	
	Total # of Projects for BNL : 57	**Total Equipment Cost for BNL : $0**		**Total Other Cost for BNL : $11,159,314**		**Total Cost for BNL : $11,159,314**	
FERMI - FERMI National Accelerator Lab							
FNAL-LDRD-2014-012	Development of High Temperature Superconductor Based Rapid-Cycling Accelerator Magnets	$0	$5,150	$5,150	7/25/2014	9/30/2017	Requested and granted extension until 9/30/2017, approximately 2 months, due to unexpected delays in obtaining safety reviews. FNAL's accounting system ended up costing this final 5086 charge in FY18.
FNAL-LDRD-2015-021	Transverse and Longitudinal Profile Diagnostics for Negatively-charged Hydrogen Beams using Fiber Lasers and Synchronous Detection	$0	$148,160	$148,160	1/31/2015	12/29/2017	
FNAL-LDRD-2015-031	A comprehensive investigation of a "transformational" integral optics test storage ring as a "smart" rapid cycling synchrotron for high-intensity beams	$0	$127,981	$127,981	2/21/2016	12/31/2018	
FNAL-LDRD-2016-001	Beam Precision Time Profile Monitor	$0	$6,786	$6,786	2/21/2016	3/28/2018	
FNAL-LDRD-2016-004	Development of an ultra low energy threshold particle detector	$0	$4,795	$4,795	2/7/2016	2/23/2018	
FNAL-LDRD-2016-007	Tuning Axion Detectors with Non-Linear Dielectrics	$0	$124,434	$124,434	12/24/2015	12/15/2018	
FNAL-LDRD-2016-008	Novel Methods for High Performance Superconducting Coating on Copper	$0	$178,475	$178,475	4/24/2016	3/31/2019	
FNAL-LDRD-2016-010	Preparing high energy physics reconstruction and analysis software for exascale era computing - The project is to produce a prototype software system suitable for moving high energy physics experiment event data through multiple processing stages in an exascale class computing facility.	$0	$121,392	$121,392	1/10/2016	9/30/2018	
FNAL-LDRD-2016-021	Implement open source high energy physics non-structured query language database	$0	$128,364	$128,364	2/21/2016	12/31/2018	
FNAL-LDRD-2016-034	Instrumentation for the Initial set of Critical Scientific Experiments in Integrable Optics Test Accelerator and the Fermilab Accelerator Science and Technology Injector	$0	$156,945	$156,945	11/26/2016	9/30/2019	
FNAL-LDRD-2017-003	Optical Microwave Kinetic Inductance Devices for future Cosmic Surveys	$0	$155,083	$155,083	4/11/2017	2/28/2020	
FNAL-LDRD-2017-010	Training Deep Neural Networks for Neutrino Identification in the Cloud	$0	$46,234	$46,234	3/27/2017	2/28/2020	
FNAL-LDRD-2017-011	Liquid Argon Charge Amplification Devices	$0	$32,286	$32,286	12/11/2017	2/28/2020	
FNAL-LDRD-2017-014	Cryogenic photon sensors for the low mass frontier	$0	$388,102	$388,102	6/11/2018	6/1/2021	
FNAL-LDRD-2017-019	First demonstration of conduction cooled superconducting radio-frequency cavity	$0	$664,833	$664,833	3/6/2017	2/28/2020	
FNAL-LDRD-2017-020	Development of next-generation niobium-3 tin superconductors for accelerator magnets	$0	$192,108	$192,108	3/13/2017	2/28/2020	
FNAL-LDRD-2017-027	Silicon precision timing detectors for minimum ionizing particles	$0	$334,581	$334,581	3/13/2017	2/28/2020	
FNAL-LDRD-2017-028	Increasing the photon detector light efficiency in a liquid argon detector by an order of magnitude	$0	$127,971	$127,971	3/20/2017	2/28/2020	
FNAL-LDRD-2017-038	Quantum computing using superconducting radio-frequency technology	$0	$1,295,329	$1,295,329	3/28/2017	2/28/2020	
FNAL-LDRD-2018-003	A scintillating liquid argon bubble chamber for weakly interacting massive particles and coherent elastic neutrino nucleon scattering	$0	$24,095	$24,095	4/20/2018	3/31/2021	
FNAL-LDRD-2018-006	Modeling Physical Systems with Deep Learning Algorithms	$0	$18,342	$18,342	3/15/2018	2/28/2021	
FNAL-LDRD-2018-009	High Temperature Superconducting Magnet with Circular Coils	$0	$58,772	$58,772	3/15/2018	12/31/2020	
FNAL-LDRD-2018-019	Broadband spectral sensitive graphene photodetector	$0	$14,574	$14,574	3/15/2018	12/31/2020	
FNAL-LDRD-2018-020	Increasing the intensity of muon based experiments using wedge absorbers	$0	$132,506	$132,506	3/15/2018	8/31/2019	
FNAL-LDRD-2018-025	Towards a Quantum Computing Science Center at Fermilab	$0	$51,964	$51,964	4/2/2018	4/1/2021	
FNAL-LDRD-2018-037	Development of 10 kilogram Skipper Charge Coupled Device experiments	$0	$27,469	$27,469	3/15/2018	2/28/2021	
FNAL-LDRD-2018-040	Dark Matter as Sterile Neutrinos Search Satellite	$0	$46,081	$46,081	3/15/2018	2/28/2021	
FNAL-LDRD-2018-041	Quantum Networks Using Time-bin Photonic Qubits	$0	$3,827	$3,827	3/15/2018	9/30/2020	
FNAL-LDRD-2018-049	A Quasi-Continuous Wave bunch-by-bunch H- Neutralization Laser System for Longitudinal Phase Collimation in linear accelerators and other Applications	$0	$18,297	$18,297	3/15/2018	9/30/2020	
FNAL-LDRD-2018-052	Understanding Dark Matter with the Faintest Galaxies	$0	$623	$623	8/1/2018	7/31/2019	
FNAL-LDRD-2018-054	Single-electron experiments in the Fermilab Integrable Optics Test Accelerator ring - A small storage ring, the Integrable Optics Test Accelerator is a 40-meter machine specifically designed to conduct accelerator physics research and will be capable of circulating electrons with energy of up to 150 mega-electronvolts. However, a single-electron mode of operation is not part of the Integrable Optics Test Accelerator commissioning plan, which focuses on bunches of 10^9 electrons. This project would allow us to develop and commission a single-electron storage and detection capability.	$0	$3,278	$3,278	8/1/2018	7/31/2019	
	Total # of Projects for FERMI : 31	**Total Equipment Cost for FERMI : $0**		**Total Other Cost for FERMI : $4,638,837**		**Total Cost for FERMI : $4,638,837**	
INL - Idaho National Lab							
I15-144	Investigation of Sonication Assisted Electrolytic Reduction of Used Oxide Fuel in Molten Salt	$0	$95,347	$95,347	5/11/2015	6/30/2018	Key project personnel took couple of months maternity leave when the project was stopped. The project resumed after the key personnel returned.
I15-146	Tailoring the Kinetic Function of a Surface through Electronic Effects of Nanoscale Architecture	$0	$431,918	$431,918	7/21/2015	7/30/2018	
I16-002	Advanced Carbon Feedstock Processing Using Ionic Liquids.	$0	$316,328	$316,328	11/30/2015	9/30/2018	
I16-003	Recycling of Tantalum-containing Waste Materials to Recover Tantalum Metal	$0	$120,104	$120,104	10/12/2015	9/30/2018	
I16-010	Development of a fully coupled radiation damage production and evolution simulation capability	$0	$398,553	$398,553	10/12/2015	9/30/2018	
I16-013	Micromechanistic approach and critical experiments for quantitative predictions of delayed hydride cracking in zirconium alloys	$0	$261,467	$261,467	10/12/2015	9/30/2018	
I16-026	Computationally Efficient Prediction of Containment Thermal Hydraulics Using Multi-Scale Simulation	$0	$112,872	$112,872	12/3/2015	9/30/2018	
I16-040	Integration of Prognostic Techniques and Probabilistic Safety Assessment for Online Risk Monitoring	$0	$249,031	$249,031	10/12/2015	9/30/2018	
I16-046	Development of a Synergistic Approach To Study Irradiated Materials Using Coupled Experiments and Simulation	$0	$217,439	$217,439	10/12/2015	9/30/2018	
I16-055	Capability Extension for Multiscale, Multi-Application development within the Multiphysics Object-Oriented Simulation Environment	$0	$403,559	$403,559	10/12/2015	9/30/2018	
I16-058	Predicting Radiation-Induced Microstructural Change via Implementation and Validation of Multiscale Cluster Dynamics in Multiphysics Object Oriented Simulation Environment	$0	$80,603	$80,603	10/12/2015	9/30/2018	
I16-070	Characterization of Neutron Beamlines at Neutron Radiography reactor	$0	$114,961	$114,961	10/12/2015	9/30/2018	
I16-071	Evaluation of Advanced Digital Neutron Imaging Systems for Post Irradiation Examination of Nuclear Fuel	$0	$239,736	$239,736	10/26/2015	9/30/2018	
I16-081	Modeling Thermite Reactions	$0	$77,689	$77,689	2/18/2016	9/30/2018	
I16-085	Production of Fluoroanion Targets for Accelerator Mass Spectrometry	$0	$204,681	$204,681	10/22/2015	9/30/2018	
I16-096	Supporting operator performance and situation awareness in highly automated nuclear power plants	$0	$107,967	$107,967	10/12/2015	9/30/2018	
I16-098	Nuclear Nonproliferation Applications of 14 Carbon Analyses by Accelerator Mass Spectrometry	$0	$167,640	$167,640	10/1/2016	9/30/2018	
I16-106	Risk Analysis Method Integrating Physical, Cyber and Infrastructure Dependencies	$0	$77,034	$77,034	10/22/2015	9/30/2018	
I16-129	Application of Radioactive Isotope Dilution Technique to Measurement of Molten Salt Mass for Electrochemical Recycling Process	$0	$134,853	$134,853	10/22/2015	9/30/2018	
I16-133	Secure Supervisory Control And Data Acquisition Communications System	$0	$171,613	$171,613	10/22/2015	9/30/2018	
I16-152	Wireless radio frequency signal identification and protocol reverse engineering	$0	$220,158	$220,158	10/22/2015	9/30/2018	
I16-176	Development of Direct Carbon Fuel Cells	$0	$430,195	$430,195	3/2/2016	9/30/2018	
I16-187	Micro-Scale Technique to Evaluate Grain Boundary Cohesion of Irradiated Alloys	$0	$258,017	$258,017	3/2/2016	9/30/2018	
I16-215	Electrochemical Manufacturing Processes	$0	$785,416	$785,416	4/14/2016	4/13/2019	
I17A1-007FP	High Performance Polymeric Membranes for Filtration Applications High Performance Polymeric Membranes for Nano and Ultrafiltration Applications	$0	$261,419	$261,419	10/1/2016	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
I17A1-024FP	Design to Enable Narrow Pulse Width in Transient Tests	$0	$317,246	$317,246	10/1/2016	9/30/2019	
I17A1-055FP	Electro-reduction of metals in supercritical fluid-room temperature ionic liquids	$0	$255,641	$255,641	10/1/2016	9/30/2019	
I17A1-070FP	Multi-Purpose Non-Destructive Examination Station in the Advanced Test Reactor Canal	$0	$214,005	$214,005	10/1/2016	9/29/2019	
I17A1-079FP	Affixing Inert Dissimilar Materials to Structural Materials for High Performance Armor Systems	$0	$211,106	$211,106	10/1/2016	9/30/2018	
I17A1-086FP	Development of a complete kinetic model for free-radical-induced degradation of formic and oxalic acids.	$0	$397,126	$397,126	10/1/2016	9/30/2019	
I17A1-093FP	Digital Neutron Imaging of Irradiated Fuel Using a Gamma-Discriminating Scintillation System	$0	$291,651	$291,651	10/1/2016	9/30/2019	
I17A1-101FP	Nuclear Instrumentation and Methods for Emergency Response	$0	$214,237	$214,237	10/1/2016	9/30/2019	
I17A1-105FP	Safety Margin Evaluation for Experiment Irradiation in Advanced Test Reactor	$0	$241,504	$241,504	10/1/2016	9/30/2018	
I17A1-106FP	A Study of Fission Modes to Improve Nuclear Forensics	$0	$164,513	$164,513	10/1/2016	9/30/2018	
I17A1-109FP	Big Data Binary Reverse Engineering	$0	$282,746	$282,746	10/1/2016	9/30/2018	
I17A1-111FP	Design of Low Activation Retrievable Sample Holder for Transient Test Reactor Irradiation of Science-Based Specimens	$0	$231,372	$231,372	10/1/2016	9/30/2019	
I17A1-114FP	Resilient, Scalable Cyber State Awareness of Industrial Control System Networks to Threat	$0	$160,699	$160,699	10/1/2016	9/30/2019	
I17A1-124FP	Systematic Error Control in Cross Section Library Generation for Novel Reactors	$0	$342,213	$342,213	10/1/2016	9/30/2019	
I17A1-142FP	Modeling and Spatial-Temporal Analysis of Cyber-Physical Impacts	$0	$252,554	$252,554	10/1/2016	9/30/2019	
I17A1-150FP	Advanced manufacturing of metallic fuels and cladding by equal-channel angular pressing	$0	$245,319	$245,319	10/1/2016	9/30/2019	
I17A1-152FP	Building Systems: Access, Management, & Automation	$0	$140,595	$140,595	10/1/2016	9/30/2019	
I17A1-156FP	Nuclear Safety Systems Cyber Security	$0	$47,619	$47,619	10/1/2016	9/30/2018	
I17A1-160FP	Mass Storage Equipment Protection	$0	$92,235	$92,235	8/17/2017	9/28/2018	
I17A1-162FP	Securing Electronic Control Unit Communication	$0	$162,622	$162,622	10/1/2016	9/30/2018	
I17A1-164FP	Application of Traditional Risk Assessment Methods to Cyber Manipulation Scenarios	$0	$214,835	$214,835	10/1/2016	9/30/2019	
I17A1-178FP	Forensics of Embedded Devices	$0	$194,108	$194,108	10/1/2016	9/30/2019	
I17A1-183FP	Vehicle-to-Vehicle, Infrastructure, and People Communication Security	$0	$200,449	$200,449	10/1/2016	9/30/2019	
I17A1-201FP	Human Reliability Analysis for Advanced Reactor Technologies and Systems	$0	$248,127	$248,127	10/1/2016	9/30/2019	
I17A1-206FP	Large Scale Log Analysis for Control System Networks	$0	$98,377	$98,377	10/1/2016	9/30/2019	
I17A1-223FP	New Approach for Post Irradiation Examination Using Modular Transportable Instrumentation	$0	$370,460	$370,460	10/1/2016	9/30/2019	
I17A1-227FP	Multi-Physics, Multi-Scale Coupled Simulation of Power Impulse Experiments	$0	$365,835	$365,835	10/1/2016	9/30/2019	
I17P10-003FP	In-situ small-scale mechanical testing of neutron irradiated ferritic steels	$0	$140,735	$140,735	10/18/2016	9/30/2018	
I17P10-010FP	Quantification of Reactor Kinetics Parameters in the Transient Reactor Test Facility during Temperature Limited Transients	$0	$61,158	$61,158	10/9/2017	9/30/2019	
I17P11-001FP	Enabling Material Discovery for Waste Heat Recovery Systems using a Multimode Optical Sensor	$0	$166,261	$166,261	2/9/2017	9/30/2019	
I17P11-005FP	Improved Industrial Control System Resilience through Automated Detection and Response	$0	$266,901	$266,901	5/18/2017	9/30/2019	
I17P11-007FP	Coupling of Modeling and Experiment to Develop Predictive Models of the Mechanical Behavior of Nuclear Fuels and Materials	$0	$253,023	$253,023	5/25/2017	4/30/2020	
I17P11-014FP	The influence of irradiation on the corrosion kinetics and hydrogen pickup of zirconium alloys	$0	$192,787	$192,787	5/25/2017	4/30/2020	
I17P11-018FP	Advanced Manufacturing of Uranium Dioxide Fuel Pellets with radially and axially zoned burnable poisons and hour-glassing control features	$0	$509,140	$509,140	5/25/2017	9/30/2019	
I17P11-030FP	Investigation of Exciton Delocalization and Exciton Coherence in Chromophores and Acoustic Nanostructures	$0	$362,741	$362,741	6/2/2017	5/30/2020	
I18A12-020FP	Real Time Transient Heating Measurements for Advanced Experiment Design and Model Validation	$0	$256,934	$256,934	10/2/2017	9/30/2020	
I18A12-029FP	Realizing Multidimensional Imaging and Machine Learning on the Scanning Transmission Electron Microscope	$0	$245,650	$245,650	10/2/2017	9/30/2020	
I18A12-059FP	Modeling and Simulation for Nuclear Fuel Cycle Separations Using Modular Coupling	$0	$222,180	$222,180	10/2/2017	9/30/2020	
I18A12-070FP	Electric Vehicle Wireless Charging Security	$0	$152,965	$152,965	10/2/2017	9/30/2020	
I18A12-076FP	Novel Methods to Produce an Argon-37 Standard	$0	$202,920	$202,920	10/2/2017	9/30/2020	
I18A12-080FP	Enabling Highly Scalable Multiphysics Simulation of Particulate Systems on Exascale Computing Architectures	$0	$309,373	$309,373	10/2/2017	9/30/2020	
I18A12-082FP	Solvent Radiolysis Product Production using Preparative High Performance Liquid Chromatography	$0	$104,972	$104,972	10/2/2017	9/30/2020	
I18A12-088FP	Thermomechanical Processing of Titanium Alloys for Improved Ballistic Performance	$0	$184,211	$184,211	10/2/2017	9/30/2020	
I18A12-105FP	Advanced manufacturing for novel nuclear fuel and structural components	$0	$383,253	$383,253	10/2/2017	9/30/2020	
I18A12-107FP	Novel Synthesis of Neptunium Irradiation Targets Through Advanced Electrochemical Techniques	$0	$142,461	$142,461	10/23/2017	9/30/2020	
I18A12-112FP	Production of ethane to ethylene using carbon dioxide as a soft oxidant	$0	$217,749	$217,749	10/2/2017	9/30/2020	
I18A12-116FP	Boron Suboxide & Refractory Transition Metal Boride Fabrication by Spark Plasma Sintering	$0	$150,961	$150,961	10/2/2017	9/30/2020	
I18A12-130FP	Development of Advanced 3-Dimensional Printing Technologies for Cutting Edge Materials	$0	$260,275	$260,275	10/2/2017	9/30/2020	
I18A12-131FP	Cyber-Secure Physical Layer Security in Millimeter Wave Communications	$0	$260,720	$260,720	10/2/2017	9/30/2020	
I18A12-132FP	Dynamics of Multi-layer Complex Infrastructure Networks	$0	$159,567	$159,567	10/2/2017	9/30/2020	
I18A12-133FP	Community of Learning for Cyber Adversary Activity	$0	$39,770	$39,770	10/2/2017	9/30/2019	
I18A12-150FP	Small scale tensile testing technique for measuring grain boundary strength of neutron-irradiated materials in focused ion beam systems	$0	$262,014	$262,014	10/2/2017	9/30/2019	
I18A12-178FP	An Advanced Reactor Fuel Performance Tool Based on Coupled Bison (not acronym- name of which is a finite element-based nuclear fuel performance code) and Monte Carlo radiation transport code. The primary goal of the proposed work is to use the Multiphysics Object Oriented Simulation Environment and Multiphysics Object Oriented Simulation Environment-wrapped application technology to couple Bison fuel performance code to the Monte Carlo radiation transport code.	$0	$254,545	$254,545	10/2/2017	9/30/2020	
I18A12-201FP	Development of structural elements in Multiphysics Object-Oriented Simulation Environment	$0	$159,067	$159,067	10/2/2017	9/30/2020	
I18A12-203FP	Optimization of carbon nanotubes in an aluminum matrix for light-weighting automobile structures	$0	$54,497	$54,497	10/2/2017	9/30/2018	
I18A12-206FP	Development of an Advanced Method for Transient Reactor Test Facility Modeling and Simulation with Thermal Graphite Model Validation	$0	$193,769	$193,769	10/2/2017	9/30/2020	
I18A12-210FP	Surface morphological patterning, structure-activity modeling, and aging analysis of catalyst materials to enhance oxidative dehydrogenation of ethane reaction conversion efficiency	$0	$277,887	$277,887	10/2/2017	9/30/2020	
I18A12-212FP	High Performance Computing-based Dynamically Adaptive Protection Schemes for Electric Grid	$0	$300,766	$300,766	10/2/2017	9/30/2020	
I18A40-001FP	Rapid Field Chemical Detection and Determination of Actinides	$0	$16,044	$16,044	7/9/2018	9/30/2019	
I18A40-007FP	Sublime Temperature Sensor - Discovering, demonstrating, and ultimately deploying temperature sensors with max temperatures of >2000 degree Celsius, this proposal focuses on material deposition temperatures to directly correlate with temperatures of symmetrical heat sources (e.g. reactor cores and furnaces). The Sublime Temperature Sensor uses well-known and characterized materials under vacuum inside a quartz tube.	$0	$51,588	$51,588	7/17/2018	9/30/2019	
I18A40-014FP	Accelerating irradiated fuel studies by advanced surrogate samples	$0	$10,014	$10,014	7/23/2018	9/30/2019	
I18A40-020FP	Separation of Fragile Chemical Species using Carbon Nanotube Emitters at Very Low Electrical Potential	$0	$24,770	$24,770	8/13/2018	9/30/2019	
I18A40-021FP	Investigation of Dual Material Shaped-Charge Liners	$0	$5,898	$5,898	7/9/2018	9/30/2019	
I18A40-023FP	Neutron Spectrum Generator	$0	$60,506	$60,506	7/30/2018	9/30/2019	
I18A40-029FP	Advanced Probabilistic Risk Assessment through Continuous Fault Trees using R Functions	$0	$26,139	$26,139	7/18/2018	9/30/2019	
I18A40-049FP	Deep-learning approaches for the analysis of synchrotron data of materials used in energy and environmental applications	$0	$19,993	$19,993	7/17/2018	9/30/2019	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
I18P37-001FP	In-Pile Investigation of Transient Boiling in the Transient Reactor Test Facility	$0	$271,913	$271,913	5/16/2018	9/30/2020	
I18P37-003FP	Production and Encapsulation of Energy Producing Isotopes	$0	$203,848	$203,848	3/29/2018	9/30/2018	
I18P37-007FP	Neutron Diffraction of Irradiated Nuclear Fuel	$0	$159,709	$159,709	5/16/2018	9/30/2020	
I18P37-008FP	Development of new experimental capability based on Focused Ion Beam micromachining and investigation of thermo-physical properties of nuclear materials at micro and mesoscale	$0	$96,418	$96,418	5/16/2018	4/15/2021	
I18P37-019FP	Modeling and Simulation of Advanced Manufacturing Techniques: Additive Manufacturing and Laser Welding	$0	$70,676	$70,676	5/16/2018	9/30/2019	
I18P37-023FP	Robust Algorithm Development for Mechanical Contact	$0	$71,609	$71,609	5/16/2018	9/30/2018	
I18P37-027FP	A reactive molecular dynamics simulation approach to understand interfacial interactions of lithium and graphite under extreme high rate conditions	$0	$153,203	$153,203	5/16/2018	9/30/2019	
I18P37-028FP	Exploration of Advanced Partitioning Methods	$0	$138,608	$138,608	5/16/2018	9/30/2018	
I18P37-030FP	Intelligent Additive Manufacturing	$0	$131,334	$131,334	5/16/2018	9/30/2019	
I18P37-031FP	Expanding photo-nuclear data via high-energy Linear Accelerator coupled with real time gaseous mass separation	$0	$265,060	$265,060	5/16/2018	9/30/2020	
I18P37-033FP	Robust Insulation For Resilient Transformers Against an Electromagnetic Pulse or Geomagnetic Disturbance	$0	$342,263	$342,263	5/16/2018	9/30/2020	
I18P37-034FP	Ortho-phosphoric and/or phosphonic acid treatment of Aluminum cladding and Aluminum-fuel matrix spent nuclear fuel for long-term wet or dry storage technique development. The process uses orthophosphoric acid for the initial phosphotation and oxidation cleaning of a ships and yachts vessel's aluminum alloy surfaces. The result of the processes is the dissolution of the metal's surface followed by the formation of a hard and continuous precoating of aluminum phosphate on the surface of the Aluminum alloy. This is a preliminary treatment to develop a uniform protective layer in preparation for additional coatings, protection from seawater corrosion, and local penetration. This type of aluminum phosphate film is nearly chemically inert in the sea or freshwater and has very high thermal stability.	$0	$34,556	$34,556	5/16/2018	9/30/2020	
I18P37-036FP	Industrial Control System Vulnerability Analysis	$0	$194,392	$194,392	5/14/2018	9/30/2019	
I18P38-001FP	Radiation Chemical Kinetics of Actinide Redox Speciation	$0	$118,959	$118,959	2/21/2018	9/30/2019	
I18P38-002FP	In-Situ Investigation of Bond-Structure and Local Chemistry in Molten Salts using Optical and Electrochemical Techniques	$0	$103,393	$103,393	2/20/2018	1/31/2020	
I18P38-004FP	Feasibility Assessment of a Molten Salt Loop in the ATR (Deslonde DeBoisblanc Postdoctoral Award)	$0	$30,713	$30,713	5/16/2018	4/15/2020	
	Total # of Projects for INL: 106	**Total Equipment Cost for INL: $0**		**Total Other Cost for INL: $21,246,652**		**Total Cost for INL: $21,246,652**	
KCNSC - Kansas City National Security Campus							
1021101	Capital Equipment Plant Directed Research Development EOS (company name) Ranger Selective Laser Sintering Printer	$0	$532,686	$532,686	5/1/2018	9/30/2018	
1967601	Capital Equipment Plant Directed Research Development High Temp Hot Press	$0	$158,871	$158,871	10/1/2016	9/30/2018	
1968901	Capital Equipment Plant Directed Research Development Wire-fed Electron Beam Additive Manufacturing	$0	$1,783,292	$1,783,292	10/1/2017	9/30/2018	
25049	Low Value Equipment Plant Directed Research Development Vector-following Launch Simulation	$0	$89,011	$89,011	10/1/2016	9/30/2018	
26020	Low Value Equipment Plant Directed Research Development Room Temperature Vulcanizing Rubber Meter/Mix/Dispense System	$0	$17,952	$17,952	10/1/2017	9/30/2018	
26022	Low Value Equipment Plant Directed Research Development Vibratory Polisher	$0	$25,925	$25,925	10/1/2017	9/30/2018	
26025	Low Value Equipment Plant Directed Research Development Multi-frequency ultrasonic cleaner	$0	$7,310	$7,310	10/1/2017	9/30/2018	
26033	Low Value Equipment Plant Directed Research Development Attrition mill	$0	$141,019	$141,019	10/1/2017	9/30/2018	
26034	Low Value Equipment Plant Directed Research Development Autogrinder	$0	$3,253	$3,253	10/1/2017	9/30/2018	
26038	Low Value Equipment Plant Directed Research Development Eye Tracking Glasses	$0	($405)	($405)	10/1/2017	9/30/2018	
26045	Low Value Equipment Plant Directed Research Development Load Truck	$0	$15,911	$15,911	10/1/2017	9/30/2018	
26047	Low Value Equipment Plant Directed Research Development Inertial Measurement Unit	$0	$103,387	$103,387	10/1/2017	9/30/2018	
26056	Low Value Equipment Plant Directed Research Development Femtosecond Laser	$0	($3,930)	($3,930)	10/1/2017	9/30/2018	
26090	Low Value Equipment Plant Directed Research Development Jet Elite Vertical Bandsaw 20 inch Vertical Bandsaw	$0	$24,094	$24,094	10/1/2017	9/30/2018	
26135	Low Value Equipment Plant Directed Research Development Furnace for debinding	$0	$63,818	$63,818	10/1/2017	9/30/2018	
26137	Low Value Equipment Plant Directed Research Development Scale Microreactor	$0	$95,671	$95,671	1/1/2018	9/30/2018	
26138	Low Value Equipment Plant Directed Research Development 2x Compute Nodes	$0	$26,507	$26,507	1/1/2018	9/30/2018	
26139	Low Value Equipment Plant Directed Research Development Harshaw 5500	$0	$99,709	$99,709	1/1/2018	9/30/2018	
26140	Low Value Equipment Plant Directed Research Development X-Ray Detector	$0	$11,299	$11,299	1/1/2018	9/30/2018	
26141	Low Value Equipment Plant Directed Research Development MicroStar 2 Dosimetry	$0	$32,291	$32,291	1/1/2018	9/30/2018	
26142	Low Value Equipment Plant Directed Research Development Reduced Build Volume	$0	$33,091	$33,091	1/1/2018	9/30/2018	
26143	Low Value Equipment Plant Directed Research Development Mohr Cable Tester	$0	$29,015	$29,015	1/1/2018	9/30/2018	
26144	Low Value Equipment Plant Directed Research Development Rheometer	$0	$59,328	$59,328	1/1/2018	9/30/2018	
26156	Low Value Equipment Plant Directed Research Development University Robotics	$0	$31,797	$31,797	2/1/2018	9/30/2018	
26202	Low Value Equipment Plant Directed Research Development Raytrix Light Field Camera	$0	$55,227	$55,227	3/1/2018	9/30/2018	
26203	Low Value Equipment Plant Directed Research Development Humidity Stg Cabinet	$0	$14,412	$14,412	3/1/2018	9/30/2018	
26233	Low Value Equipment Plant Directed Research Development Ultra-High Speed In-Line	$0	$26,523	$26,523	5/1/2018	9/30/2018	
26240	Low Value Equipment Plant Directed Research Development Measures Dielectric	$0	$57,938	$57,938	5/1/2018	9/30/2018	
26244	Low Value Equipment Plant Directed Research Development Keyence Optical Micro	$0	$23,867	$23,867	5/1/2018	9/30/2018	
26246	Low Value Equipment Plant Directed Research Development Blue Light 3-Dimensional Scanner	$0	$105,009	$105,009	6/1/2018	9/30/2018	
26248	Low Value Equipment Plant Directed Research Development Controller System	$0	$169,611	$169,611	6/1/2018	9/30/2018	
26249	Low Value Equipment Plant Directed Research Development Admaflex Ceramic Printer	$0	$204,042	$204,042	6/1/2018	9/30/2018	
26265	Low Value Equipment Plant Directed Research Development Vacuum Chamber	$0	$34,993	$34,993	6/1/2018	9/30/2018	
26269	Low Value Equipment Plant Directed Research Development LiquiSonic Controller	$0	$18,120	$18,120	6/1/2018	9/30/2018	
26283	Low Value Equipment Plant Directed Research Development Hydrophone with Acoustic	$0	$17,035	$17,035	7/1/2018	9/30/2018	
26285	Low Value Equipment Plant Directed Research Development Vector Signal Analyze	$0	$76,477	$76,477	7/1/2018	9/30/2018	
704486	Printed Circuit Boards Physically Unclonable Features	$0	$9,829	$9,829	10/1/2013	9/30/2018	Purchase Card order that was paid on 10/06/2017 after the books closed for the fiscal year.
704587	University Senior Design Projects to Support Plant Directed Research and Development	$0	$2,759	$2,759	10/1/2013	9/30/2018	This overall project number has been used for senior design projects for several years. Individual scoped activities are added throughout the year. Going forward new projects will be stood up and assigned individual accounts.
704614	Thick Physical Vapor Deposition Films for Current Viewing Resistor	$0	$1,855	$1,855	10/1/2014	9/30/2018	Labor was charged the last week of September after the books were closed, and showed up in FY18.
704652	Gas Transfer System Laser Welding in Vacuum	$0	$210	$210	10/1/2014	9/30/2018	Labor was charged the last week of September after the books were closed, and showed up in FY18.
704665	Additive Manufacturing Metal Qualification	$0	$4,818	$4,818	10/1/2014	9/30/2018	Labor charged the last week of September after the books were closed. Labor closed in FY18. Difference between Actuals and Accruals charged in the last week in September after the books closed.

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
704672	Infrared Vision: Component and Circuit Board Inspection	$0	($81)	($81)	10/1/2014	9/30/2018	Partial PO was accrued, but eventually cancelled and reversed. The difference is between the partial PO and the full PO.
704674	Safety Project Maturation	$0	($5,102)	($5,102)	10/1/2014	9/30/2018	Project charges were reversed after project closeout.
704695	Plant Directed Research and Development Massachusetts Institute of Technology Project	$0	($22,811)	($22,811)	10/1/2015	9/30/2018	
704701	Additive Manufacturing Raw Material Analysis	$0	$105	$105	10/1/2015	9/30/2018	
704703	Remote Collaboration using Augmented Reality - primary focus on the evaluation of current remote collaboration offerings and the development of custom applications	$0	$131	$131	10/1/2015	9/30/2018	
704704	Environmentally Powered Sensor Systems	$0	$703	$703	10/1/2015	9/30/2018	
704707	Model-Based Design For Additive Manufacturing - investigate and determine suitability rules based on geometry, tolerances, material, and machine type.	$0	$175	$175	10/1/2015	9/30/2018	
704709	Achilles III - researching and developing a new Additive Manufacturing capability	$0	$734	$734	10/1/2015	9/30/2018	
704715	Secure Assembly 1 - evaluate the use of an alternative technology	$0	$24,407	$24,407	10/1/2015	9/30/2018	
704716	Integrated Computational Materials Engineering Development	$0	$1,486,267	$1,486,267	10/1/2015	9/30/2018	
704719	Radar 2021- deliver the science and research behind cutting-edge Multi-Chip-Module packaging, miniaturization and Radio Frequency technology	$0	$2,109,351	$2,109,351	10/1/2015	9/30/2018	
704720	Multi-Chip Module- Land Radio Frequency Integrated Circuit Packaging	$0	$281,533	$281,533	10/1/2015	9/30/2018	
704725	Evaluation of Disturbances to Power Lines via Monitoring Techniques	$0	$544	$544	10/1/2015	9/30/2018	
704727	Magnetorheological Fluid Damping - to create a surface which has variable damping characteristics in the context of impact testing	$0	$1,265	$1,265	10/1/2015	9/30/2018	
704729	Embedded Sensing & Inventory - to determine the viability of low frequency wireless communication	$0	$684	$684	10/1/2015	9/30/2018	
704734	Tailorable Resonant Plate Shock	$0	($321)	($321)	10/1/2015	9/30/2018	
704741	Augmented Reality Vision: Assembly/Inspection	$0	$255,148	$255,148	10/1/2015	9/30/2018	
704751	Development of Precipitation Hardening Steel for Additive Manufacturing	$0	$138,440	$138,440	10/1/2015	9/30/2018	
704754	Additive Manufacturing Metal Heat Treatment	$0	$5,519	$5,519	10/1/2015	9/30/2018	
704755	Digital Radiographic Methods	$0	($965)	($965)	10/1/2015	9/30/2018	
704760	Frequency Response Inspection	$0	$239,353	$239,353	10/1/2015	9/30/2018	
704765	Innovation, Development, Experimentation, and Assessment - short term initiatives to evaluate the feasibility of ideas that could turn into full time Plant Directed Research & Development projects	$0	$52,608	$52,608	10/1/2015	9/30/2018	
704766	Plant Directed Research and Development Broadband Receiver	$0	($28)	($28)	10/1/2015	9/30/2018	
704770	Copper Development for Additive Manufacturing	$0	$190,058	$190,058	10/1/2016	9/30/2018	
704773	Advanced Techniques and Applications for Computed Tomography	$0	($2,179)	($2,179)	10/1/2016	9/30/2018	
704774	Unique Chip Identification	$0	$113,614	$113,614	10/1/2016	9/30/2018	
704775	Densification of Non-Oxide Ceramics	$0	$500,790	$500,790	10/1/2016	9/30/2018	
704777	Design and Manufacture of Cryogenic Systems	$0	$97,344	$97,344	10/1/2016	9/30/2018	
704778	Nanocellulose Metal Matrix Composites	$0	$356,051	$356,051	10/1/2016	9/30/2018	
704779	Augmented Reality for Office of Secure Transport Operations	$0	$1,653	$1,653	10/1/2016	9/30/2018	
704783	Vector Following Launch Simulations	$0	$127,037	$127,037	10/1/2016	9/30/2018	
704784	Laster Sintering Research and Development System	$0	$104,565	$104,565	10/1/2016	9/30/2018	
704787	Big Data Storage and Structure	$0	$40,018	$40,018	10/1/2016	9/30/2018	
704788	Big Data Infrastructure and Formats	$0	$1,038	$1,038	10/1/2016	9/30/2018	
704789	Engineered Substrates	$0	$173,916	$173,916	10/1/2016	9/30/2018	
704790	Milli-Meter-Wave Radio Frequency Identification	$0	$213,084	$213,084	10/1/2016	9/30/2018	
704793	Defense against Aerial Drones	$0	$651	$651	10/1/2016	9/30/2018	
704794	Small Spacecraft Technologies	$0	($35,142)	($35,142)	10/1/2016	9/30/2018	
704795	Antennas and Transverters	$0	$355,441	$355,441	10/1/2016	9/30/2018	
704796	Cleaning of Additive Manufactured Polymer Parts	$0	$52,609	$52,609	10/1/2016	9/30/2018	
704797	Nanocomposites for Next Generation Materials	$0	$173,933	$173,933	10/1/2016	9/30/2018	
704798	Laser Weld Depth Monitoring	$0	$315	$315	10/1/2016	9/30/2018	
704799	Additive Manufacturing Machine Characterization of Selective Laser Melting Machine's Solution (SLM280), comparing machine performance from site to site.	$0	$827	$827	10/1/2016	9/30/2018	
704800	Advancing Aluminum Development for Electron Beam Melt Additive Manufacturing	$0	$234,703	$234,703	10/1/2016	9/30/2018	
704802	Additively Manufactured Magnetic Solenoid	$0	$240,784	$240,784	10/1/2016	9/30/2018	
704803	Three-Dimensional X-Ray Analysis for Three-Dimensional Printing	$0	$96	$96	10/1/2016	9/30/2018	
704804	In-Situ X-ray Analysis of the additive manufacturing process at the intersection of the energy source with the feedstock	$0	$489,635	$489,635	10/1/2016	9/30/2018	
704805	Large Scale Additive Manufacturing with Wire Fed System	$0	$105,606	$105,606	10/1/2016	9/30/2018	
704806	Laser Oxidations for Wear Resistance and Lubrication	$0	$23,030	$23,030	10/1/2016	9/30/2018	
704807	Machine Health Monitoring	$0	$47,570	$47,570	10/1/2016	9/30/2018	
704808	Materials, Equipment, and Tool Verification	$0	$340	$340	10/1/2016	9/30/2018	
704809	Automated Optical Inspection	$0	$40,343	$40,343	10/1/2016	9/30/2018	
704810	Smart Storage Shelving	$0	$262	$262	10/1/2016	9/30/2018	
704811	Dry Ice Blasting	$0	$39,240	$39,240	10/1/2016	9/30/2018	
704812	Next Generation Electrostatic Dissipation Survey	$0	$7,427	$7,427	10/1/2016	9/30/2018	
704813	Scrubbing Native Model-Based Definitions	$0	$2,378	$2,378	10/1/2016	9/30/2018	
704814	Investigation of Conformal Cell Structures	$0	$258,498	$258,498	10/1/2016	9/30/2018	
704816	Development of Material Point Method Simulation Capabilities	$0	$221,389	$221,389	10/1/2016	9/30/2018	
704817	Aging and Absorption of Molecules	$0	($52)	($52)	10/1/2016	9/30/2018	
704818	Metal Barrier on Radar Layers	$0	$26	$26	10/1/2016	9/30/2018	
704819	Design for Additive Manufacturing Research	$0	$539	$539	10/1/2016	9/30/2018	
704820	Fixture Design and Damage Potential	$0	$256,890	$256,890	10/1/2016	9/30/2018	
704821	Thin-Client Use on Testers	$0	($210)	($210)	10/1/2016	9/30/2018	
704823	Ink Jet Fabrication - This project seeks to develop materials and fabrication processes for ink jet printing of electrical and optical devices.	$0	$204,755	$204,755	10/1/2016	9/30/2018	
704824	Advanced Real Time Digital Signal Processing	$0	$87	$87	10/1/2016	9/30/2018	
704825	Vibrafuge for Environmental Laboratory	$0	$637	$637	10/1/2016	9/30/2018	
704826	Multiple-Input Multiple-Output Active Vibration Control	$0	$120,726	$120,726	10/1/2016	9/30/2018	
704827	Helical Electromagnetic Launcher	$0	$145,813	$145,813	10/1/2016	9/30/2018	
704828	Digital Radar Target Simulator	$0	$126,345	$126,345	10/1/2016	9/30/2018	
704829	Nuclear Magnetic Resonance Spectra Database	$0	$13,761	$13,761	10/1/2016	9/30/2018	
704830	Materials-At-Risk Pilot	$0	$87	$87	10/1/2016	9/30/2018	
704831	Additive Manufacturing of Ceramic Composites	$0	$252,202	$252,202	10/1/2016	9/30/2018	
704832	Improved Diamond Like Carbon Recipe	$0	$157	$157	10/1/2016	9/30/2018	
704833	Non-contact Dimensional and Workmanship Inspection	$0	$201,945	$201,945	10/1/2016	9/30/2018	
704834	Maraging Steel Study	$0	$16,070	$16,070	10/1/2016	9/30/2018	
704836	Polymer Additive Manufacturing Consortium	$0	$1,376,768	$1,376,768	10/1/2016	9/30/2018	
704837	Augmented Reality Advanced Inspection	$0	$95,328	$95,328	10/1/2016	9/30/2018	
704839	Next Generation Microfluidics	$0	$225,180	$225,180	10/1/2016	9/30/2018	
704840	Magnetic Sensor Array and Video Camera	$0	$303,159	$303,159	10/1/2016	9/30/2018	
704841	Development of Electromagnetic Compatibility Analysis	$0	$144,954	$144,954	10/1/2016	9/30/2018	
704842	Direct Write Electronics	$0	$761,825	$761,825	10/1/2016	9/30/2018	
704843	Ceramic Additive Manufacturing Materials Characterization	$0	$138,202	$138,202	10/1/2016	9/30/2018	
704844	De-embedded Measurement Traceability	$0	$92,820	$92,820	10/1/2016	9/30/2018	
704850	Cognitive Radio for Mobile	$0	$221,171	$221,171	10/1/2017	9/30/2018	
704851	High-Voltage Gallium Nitride Switch - Firing Set	$0	$267,454	$267,454	10/1/2017	9/30/2018	
704852	Integrated Circuit Reverse Engineering	$0	$642,613	$642,613	10/1/2017	9/30/2018	
704853	Diamond Like Carbon and Kynar Coatings on Polymers	$0	$1,830	$1,830	10/1/2017	9/30/2018	
704854	Room Temperature Vulcanizing Rubber Mix-Meter Dispense System	$0	$106,830	$106,830	10/1/2017	9/30/2018	
704855	Thermoset Additive Manufacture	$0	$629,905	$629,905	10/1/2017	9/30/2018	
704856	Glass-Ceramic Processing Science	$0	$333,103	$333,103	10/1/2017	9/30/2018	
704858	Hybrid Additive Manufacturing	$0	($199)	($199)	10/1/2017	9/30/2018	
704859	High Precision Profile Measure	$0	$2,122	$2,122	10/1/2017	9/30/2018	
704860	Selective Vapor Deposition	$0	$212	$212	10/1/2017	9/30/2018	
704863	Nonlinear Environmental-Test Substructure	$0	$145,918	$145,918	10/1/2017	9/30/2018	
704864	Globalstar Decoder using radio	$0	$5,013	$5,013	10/1/2017	9/30/2018	
704865	Sonic Fatigue Chamber - This project will investigate Sonic Fatigue chamber testing to determine if the testing method can meet high frequency Random Vibration requirements of four kilohertz.	$0	$5,283	$5,283	10/1/2017	9/30/2018	
704867	Polar Measurements for Aging Dielectric Materials	$0	$27,535	$27,535	10/1/2017	9/30/2018	
704868	Universal Low Carbon (304L) Material project is to determine if a more restrictive chemistry and phase requirement set is possible. This includes investigation into the melting, rolling, and subsequent heat treatments to determine what changes, if any, will produce an acceptable resulting material.	$0	$4,611	$4,611	10/1/2017	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
704870	Metal Filament Development	$0	$149,005	$149,005	10/1/2017	9/30/2018	
704871	Hiperco Replacement	$0	$220,500	$220,500	10/1/2017	9/30/2018	
704872	Massachusetts Institute of Technology Plant Directed Research and Development Project	$0	$2,572	$2,572	10/1/2017	9/30/2018	
704873	Advances in Superhydrophobic Coatings	$0	$55,084	$55,084	10/1/2017	9/30/2018	
704875	Improved Diamond Like Carbon Recipe	$0	$90,925	$90,925	10/1/2017	9/30/2018	
704880	Transport Phenomena for Gas Transfer Systems	$0	$97,551	$97,551	10/1/2017	9/30/2018	
704881	Real-Time Tracking in Augmented Reality	$0	$55,322	$55,322	10/1/2017	9/30/2018	
704882	Material Risk Detection	$0	$18,146	$18,146	10/1/2017	9/30/2018	
704883	Active D Frequency Modulation Machine Learning	$0	$13,428	$13,428	10/1/2017	9/30/2018	
704884	Active Record of Assembly Mistake Proofing	$0	$15,988	$15,988	10/1/2017	9/30/2018	
704885	Metallurgical and Mechanical Properties of Additively Manufactured Steel	$0	$98,811	$98,811	10/1/2017	9/30/2018	
704888	High Side Analytics Big Data	$0	$152,173	$152,173	10/1/2017	9/30/2018	
704889	Optical Monitoring of Fireset Current Using Faraday Rotation	$0	$227,966	$227,966	10/1/2017	9/30/2018	
704890	Trusted Additive Manufacturing	$0	$210,883	$210,883	10/1/2017	9/30/2018	
704891	Embedded Hardware Access and Communication	$0	$75,173	$75,173	10/1/2017	9/30/2018	
704892	Controller Area Network Bus Security	$0	$36,258	$36,258	10/1/2017	9/30/2018	
704893	Tester Security	$0	$116,469	$116,469	10/1/2017	9/30/2018	
704894	Cognitive Software Defined Radio on a Field-Programmable Gate Array with Beam Steering	$0	$56,827	$56,827	10/1/2017	9/30/2018	
704895	Computational X-Ray Dose Maps	$0	$197,820	$197,820	10/1/2017	9/30/2018	
704896	Constant Rate of Change Compression with Variable Sampling Rate	$0	$17,081	$17,081	10/1/2017	9/30/2018	
704897	Multiaxial (6 degree of freedom) Vibration Test to Assess Durability of Electronic Systems and Components	$0	$128,804	$128,804	10/1/2017	9/30/2018	
704898	Tailorable Resonant PlateShock	$0	$179,405	$179,405	10/1/2017	9/30/2018	
704899	Validating New Instruments & Developing New Technology (Sounding Rockets)	$0	$508,047	$508,047	10/1/2017	9/30/2018	
704900	Advanced Field-Programmable Gate Array Development	$0	$123,873	$123,873	10/1/2017	9/30/2018	
704901	Next Generation Telemetry Decommutator and Product Interface	$0	$3,665	$3,665	10/1/2017	9/30/2018	
704902	Orchestra Simulation into Foundation Bus	$0	$7,775	$7,775	10/1/2017	9/30/2018	
704903	Solid State Dual Neutron/X-Ray Detector Development	$0	$193,271	$193,271	10/1/2017	9/30/2018	
704905	Neutron Interrogation Imaging	$0	$116,887	$116,887	10/1/2017	9/30/2018	
704906	Enhanced Gamma Ray Diagnostics & Imaging	$0	$79,592	$79,592	10/1/2017	9/30/2018	
704917	Automating Design for Manufacturability Analysis & Feedback	$0	$138,884	$138,884	10/1/2017	9/30/2018	
704918	Augmented Reality Microscope	$0	$114,508	$114,508	10/1/2017	9/30/2018	
704919	Additively Manufactured Metals: A Continuing International Computational Materials Engineering approach at Kansas City National Security Campus	$0	$218,211	$218,211	10/1/2017	9/30/2018	
704920	Investigation of Isogeometric Finite Element Analysis	$0	$273,092	$273,092	10/1/2017	9/30/2018	
704921	Advanced Modeling and Simulations for Global Security	$0	$229,607	$229,607	10/1/2017	9/30/2018	
704922	Model-Based, Interactive Simulation Training	$0	$83,241	$83,241	10/1/2017	9/30/2018	
704923	Electronics X-Ray Inspection Shielding and Prediction Simulation	$0	$186,280	$186,280	10/1/2017	9/30/2018	
704924	Digital Requirements Management	$0	$12,271	$12,271	10/1/2017	9/30/2018	
704925	Enhanced Precision Energetics	$0	$70,549	$70,549	10/1/2017	9/30/2018	
704927	Kansas City National Security Campus Policy Engagement and Training	$0	$82,777	$82,777	10/1/2017	9/30/2018	
704928	Senior Design- small scope activities that are sent to University partners to be used for Senior Design or 'Capstone' projects.	$0	$365,937	$365,937	10/1/2017	9/30/2018	
704929	Innovation, Development, Experimentation, and Assessment Financial Year18	$0	$1,176,733	$1,176,733	10/1/2017	9/30/2018	
704931	Pellet Additive Manufacturing Feedstock	$0	$85,611	$85,611	2/1/2018	9/30/2018	
704932	Powder Simulations	$0	$8,184	$8,184	3/1/2018	9/30/2018	
704984	Gallium Nitride Vibration Energy Harvester	$0	$214,703	$214,703	10/1/2017	9/30/2018	
704992	Miniature Mechanisms Testing	$0	$5,844	$5,844	7/1/2018	9/30/2018	
704994	Advanced Characterization of Additive Manufacturing Metals	$0	$4,631	$4,631	7/1/2018	9/30/2018	
705110	Financial Year 18/19 Innovation, Development, Experimentation, and Assessment Carryover Project	$0	$65,913	$65,913	8/1/2018	9/30/2018	
	Total # of Projects for KCNSC: 186	**Total Equipment Cost for KCNSC: $0**		**Total Other Cost for KCNSC: $26,405,902**		**Total Cost for KCNSC: $26,405,902**	

LANL - Los Alamos National Lab							
LANL-20150090DR	Integrated Biosurveillance	$0	$72,185	$72,185	10/1/2014	3/31/2018	Extension accounts for a delay in receiving critical data from project collaborators. Extension approval noted high marks in recent project appraisal, including quality of science, performance/execution, relevance to mission, and leadership.
LANL-20150707PRD2	Dynamic Strength and Phase Transition Kinetics in Geophysical Materials	$0	$83,808	$83,808	3/16/2015	3/15/2018	
LANL-20150711PRD2	Remediation Process Simulation-Optimization Under Complex Uncertainties	$0	$49,190	$49,190	5/11/2015	2/23/2018	
LANL-20150717PRD2	Studying nuclear astrophysics and inertial fusion with gamma-rays	$0	$130,179	$130,179	8/3/2015	9/7/2018	Extension with no increase in total project budget permitted the inclusion of a rare experimental opportunity at the Omega laser facility.
LANL-20150760PRD4	Macroporous/Nanoporous Hierarchical Carbon Structure for High-Performance Energy Storage Devices - This project aims to develop next-generation, carbon-based porous materials for high performance energy storage devices such as lithium ion batteries and supercapacitors.	$0	$38,976	$38,976	1/11/2016	1/10/2018	
LANL-20150762PRD4	Investigating Complex Superconducting Phases via Field-Rotating Transport and Thermodynamic Measurements	$0	$9,163	$9,163	10/19/2015	10/18/2017	
LANL-20160007DR	Cosmic Positrons from Pulsar Winds and Dark Matter	$0	$1,529,049	$1,529,049	10/1/2015	9/30/2018	
LANL-20160011DR	Using Extinct Radionuclides for Radiochemical Diagnostics	$0	$1,519,557	$1,519,557	10/1/2015	9/30/2018	
LANL-20160013DR	10 Gigahertz Bandwidth Synthetic Aperture Radar Technology Development for Satellite Deployment	$0	$1,532,497	$1,532,497	10/1/2015	9/30/2018	
LANL-20160037DR	Dark Matter Search with a Neutrino Experiment	$0	$1,694,609	$1,694,609	10/1/2015	9/30/2018	
LANL-20160044DR	Foldamers: Design of Monodisperse Macro-Molecular Structure by Selection of Synthetic Heteropolymer Sequence	$0	$1,456,428	$1,456,428	10/1/2015	9/30/2018	
LANL-20160054DR	Countering Pathogen Interference with Human Defenses	$0	$1,497,653	$1,497,653	10/1/2015	9/30/2018	
LANL-20160069DR	Hybrid Quantum-Classical Computing	$0	$1,289,504	$1,289,504	10/1/2015	9/30/2018	
LANL-20160081ER	Search for Low Mass Dark Photons in High Energy Proton-Nucleus Collisions at Fermi lab	$0	$272,314	$272,314	10/1/2015	9/30/2018	
LANL-20160085DR	Topology and Strong Correlations: A New Paradigm	$0	$1,450,626	$1,450,626	10/1/2015	9/30/2018	
LANL-20160103DR	Additive Manufacturing of Mesoscale Energetic Materials: Tailoring Explosive Response through Controlled Three-Dimensional Microstructure.	$0	$1,677,599	$1,677,599	10/1/2015	9/30/2018	
LANL-20160144ER	Probing Critical Behavior in Hydraulic Injection Reservoirs and Active Seismic Regions	$0	$274,511	$274,511	10/1/2015	9/30/2018	
LANL-20160156ER	Predicting High Temperature Dislocation Physics in Hexagonal Close Packed Crystal Structures	$0	$307,663	$307,663	10/1/2015	9/30/2018	
LANL-20160172ER	Quantum Optics of Solitary Covalent Dopants in Carbon Nanotubes	$0	$308,156	$308,156	10/1/2015	9/30/2018	
LANL-20160173ER	The Cosmogenic Origins of Iron-60	$0	$298,101	$298,101	10/1/2015	9/30/2018	
LANL-20160180ER	Transient Thermal Conduction in Nonlinear Molecular Junctions	$0	$281,709	$281,709	10/1/2015	9/30/2018	
LANL-20160183ER	Shining Light on the Dense Gluon Structure of Large Nuclei	$0	$282,972	$282,972	10/1/2015	9/30/2018	
LANL-20160189ER	Efficient Exploration of High-Dimensional Model Structural Uncertainties	$0	$297,883	$297,883	10/1/2015	9/30/2018	
LANL-20160220ER	Rigorous Development of Atomic Potential Functions in Terms of Strain Functionals	$0	$286,340	$286,340	10/1/2015	9/30/2018	
LANL-20160231ER	Radio Frequency Scintillation Prediction Driven by Direct Measurement of Ionospheric Spatial Irregularities	$0	$176,763	$176,763	10/1/2015	9/30/2018	
LANL-20160255ER	Investigations of the Magnetic Characteristics of Iron-Only Clusters	$0	$257,338	$257,338	10/1/2015	9/30/2018	
LANL-20160261ER	Molecular Actinide Nitrides	$0	$328,000	$328,000	10/1/2015	9/30/2018	
LANL-20160284ER	Stimuli-Responsive Coordination Polymersomes	$0	$271,987	$271,987	10/1/2015	9/30/2018	
LANL-20160317ER	Global Optimization Methods for Structural Bioinformatics	$0	$271,817	$271,817	10/1/2015	9/30/2018	
LANL-20160331ER	Black Carbon Interactions with Radiation, Water & Ice: Laboratory Studies to Calibrate Arctic Climate Models	$0	$331,817	$331,817	10/1/2016	9/30/2019	
LANL-20160340ER	Using Therapeutic Bacteria to Treat Human Diseases	$0	$275,933	$275,933	10/1/2015	9/30/2018	
LANL-20160361ER	A Rigorous Multiscale Method to Couple Kinetic and Fluid Models	$0	$278,978	$278,978	10/1/2015	9/30/2018	
LANL-20160369ER	Nonequilibrium Dynamics and Controlled Transport in Skyrmion Lattices in Nanostructures	$0	$326,394	$326,394	10/1/2015	9/30/2018	
LANL-20160373ER	Tracking Microbial Effects on Water-Uptake and Productivity of Plants	$0	$283,305	$283,305	10/1/2015	9/30/2018	
LANL-20160393ER	Expediting the Genetic Engineering of Microalgae for Industrial Production	$0	$299,922	$299,922	10/1/2015	9/30/2018	
LANL-20160448ER	A Multiscale, Non-stochastic Approach to Model Collisions in Particle Systems	$0	$271,137	$271,137	10/1/2015	9/30/2018	
LANL-20160458ER	Bridging Knowledge Gaps in Simulations of Inertial Confinement Fusion Implosions	$0	$270,188	$270,188	10/1/2015	9/30/2018	
LANL-20160459ER	Narrow Spectrum Gamma-Ray Production Through Inverse Compton Scattering with a Free-Electron Laser	$0	$288,984	$288,984	10/1/2015	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
LANL-20160462ER	Range-Resolved Measurement of Atmospheric Greenhouse Gases for Treaty Verification and Climate Science	$0	$288,959	$288,959	10/1/2015	9/30/2018	
LANL-20160472ER	Kinetic Modeling of Next-Generation High-Energy High-Intensity Laser-Ion Accelerators as an Enabling Capability	$0	$243,943	$243,943	10/1/2015	9/30/2018	
LANL-20160501ER	Connecting Interface Structure and Functionality in Oxide Composites	$0	$315,891	$315,891	10/1/2015	9/30/2018	
LANL-20160518ER	Novel Antennas Based on Atomic Magnetometers	$0	$155,862	$155,862	10/1/2015	9/30/2018	
LANL-20160519ER	Controlling the Functionality of Materials through Interfacial Colloidal Gelation	$0	$274,230	$274,230	10/1/2015	9/30/2018	
LANL-20160528ER	Emergent and Adaptive Polymers	$0	$289,064	$289,064	10/1/2015	9/30/2018	
LANL-20160572ER	Exotic States in Uranium-based Superconductors	$0	$318,540	$318,540	10/1/2015	9/30/2018	
LANL-20160584ER	Accumulator for Low-Energy Laser-Cooled Particles	$0	$280,129	$280,129	10/1/2015	9/30/2018	
LANL-20160587DR	Frontiers in Quantum Science	$0	$529,104	$529,104	10/1/2015	9/30/2018	
LANL-20160588DR	Systems Out of Equilibrium	$0	$454,880	$454,880	10/1/2015	9/30/2018	
LANL-20160595ECR	Real-Time, Real-World Time Series Forecasting Using Internet Data	$0	$133,424	$133,424	5/9/2016	9/30/2018	
LANL-20160599ECR	Assimilation Algorithms for Data Fusion in Large-scale Non-linear Dynamical Systems	$0	$188,807	$188,807	5/2/2016	9/21/2018	
LANL-20160604ECR	Formation, Stability, and Chemistry of Tetravalent Actinide Nanocrystals	$0	$121,996	$121,996	5/2/2016	9/24/2018	
LANL-20160606ECR	Discovering Biosignatures in Manganese Deposits on Mars	$0	$104,867	$104,867	1/19/2016	5/29/2018	
LANL-20160608ECR	Next-Generation Sea Level Predictions with Novel Ice Sheet Physics	$0	$57,776	$57,776	1/19/2016	1/18/2018	
LANL-20160619ECR	Microstructural Characterization of Shock-Recovered Explosives for Mesoscale Model Development	$0	$61,611	$61,611	2/22/2016	2/21/2018	
LANL-20160629ECR	Developing a Compact Portable Muon Tracker for Non-Destructive Evaluation	$0	$306,100	$306,100	1/11/2016	9/21/2018	
LANL-20160641PRD2	Revealing the Particle Nature of Dark Matter with Cosmic Gamma Rays	$0	$128,771	$128,771	3/28/2016	7/26/2019	Extension approved to account for Distinguished Postdoc Fellows medical leave. The extension, with the same duration as the medical leave, permitted the Postdoc Fellow the opportunity to further research dark matter, a specialty that builds capability for our nuclear missions. This aligns with the LDRD objective to help recruit and retain new scientific talent in service to the nation.
LANL-20160642PRD1	Laboratory Study of Fracturing and Hydraulic Conductivity through Heterogeneous Materials in Compressive Stress Environments	$0	$35,411	$35,411	1/4/2016	1/3/2018	
LANL-20160643PRD2	Tensor Networks and Anyons: Novel Techniques for Novel Physics	$0	$168,414	$168,414	8/29/2016	8/28/2019	
LANL-20160645PRD1	Precision Theoretical Analysis of Reactions with Protons Polarized in a Strong Magnetic Field	$0	$123,523	$123,523	8/22/2016	8/21/2018	
LANL-20160647PRD2	Coupling Kinetic to Fluid Scales in Space and Laboratory Plasmas	$0	$161,061	$161,061	2/22/2016	2/21/2019	
LANL-20160648PRD2	Theory of Spin and Valley Dynamics in Two-Dimensional Dirac Semiconductors	$0	$36,360	$36,360	2/22/2016	2/21/2018	
LANL-20160650PRD2	Trace Elements in Martian Rocks and Soils as Observed by ChemCam in Gale Crater, Mars, and Preparation for LANL's Next Mars Mission	$0	$79,408	$79,408	5/16/2016	5/15/2019	
LANL-20160651ER	Target Projects in Theoretical and Experimental Materials Science: Novel Structural Models, Materials Imaging and Informatics, and Strength/Sensing Capabilities Integrated During Manufacturing.	$0	$311,326	$311,326	3/14/2016	9/30/2018	
LANL-20160652PRD2	Using X-Rays with Protons for a Material-Identification Capability via Proton Radiography	$0	$41,875	$41,875	3/14/2016	3/13/2018	
LANL-20160653PRD2	Plasmonics-Transformed Quantum Emitters Through Theory-Guided Synthesis	$0	$80,530	$80,530	3/21/2016	8/17/2018	
LANL-20160654PRD2	Climate, Hydrology and Forest Disturbances in Southern and Western Watersheds	$0	$42,612	$42,612	2/29/2016	2/28/2018	
LANL-20160655PRD2	On the Origin of Colossal Ion Conductivity	$0	$87,588	$87,588	8/1/2016	7/31/2019	
LANL-20160662PRD2	Development and Application of Multi-scale Models for Disease Forecasting	$0	$88,652	$88,652	8/1/2016	9/28/2018	
LANL-20160664DR	Rapid Response to Future Threats	$0	$1,832,524	$1,832,524	6/6/2016	6/5/2019	
LANL-20160670PRD3	Physiological and Structural Acclimation to Climate Change in Forest Ecosystems	$0	$61,433	$61,433	6/6/2016	5/24/2018	
LANL-20160671PRD3	Atom-Efficient Upgrading of Bio-Derived Isopropanol/Acetone Mixtures	$0	$73,669	$73,669	7/25/2016	7/24/2018	
LANL-20160672PRD3	Evolution of Water and Carbon Dioxide at Mars: Implications for its Past and Future	$0	$68,296	$68,296	6/13/2016	8/1/2018	
LANL-20160674PRD3	Radiation Effects and Plasma Interactions in Tungsten Based Materials	$0	$91,102	$91,102	7/25/2016	7/26/2019	
LANL-20160675PRD3	Deoxyribonucleic Acid (DNA) mediated Photonic Superstructures for Enhanced Artificial Photosynthesis	$0	$30,445	$30,445	1/30/2017	1/7/2018	
LANL-20160676PRD4	Regulation of Intercellular Signaling	$0	$94,724	$94,724	10/24/2016	10/31/2018	
LANL-20160677PRD4	Building Full-scale Computational Models of Viruses	$0	$109,285	$109,285	1/30/2017	9/30/2019	
LANL-20160678PRD4	Additive Manufacturing of Composite Lithium Containing Neutron Scintillators	$0	$93,000	$93,000	9/12/2016	9/13/2019	
LANL-20160679PRD4	Understanding Non-Collinear Magnets: From Crystal Structure to Magnetic Function	$0	$83,841	$83,841	9/26/2016	7/27/2018	
LANL-20160680PRD4	Chemical Vapor Growth of Hybrid-Perovskite Materials for Next-Generation Energy	$0	$93,093	$93,093	10/3/2016	10/4/2019	
LANL-20160681PRD4	Turbulence in Supernova Progenitors	$0	$116,045	$116,045	5/8/2017	5/7/2019	
LANL-20170001DR	Hybrid Photonic-Plasmonic Materials: Toward Ultimate Control Over the Generation and Fate of Photons	$0	$1,598,492	$1,598,492	10/1/2016	9/30/2019	
LANL-20170004DR	Critical Stress in Earth Crust	$0	$1,518,363	$1,518,363	10/1/2016	9/30/2019	
LANL-20170006DR	New Science and Technology for a Tabletop Accelerator.	$0	$1,718,267	$1,718,267	10/1/2016	9/30/2019	
LANL-20170026ER	Point of Care Enabling Technologies: Magnetically Coupled Valves & Pumps	$0	$320,987	$320,987	10/1/2016	9/30/2018	
LANL-20170029DR	Real-time Adaptive Acceleration of Dynamic Experimental Science	$0	$1,572,101	$1,572,101	10/1/2016	9/30/2019	
LANL-20170033DR	Material Processing to Performance: A Path to Physically-Based Predictive Capability	$0	$1,788,565	$1,788,565	10/1/2016	9/30/2019	
LANL-20170046DR	Flow Cells for Scalable Energy Conversion and Storage	$0	$1,619,404	$1,619,404	10/1/2016	9/30/2019	
LANL-20170047DR	Impacts of Extreme Space Weather Events on Power Grid Infrastructure: Physics-Based Modelling of Geomagnetically-Induced Currents During Carrington-Class Geomagnetic Storms	$0	$1,505,478	$1,505,478	10/1/2016	9/30/2019	
LANL-20170048DR	Fieldable Chemical Threat Mapping by Multi-Modal Low Magnetic Field Nuclear Magnetic Resonance Signatures	$0	$1,547,550	$1,547,550	10/1/2016	9/30/2019	
LANL-20170051DR	High-Order Hydrodynamic Algorithms for Exascale Computing	$0	$1,475,921	$1,475,921	10/1/2016	9/30/2019	
LANL-20170055DR	Agile Spectral Reconnaissance from CubeSats	$0	$1,830,981	$1,830,981	10/3/2016	9/30/2019	
LANL-20170070DR	Shocked Chemical Dynamics in High Explosives	$0	$1,514,797	$1,514,797	10/1/2016	9/30/2019	
LANL-20170073DR	Probing Quark-Gluon Plasma with Bottom Quark Jets at sPHENIX	$0	$1,449,490	$1,449,490	10/1/2016	9/30/2019	
LANL-20170082DR	Understanding Ejecta, Transport, Break-up and Conversion Processes	$0	$1,492,794	$1,492,794	10/1/2016	9/30/2019	
LANL-20170103DR	Advancing Predictive Capability for Brittle Failure Using Dynamic Graphs	$0	$1,545,349	$1,545,349	10/1/2016	9/30/2019	
LANL-20170109ER	Walking the Road from Impacts to Seismic Sources for Celestial Bodies	$0	$285,808	$285,808	10/1/2016	9/30/2019	
LANL-20170121ER	Interfacial Structure Transfer for Direct Band Gap Wurtzite Group-IV Semiconductors	$0	$301,653	$301,653	10/1/2016	9/30/2019	
LANL-20170127ER	Asynchronous Navier-Stokes Solver on Three-Dimensional Unstructured Grids for the Exascale Era	$0	$286,063	$286,063	10/1/2016	9/30/2019	
LANL-20170141ER	Three-Dimensional Nuclear Quadrupole Resonance Imaging	$0	$289,745	$289,745	10/1/2016	9/30/2019	
LANL-20170143ER	Depleted Uranium Oxides Photodiode	$0	$151,313	$151,313	10/1/2016	6/27/2018	
LANL-20170147ER	Designing Emergent Behavior in the Collective Dynamics of Interacting Nano-Magnets	$0	$289,386	$289,386	10/1/2016	9/30/2019	
LANL-20170155ER	Three-Dimensional Structure from Drone and Stereo Video	$0	$283,102	$283,102	10/1/2016	9/30/2019	
LANL-20170156ER	Mapping Cotranscriptional Assembly of the 30S Ribosomal Subunit to Illuminate Mechanisms of Antibiotic Interference	$0	$325,732	$325,732	10/1/2016	9/30/2019	
LANL-20170179ER	High Energy Lightning: Understanding Relations Between Energetic Particles and Lightning Discharges in Thunderclouds	$0	$333,120	$333,120	10/1/2016	9/30/2019	
LANL-20170183ER	Next Generation Image Processing and Analysis Algorithms for Persistent Sky Surveillance	$0	$325,906	$325,906	10/1/2016	9/30/2019	
LANL-20170198ER	Development of Computational Methods for Large-Scale Simulations of Heavy Elements in Solution Environments	$0	$273,442	$273,442	10/1/2016	9/30/2019	
LANL-20170199ER	Laser Radiochronometry	$0	$315,110	$315,110	10/1/2016	9/30/2019	
LANL-20170201ER	A Polyhedral Outer-Approximation, Dynamic-Discretization Solver for Mixed-Integer Semi-Definite Programming	$0	$295,573	$295,573	10/1/2016	9/30/2019	
LANL-20170203ER	A Novel Ultrasound Tomography Technique for High-Resolution Imaging	$0	$295,845	$295,845	10/1/2016	9/30/2019	
LANL-20170204ER	Continuous in-situ Tuning and Nuclear Magnetic Resonance Spectroscopy of Correlated Matter	$0	$329,184	$329,184	10/1/2016	9/30/2019	
LANL-20170207ER	Breaking the "Curse of Dimensionality" for Boltzmann-like Systems	$0	$297,098	$297,098	10/1/2016	9/30/2019	
LANL-20170211ER	Dynamics of Nonequilibrium Phase Transitions and Universality	$0	$332,899	$332,899	10/1/2016	9/30/2019	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
LANL-20170218ER	Strontium Bose-Einstein Condensate Atom Interferometer with Matter Wave Circuits	$0	$326,208	$326,208	10/1/2016	9/30/2019	
LANL-20170221ER	Exploiting Quantum Interference to Control Ultracold Molecular Collisions	$0	$296,125	$296,125	10/1/2016	9/30/2019	
LANL-20170236ER	Harnessing Dark Excitons in Carbon Nanotubes through Covalent Doping Chemistry	$0	$320,027	$320,027	10/1/2016	9/30/2019	
LANL-20170249ER	Sensitive Optical Super-resolution Neuroimaging	$0	$301,507	$301,507	10/1/2016	9/30/2019	
LANL-20170256ER	Measuring Messenger Ribonucleic Acid and Protein Content from Single Cells: Single Molecule Fluorescence In-Situ Hybridization on a Chip	$0	$295,792	$295,792	10/1/2016	9/30/2019	
LANL-20170279ER	"Zero-Threshold Gain" and Continuous-Wave Lasing Using Charged Quantum Dots	$0	$328,614	$328,614	10/1/2016	9/30/2019	
LANL-20170288ER	Fluctuating Domains in Antiferromagnets for Sensing and Switching Applications	$0	$310,914	$310,914	10/1/2016	9/30/2019	
LANL-20170290ER	Lepton Number Violation: Connecting the Teraelectron Volt Scale to Nuclei	$0	$329,808	$329,808	10/1/2016	9/30/2019	
LANL-20170317ER	Exploring the Multi-scale Physics that Regulates Black Hole Accretion	$0	$308,016	$308,016	10/1/2016	9/30/2019	
LANL-20170328ER	Hetero-Interfaces of Novel Two-Dimensional Dirac Semiconductors	$0	$361,436	$361,436	10/1/2016	9/30/2019	
LANL-20170357ER	Meta-surface Enabled Passive Radiative Cooling	$0	$294,104	$294,104	10/1/2016	9/30/2018	
LANL-20170367ER	Realization of a Laboratory Turbulent Magnetic Dynamo: A Gateway to New Laboratory Astrophysics and Inertial Confinement Fusion Experiments	$0	$317,844	$317,844	10/1/2016	9/30/2019	
LANL-20170393ER	Chemical Approaches to Stable, Narrow-Bandgap Perovskite Materials	$0	$293,287	$293,287	10/1/2016	9/30/2019	
LANL-20170402ER	Inspecting America's Aging Infrastructure with Muon Radiography	$0	$293,443	$293,443	10/1/2016	9/30/2018	
LANL-20170414ER	Life on the Edge: Microbes in Rock Varnish	$0	$327,370	$327,370	10/1/2016	9/30/2019	
LANL-20170423ER	Probing Ionosphere and Magnetosphere Connections with an Electron Gun	$0	$313,655	$313,655	10/1/2016	9/30/2019	
LANL-20170430ER	Quantum Effects on Cosmological Observables: Probing Physics Beyond the Standard Model	$0	$236,083	$236,083	10/1/2016	9/30/2019	
LANL-20170435ER	Quantum-Dot-Based Infrared Photodetectors with Picosecond Temporal Resolution Operating at Room Temperature	$0	$329,638	$329,638	10/1/2016	9/30/2019	
LANL-20170438ER	Elpasolite Planetary Ice and Composition Spectrometer: A Low-Resource Combined Gamma-Ray and Neutron Spectrometer for Planetary Science	$0	$322,362	$322,362	10/1/2016	9/30/2019	
LANL-20170450ER	Quantum Molecular Dynamics of Strongly Correlated Materials	$0	$307,593	$307,593	10/1/2016	9/30/2019	
LANL-20170457ER	Beat-Wave Magnetization of a Dense Plasma	$0	$324,338	$324,338	10/1/2016	9/30/2019	
LANL-20170460ER	Computational algorithms for modeling non-adiabatic dynamics in molecular systems	$0	$312,471	$312,471	10/1/2016	9/30/2019	
LANL-20170490ER	Enabling Electron Excitations in the Modeling of Warm Dense Matter	$0	$322,002	$322,002	10/1/2016	9/30/2019	
LANL-20170508DR	Optimization and Physics Inspired Machine Learning Approaches	$0	$558,412	$558,412	10/1/2016	9/30/2019	
LANL-20170509DR	Multiscale Modeling of Biological Systems	$0	$498,873	$498,873	10/1/2016	9/30/2019	
LANL-20170521ER	Demonstration of Electron Beam Generation with a Novel Solid-State Amplifier Driven Accelerator for Space Deployment Applications	$0	$353,230	$353,230	10/3/2016	9/30/2018	
LANL-20170527ECR	Next Generation Radiation Hydrodynamics for Astrophysics	$0	$204,890	$204,890	1/9/2017	1/8/2019	
LANL-20170529ER	Aromatic Actinide Metallacycles	$0	$269,764	$269,764	1/24/2017	9/30/2019	
LANL-20170531ER	Pellet Cracking during Fabrication of Plutonium-238 Oxide Fuel	$0	$546,354	$546,354	12/5/2016	9/30/2018	
LANL-20170533ECR	Boosting Algae Biomass for Biofuels with Plant Substrate Utilization	$0	$226,601	$226,601	1/9/2017	1/8/2019	
LANL-20170537ECR	Deep Learning for Multispectral and Hyperspectral Target Detection in Remote Sensing Data	$0	$136,190	$136,190	1/9/2017	5/30/2018	
LANL-20170539ECR	Understanding the Magnetic Properties of Heavy Fermion Materials	$0	$210,078	$210,078	10/1/2017	9/30/2019	
LANL-20170541ECR	High Resolution Laser Velocimetry and Ranging for Materials Research	$0	$207,650	$207,650	1/9/2017	1/8/2019	
LANL-20170549ECR	Convolutional Compressive Sensing for Scientific Imaging	$0	$220,493	$220,493	1/9/2017	1/8/2019	
LANL-20170558ER	Direct Electrolytic Reduction of Plutonium Oxide Surrogates	$0	$545,681	$545,681	12/5/2016	9/30/2018	
LANL-20170569ECR	Gluon Saturation Search with Large Hadron Collider Beauty Experiment	$0	$175,360	$175,360	1/9/2017	1/8/2019	
LANL-20170573ECR	Laser-Based Mega Electron Volt X-ray Source for Double-Shell Radiography	$0	$203,976	$203,976	1/9/2017	1/8/2019	
LANL-20170574ECR	Large-Scale Nonlinear Optimization via Cloud Computing	$0	$205,906	$205,906	6/19/2017	6/18/2019	
LANL-20170583ER	Coherent Radio Frequency Collection Through Computation for CubeSat Constellations	$0	$518,611	$518,611	12/5/2016	9/30/2018	
LANL-20170587ER	Insensitive High Explosives using 3-picrylamino-triazole	$0	$549,839	$549,839	12/5/2016	9/30/2018	
LANL-20170610ECR	New Nanomaterials with Confined Oxide/Metal Interfaces for Flexible Electrodes	$0	$203,447	$203,447	7/3/2017	7/2/2019	
LANL-20170615ER	Microstructure Sensitive Radiation Effects	$0	$110,106	$110,106	12/13/2016	9/30/2018	
LANL-20170625ER	Advanced Technology Laser Triggering of High Power Linear Induction Accelerator Pulsed Power Switches	$0	$6,285	$6,285	1/4/2017	3/31/2018	
LANL-20170628ER	Wakefield Study for Superconducting Accelerator Cavities	$0	$67,977	$67,977	1/4/2017	9/30/2018	
LANL-20170630ER	Adaptive Feedback for Automatic Phase Space Tuning of Electron Beams in Advanced X-ray Free-Electron Lasers	$0	$20,511	$20,511	1/4/2017	1/22/2018	
LANL-20170641ER	In Situ Quantification and Characterization of Phase Evolution during Metal Additive Manufacturing	$0	$79,961	$79,961	1/4/2017	12/18/2017	
LANL-20170660PRD1	Neuromorphic Memcomputing via Interacting Nanomagnets	$0	$169,063	$169,063	2/21/2017	2/20/2020	
LANL-20170661PRD1	Dark Matter and the Validity of Effective Field Theories	$0	$166,328	$166,328	9/5/2017	9/4/2020	
LANL-20170662PRD1	First Principles Approach to Factorization Violation	$0	$171,257	$171,257	1/9/2017	1/8/2020	
LANL-20170663PRD1	Quantifying Covalency in Californium and the Other +3 Actinides	$0	$121,889	$121,889	1/9/2017	1/8/2020	
LANL-20170664PRD1	Novel Topological Orders in Strongly-Correlated Systems	$0	$90,884	$90,884	1/9/2017	1/8/2019	
LANL-20170665ER	Driven Quantum Matter	$0	$218,876	$218,876	3/9/2017	11/16/2018	
LANL-20170666PRD1	Jets in Strongly Interacting Plasmas	$0	$165,131	$165,131	8/21/2017	8/20/2020	
LANL-20170667PRD1	A Gruneisen Approach to Quantum Criticality	$0	$111,796	$111,796	4/17/2017	4/16/2019	
LANL-20170668PRD1	Impacts of Climate and Land Use on Global River Dynamics	$0	$107,148	$107,148	4/3/2017	4/2/2019	
LANL-20170670PRD1	Toward Controlled Synthesis of Actinide Oxide Nanocrystals: A Theoretical Perspective	$0	$103,540	$103,540	2/27/2017	2/26/2019	
LANL-20170671PRD2	Developing a Unique Technology to Control Emerging Threats of Antibiotic-resistant Pathogens	$0	$87,105	$87,105	4/3/2017	11/2/2019	
LANL-20170672PRD2	Valley Dynamics and Coherence in Atomically-Thin Semiconductors	$0	$154,998	$154,998	9/25/2017	9/24/2019	
LANL-20170673PRD2	Forecasting Failure	$0	$118,251	$118,251	7/3/2017	7/2/2019	
LANL-20170674PRD2	Joint Mapping of Charge and Spin Degrees of Freedom in Intermediate Valence Materials	$0	$133,040	$133,040	7/31/2017	7/30/2019	
LANL-20170675PRD2	Controlling Quantum Information by Quantum Correlations	$0	$33,189	$33,189	7/31/2017	1/5/2018	
LANL-20170677PRD2	Prediction of Magnetic Properties of Actinide Complexes Using Ab Initio Methods	$0	$121,460	$121,460	7/31/2017	7/30/2019	
LANL-20170684PRD3	Design of New Materials for Energy Applications	$0	$44,254	$44,254	7/10/2017	2/11/2018	
LANL-20170685PRD3	Tandem Dehydrogenation of Formic Acid and Olefin Hydrogenation: Steps Towards a Self-Sustaining Pressure/Volume System	$0	$101,521	$101,521	6/19/2017	6/18/2019	
LANL-20170686PRD3	Modeling of Two-Dimensional Materials and Hybrid Perovskite Optoelectronic Devices	$0	$108,209	$108,209	6/26/2017	6/25/2019	
LANL-20170687PRD3	Measurement of Cross Sections Crucial for Constraining Stellar Nucleosynthesis	$0	$117,057	$117,057	6/19/2017	6/18/2019	
LANL-20170688PRD3	Engineering Deoxyribonucleic Acid Protected Silver Nanoclusters via Doping and Alloying	$0	$120,693	$120,693	9/5/2017	9/4/2019	
LANL-20170690PRD4	Epigenetic Control of Synchronized Proliferation in Harmful Algal Blooms	$0	$178,142	$178,142	9/11/2017	9/10/2019	
LANL-20170691PRD4	Accelerated Discovery of New Nanocomposites for Energy Applications	$0	$138,578	$138,578	10/30/2017	10/29/2019	
LANL-20170693PRD4	Mega Electron Volt Gamma-Ray Astronomy: Exploring the Universe in the Nuclear Transition Region	$0	$113,239	$113,239	10/23/2017	10/22/2019	
LANL-20170694PRD4	Full-Field Characterization of the Micromechanical Cues Associated with the Breakdown of the Cytoskeleton During Cancer Metastasis	$0	$101,720	$101,720	6/4/2018	6/24/2020	
LANL-20170695PRD4	Excited State Dynamics for Photochemistry and Light-Matter Interactions	$0	$95,959	$95,959	1/2/2018	1/1/2020	
LANL-20180005DR	Establishing a Radiotherapeutic Capability to Counter Biothreats	$0	$1,594,402	$1,594,402	10/1/2017	9/30/2020	
LANL-20180007DR	Understanding Actinide-Water Interactions in High Pressure-Temperature Environments	$0	$1,554,736	$1,554,736	10/1/2017	9/30/2020	
LANL-20180009DR	Brighter, Faster, Denser: Adaptive Co-design of Next-Generation Radiation Detector Materials	$0	$278,735	$278,735	10/1/2017	9/30/2018	
LANL-20180014ER	Neutrino Energy Spectroscopy of Electron-Capture Decay for Neutrino Mass	$0	$343,140	$343,140	11/27/2017	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
LANL-20180017ER	Effects of Cosmic Ray Neutrons on Modern High Performance Computing Components	$0	$317,062	$317,062	10/1/2017	9/30/2020	
LANL-20180025DR	Uncovering the Role of 5f-electron Magnetism in the Electronic Structure and Equation of State of Plutonium	$0	$1,554,877	$1,554,877	10/1/2017	9/30/2020	
LANL-20180026DR	Rational Design of Halide Perovskites for Next Generation Gamma-ray Detection	$0	$1,617,034	$1,617,034	10/1/2017	9/30/2020	
LANL-20180033DR	Adaptation Science for Complex Natural-Engineered Systems	$0	$1,245,833	$1,245,833	12/18/2017	12/17/2020	
LANL-20180037ER	This project will enable lightweight, field-portable, x-ray units for use in nuclear counter-terrorism environs. In addition, this project will enable x-ray movies suitable for use with a wide variety of explosive testing for Stockpile Stewardship programs	$0	$375,192	$375,192	10/1/2017	9/30/2019	
LANL-20180038DR	Deepening Los Alamos National Laboratory's Neutrino Legacy	$0	$1,502,791	$1,502,791	10/1/2017	9/30/2020	
LANL-20180040DR	Quantifying Effects of Magnetic Fields for Inertial Confinement Fusion/High-Energy-Density Plasmas with Instabilities and Turbulence	$0	$1,397,131	$1,397,131	10/1/2017	9/30/2020	
LANL-20180045DR	Atomtronics: A New Approach to Sensing, Signal Processing, and Signal Analysis	$0	$1,436,774	$1,436,774	10/1/2017	9/30/2020	
LANL-20180051DR	A Low Fuel Convergence Path to Inertial Confinement Fusion on the National Ignition Facility	$0	$1,306,254	$1,306,254	10/1/2017	9/30/2020	
LANL-20180058ER	Imaging Neural Dynamics With Ultra-Low Field Magnetic Resonance Imaging	$0	$349,896	$349,896	10/1/2017	9/30/2020	
LANL-20180060DR	Robust Deep Unsupervised Machine Learning for Big-Data Analytics	$0	$570,427	$570,427	10/1/2017	9/30/2018	
LANL-20180062DR	Dominating the Electromagnetic Spectrum with Spatio-Temporal Modulated Metasurfaces	$0	$1,617,728	$1,617,728	10/1/2017	9/30/2020	
LANL-20180066DR	The Fundamental Physical Interpretation and Exploitation of Stable Isotope Fractionation	$0	$1,520,102	$1,520,102	10/1/2017	9/30/2020	
LANL-20180074ER	Nonlinear Dynamics of Cross-Beam Energy Transfer for Multi-Speckled Laser Beams	$0	$268,600	$268,600	10/1/2017	9/30/2020	
LANL-20180078ER	Production of Shaped Electron Bunches with Diamond Field Emitter Array Cathodes	$0	$320,388	$320,388	10/1/2017	9/30/2020	
LANL-20180085DR	Pushing the Precision Frontier at the Upgraded Los Alamos National Laboratory Ultra-cold Neutron Facility	$0	$703,538	$703,538	10/1/2017	9/30/2018	
LANL-20180088DR	Enabling Anticipatory Analytics for Data Fusion Applications	$0	$221,182	$221,182	10/27/2017	9/30/2018	
LANL-20180094DR	Desalination Co-mingled: The Path to Affordability	$0	$465,172	$465,172	10/1/2017	9/30/2018	
LANL-20180097ER	Enabling Fast Disaggregation of Large Parameter Spaces	$0	$295,023	$295,023	10/1/2017	9/30/2020	
LANL-20180098ER	Quantitative Understanding of Electronic Correlations in F-Electron Quantum Matter	$0	$318,526	$318,526	10/1/2017	9/30/2020	
LANL-20180100DR	Boom or Bust? Predicting Explosive Safety under Impacts	$0	$1,509,642	$1,509,642	10/1/2017	9/30/2020	
LANL-20180114ER	Making the Unmakeable: Nanostabilized Magnetic Alloys	$0	$244,981	$244,981	10/1/2017	9/30/2020	
LANL-20180125ER	Atomic Structure of Actinides	$0	$240,875	$240,875	10/1/2017	9/30/2020	
LANL-20180128ER	Utilizing Crystalline Sponges to Perform Single Crystal X-ray Determination on Trace Amounts of Actinium Compounds	$0	$295,055	$295,055	10/1/2017	9/30/2020	
LANL-20180129ER	Search for Axion-mediated Interactions with a Spin-exchange Relaxation-free Magnetometer	$0	$332,260	$332,260	10/1/2017	9/30/2020	
LANL-20180131ER	Novel Multichannel Atomic Magnetometer	$0	$329,067	$329,067	10/1/2017	9/30/2019	
LANL-20180137ER	Electronic Structure of Putative Topological Kondo Insulators	$0	$338,198	$338,198	10/1/2017	9/30/2020	
LANL-20180139ER	Powering the Resolution Revolution with Multi-Resolution Algorithms: Merging Image Analysis, Molecular Simulation and Model Building	$0	$308,319	$308,319	10/1/2017	9/30/2020	
LANL-20180142DR	Neuromorphic Systems for Real-Time Data Understanding	$0	$545,054	$545,054	10/1/2017	9/30/2018	
LANL-20180146ER	Light-Driven Nonlinear Phenomena in Weyl and Dirac Semimetals	$0	$228,868	$228,868	10/1/2017	9/30/2018	
LANL-20180151ER	Visualizing and Understanding Complex Fluid Transport in 3-Dimensional Microstructure	$0	$297,279	$297,279	10/1/2017	9/30/2020	
LANL-20180154ER	Synthesizing Fokker-Planck and Navier-Stokes Methods for Strongly Coupled Hydrodynamics and Material Fields in Turbulent Mixing	$0	$284,592	$284,592	10/1/2017	9/30/2020	
LANL-20180158ER	Geophysical Signatures of Changing Water Resources	$0	$295,099	$295,099	10/1/2017	9/30/2020	
LANL-20180189ER	Visualizing Nanoscale Spatio-Temporal Dynamics in Single Quantum Systems	$0	$310,634	$310,634	10/1/2017	9/30/2020	
LANL-20180197ER	Missing Physics behind X-ray Emission from High-Energy-Density Plasmas	$0	$295,866	$295,866	10/1/2017	9/30/2020	
LANL-20180210ER	Properties of Medium Nuclei from First Principles	$0	$294,542	$294,542	10/1/2017	9/30/2020	
LANL-20180213ER	Hamiltonian on Demand for Computational Materials Using Machine Learning	$0	$283,828	$283,828	10/1/2017	9/30/2020	
LANL-20180220ER	Improved Biologically Friendly Polymer Drag Reducers From Novel Architectures	$0	$312,121	$312,121	10/1/2017	9/30/2020	
LANL-20180228ER	Pinning Down the Neutrino-proton Process Importance in Heavy Element Production via Reaction Studies on Radioactive Nickel-56	$0	$331,808	$331,808	10/1/2017	9/30/2020	
LANL-20180238ER	Proton Radiography for Advanced Cancer Therapy	$0	$502,795	$502,795	10/1/2017	9/30/2020	
LANL-20180242ER	Ultrafast X-ray Imaging Using Slow, Visible Cameras	$0	$311,917	$311,917	10/1/2017	9/30/2020	
LANL-20180244ER	OrganiCam: A High-Sensitivity Radiation-Hardened Imaging Organic Detector For Space and Programmatic Applications	$0	$278,557	$278,557	10/1/2017	9/30/2020	
LANL-20180250ER	Next Generation Discrete Dislocation Dynamics Modelling for Materials Science Applications	$0	$403,878	$403,878	10/1/2017	9/30/2020	
LANL-20180257ER	Ultra-Diffuse Galaxies, Tidal Streams and Dwarf Galaxies: The Low-Surface Brightness Frontier	$0	$319,097	$319,097	10/1/2017	9/30/2020	
LANL-20180267ER	Preprocessing Algorithms for Boosting Quantum Annealing Scalability	$0	$293,912	$293,912	10/1/2017	9/30/2020	
LANL-20180283ER	Dopant Profiling in Semiconductors by Scanning Frequency Comb Microscopy	$0	$310,664	$310,664	10/1/2017	9/30/2020	
LANL-20180287ER	Very Low Frequency Mode Generation and Propagation in Space Plasmas	$0	$225,224	$225,224	10/1/2017	9/30/2018	
LANL-20180295ER	In Situ Characterization of Uranium Hydriding Corrosion	$0	$306,728	$306,728	10/1/2017	9/30/2020	
LANL-20180352ER	Scalable Dielectric Technology for Very Low Frequency Antennas	$0	$295,690	$295,690	10/1/2017	9/30/2019	
LANL-20180360ER	Two-dimensional Nanostructure-Engineered Durable Supercapacitors	$0	$301,174	$301,174	10/1/2017	9/30/2020	
LANL-20180369ER	Switchable Spin Crossover Explosives: Nitrogen-rich Iron (Fe II) Complexes for On-Demand Initiation Sensitivity	$0	$326,893	$326,893	10/1/2017	9/30/2020	
LANL-20180372ER	Breaking the Efficiency Limits in Quantum Dot Emitters Using Dual-Band Metamaterials	$0	$291,703	$291,703	10/1/2017	9/30/2020	
LANL-20180382ER	ERIS: Electrolysis Rocket Ignition System	$0	$368,240	$368,240	10/1/2017	9/30/2019	
LANL-20180387ER	Engineering the Universal Bacterial Sensor	$0	$340,220	$340,220	10/1/2017	9/29/2019	
LANL-20180393ER	Removing and Swapping Photoreceptors in Algae to Improve Biomass Yield	$0	$318,462	$318,462	10/1/2017	9/30/2020	
LANL-20180402ER	Full-Field Ultrasound for In-process Inspection of Additively Manufactured Parts	$0	$230,147	$230,147	10/1/2017	9/30/2018	
LANL-20180428ER	Novel Algorithms for Large-Scale Ab-Initio Materials Simulations: Extending the Reach of Quantum Mechanics	$0	$295,858	$295,858	10/1/2017	9/30/2020	
LANL-20180441ER	Methods and Algorithms to Account for Field Fluctuations Obtained by Homogenization in Solid Mechanics	$0	$278,867	$278,867	10/1/2017	9/30/2020	
LANL-20180449ER	Next Generation Models for Radial Diffusion of Energetic Electrons in the Earth's Radiation Belts	$0	$296,198	$296,198	10/1/2017	9/30/2020	
LANL-20180468ER	Optimization Aware Uncertainty Quantification in Non-Linear Networked Systems	$0	$292,823	$292,823	10/1/2017	9/30/2020	
LANL-20180474DR	Properties, Theory, and Measurements for Understanding the Function of Heavy Elements	$0	$1,121,722	$1,121,722	10/1/2017	9/30/2020	
LANL-20180475DR	Emerging Challenges in Space and Earth Science	$0	$1,836,280	$1,836,280	10/11/2017	9/30/2020	
LANL-20180478ER	Machine Learning Emulators for Turbulence	$0	$259,316	$259,316	10/1/2017	9/30/2018	
LANL-20180481ER	Finding a Needle in a Haystack: Physics-Constrained Discrete Optimization by Coupling HPC and Quantum Annealing	$0	$300,752	$300,752	10/1/2017	9/30/2018	
LANL-20180491ER	Towards Optimal Adaptive Control of Particle Accelerators using Deep Reinforcement Learning	$0	$254,453	$254,453	10/1/2017	9/30/2018	
LANL-20180496ER	Analyst-Driven Machine Learning for Image Segmentation	$0	$99,782	$99,782	12/12/2017	9/30/2018	
LANL-20180527ER	Advances in Multi-Phenomenology Event Identification and Location	$0	$178,106	$178,106	10/19/2017	9/30/2018	
LANL-20180529ECR	Geospatial Change Surveillance with Heterogeneous Data	$0	$156,168	$156,168	1/16/2018	1/14/2020	
LANL-20180533ECR	Using Solar-analog Stars to Understand Extreme Space Weather	$0	$162,753	$162,753	1/16/2018	10/15/2018	
LANL-20180535ECR	Integrated Study of X-ray Free-electron Lasers Performance with High Brightness Bunched Electron Beams	$0	$149,165	$149,165	1/16/2018	1/14/2020	
LANL-20180549ECR	Advanced Understanding of Ocean Heat Storage by Coupling Large Eddy Simulation to a Global Ocean Model	$0	$155,812	$155,812	1/16/2018	1/14/2020	
LANL-20180551ER	Additive Re-Manufacturing Guided by Process and Hydrodynamic Modeling	$0	$293,574	$293,574	12/7/2017	9/30/2019	
LANL-20180552ECR	Excited State Dynamics for Spin Systems	$0	$163,941	$163,941	1/16/2018	1/14/2020	
LANL-20180555ER	Multiscale Relational Analytics for Weapons of Mass Destruction and Proliferation Activity Monitoring	$0	$141,462	$141,462	12/7/2017	6/14/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
LANL-20180567ECR	Charged-Particle Stopping Power Measurements in Dense Plasmas	$0	$21,433	$21,433	1/16/2018	9/7/2018	
LANL-20180568ER	Long-Range In-Situ Acoustic Diagnosis and Monitoring of Molten-Salt Systems	$0	$140,339	$140,339	11/27/2017	6/14/2018	
LANL-20180573ECR	Critical Analysis of Neutrinoless Double Beta Decay with Effective Field Theories	$0	$154,614	$154,614	1/16/2018	1/14/2020	
LANL-20180575ER	Noninvasive Thermal Mass Flow Meter for Safeguards	$0	$369,371	$369,371	12/19/2017	9/30/2019	
LANL-20180578ER	Nonlinear Elastic Wave Measurements for Diagnosing Aging in Pentaerythritol Tetranitrate	$0	$130,930	$130,930	12/7/2017	6/14/2018	
LANL-20180579ECR	Advancing Discrete Fracture Matrix Models using Topologically Driven System Reduction	$0	$52,076	$52,076	7/2/2018	7/1/2020	
LANL-20180588ER	Engineered Functionality and Structural Hierarchy in Additively Manufactured Materials	$0	$261,487	$261,487	11/27/2017	9/30/2018	
LANL-20180589ECR	Establishing a Scientific Understanding for the Generation of Radiofrequency Signals from High Explosives	$0	$145,024	$145,024	1/16/2018	1/14/2020	
LANL-20180597ECR	Tracking Ultrafast Morphology Changes in Solid Explosives During a Detonation using Visible Laser Speckle	$0	$156,292	$156,292	1/16/2018	1/14/2020	
LANL-20180602ER	Disrupting Actinide Aqueous Processing: Additively Manufacturing High-Speed Counter-Current Chromatography Devices	$0	$308,996	$308,996	12/7/2017	9/30/2019	
LANL-20180605ER	New Methods for Producing Stockpile Equivalent High Explosive Components	$0	$413,262	$413,262	12/7/2017	9/30/2019	
LANL-20180607ECR	Robust Anomaly Detection in Complex Networks: Data Fusion and New-Link Prediction	$0	$156,494	$156,494	1/16/2018	1/14/2020	
LANL-20180612ECR	Modeling Heterogeneous Surveillance Data for Adaptive Real-time Response to Epidemics	$0	$156,280	$156,280	1/16/2018	1/14/2020	
LANL-20180613ECR	Hybrid Density Functional Theory	$0	$79,507	$79,507	4/16/2018	4/14/2020	
LANL-20180618ECR	Probing Quantum Fluctuations via Thermal Expansion Measurements under Pressure	$0	$150,202	$150,202	1/16/2018	1/14/2020	
LANL-20180621ECR	Joint Critical Thresholds and Extremes for Vulnerability Assessment of Regional Stability	$0	$124,800	$124,800	2/26/2018	2/25/2020	
LANL-20180622ECR	New Physics at the Giga Electron Volt Scale, with Implications for the Strong Charge-conjugation x Parity Problem	$0	$251,108	$251,108	1/16/2018	1/14/2020	
LANL-20180633ECR	Overdriven Shock and Initiation Effects on Detonator-Scale Energetic Materials	$0	$168,351	$168,351	1/16/2018	1/14/2020	
LANL-20180653ER	Clustered Regularly Interspaced Short Palindromic Repeat Associated Protein 9 Gene Editing Efficacy	$0	$207,943	$207,943	12/11/2017	9/30/2018	
LANL-20180654ER	Solution Processable Laser Diodes Based on Engineered Quantum Dots with Suppressed Auger Recombination	$0	$202,862	$202,862	12/7/2017	9/30/2018	
LANL-20180655ER	Translational Cold Cathode Designs for Mission-Specific Applications	$0	$221,267	$221,267	12/7/2017	10/15/2018	
LANL-20180656ER	Spin-Orbit Materials for Quantum Information	$0	$273,536	$273,536	11/27/2017	9/30/2018	
LANL-20180657ER	Development of a Compton Imager for Planetary Science Gamma-ray Spectroscopy	$0	$149,153	$149,153	1/2/2018	9/30/2018	
LANL-20180658ER	Experimental Demonstration of Hyperspectral Intensity Correlation Interferometry	$0	$251,748	$251,748	11/27/2017	9/30/2018	
LANL-20180660ER	Artificial Intelligence for Materials Design	$0	$238,296	$238,296	11/21/2017	9/30/2018	
LANL-20180661ER	Watching Nucleation Dynamics of Complex Electronic and Magnetic Phases in Space and Time	$0	$161,214	$161,214	12/18/2017	9/30/2018	
LANL-20180665ER	X-ray Bragg Coherent Diffraction Imaging from Complex Oxide Nanostructures	$0	$99,762	$99,762	1/4/2018	9/30/2018	
LANL-20180670ER	Enabling Physics-based Design of Next-generation Photocathode Guns: An Integrated First-principle Approach	$0	$198,149	$198,149	1/2/2018	9/23/2018	
LANL-20180671ER	Hybrid Cryogenic Accelerators	$0	$142,368	$142,368	1/2/2018	9/23/2018	
LANL-20180677ER	Accelerated Microstructure Reconstruction from High-Energy X-ray Diffraction Data Collected at Light Sources	$0	$131,132	$131,132	1/2/2018	9/23/2018	
LANL-20180683ER	In-situ Measurements of Strain at X-ray Light Sources within Irradiated Microstructures	$0	$204,713	$204,713	1/5/2018	9/23/2018	
LANL-20180684ER	Multi-branch X-ray Split and Delay	$0	$231,250	$231,250	1/2/2018	9/23/2018	
LANL-20180688ER	Time-varying Free Electron Laser Control	$0	$132,502	$132,502	1/2/2018	9/23/2018	
LANL-20180700PRD1	Machine Learning the Physics of an Active Gold Mine	$0	$121,781	$121,781	1/8/2018	1/7/2021	
LANL-20180701PRD1	Soft Matter-Directed Photonic Materials by Data-Driven Design	$0	$119,931	$119,931	1/8/2018	1/7/2021	
LANL-20180702PRD1	Optimal Control of Quantum Machines	$0	$97,789	$97,789	1/8/2018	1/7/2021	
LANL-20180703PRD1	Unusual Oxidation States and Covalency-Tuning in Transuranic Molecules	$0	$78,371	$78,371	4/16/2018	4/15/2021	
LANL-20180704PRD1	Forest Ecosystems: Resilience or Tipping Point?	$0	$84,636	$84,636	1/29/2018	1/28/2020	
LANL-20180705PRD1	New First Row Transition Metal Based Catalysts for Sustainable Energy Production	$0	$98,015	$98,015	4/2/2018	4/1/2020	
LANL-20180707PRD1	A Multi-scale Approach to Modeling the Competitive Adsorption of Different Species on Molten Salt Reactor Structural Components and Their Role in Corrosion Initiation	$0	$86,251	$86,251	2/5/2018	2/4/2020	
LANL-20180708ER	In-situ Studies of Hydriding and Transport of Hydrogen through Plutonium Dioxide	$0	$92,287	$92,287	2/22/2018	9/30/2018	
LANL-20180710PRD1	Design of State-of-the-art Flow Cells for Energy Applications	$0	$107,566	$107,566	2/12/2018	2/11/2021	
LANL-20180711PRD2	Atomic Layer Deposition of Templated Electrode Structures for Electrochemical Devices	$0	$192,367	$192,367	3/12/2018	3/11/2020	
LANL-20180713PRD2	Exploration of New Topological States of Matter in Strongly Correlated Materials and in Ultra-high Magnetic Fields	$0	$75,604	$75,604	3/26/2018	3/25/2020	
LANL-20180714PRD2	Shock-accelerated Variable-density Mixing in a Subsonic Cross Flow	$0	$59,026	$59,026	3/26/2018	3/25/2020	
LANL-20180715PRD2	How Biological Communities Can Unlock Hidden Signatures of Environmental Change	$0	$83,837	$83,837	4/16/2018	4/15/2020	
LANL-20180716PRD2	Extreme Radiation Magnetohydrodynamics Around Black Holes	$0	$46,454	$46,454	5/21/2018	5/20/2020	
LANL-20180717DR	Theoretical Studies of Strongly Correlated Electron Systems	$0	$102,278	$102,278	5/16/2018	7/15/2019	
LANL-20180718PRD2	Understanding and Controlling Ultrafast Exciton Dynamics in Group-VII Transition Metal Dichalcogenides	$0	$57,086	$57,086	4/16/2018	4/15/2020	
LANL-20180719ER	Rapid Response: Novel Computing	$0	$669,158	$669,158	4/23/2018	9/30/2020	
LANL-20180720ER	Numerical Modeling in Support of Experimental Formation of Novel Thermal-pressure-dominated Magnetized Plasmas	$0	$48,649	$48,649	5/2/2018	9/30/2018	
LANL-20180721ER	Innovative Methods for Very Large-Scale Simulations of Richtmyer-Meshkov instability Sheet Breakup in Gases	$0	$150,100	$150,100	5/14/2018	9/30/2018	
LANL-20180722ER	Development of Variational Data Sets for the Study of Radiographic Data	$0	$53,464	$53,464	6/4/2018	9/30/2018	
LANL-20180723ER	Fast-running Fire Propagation Model for Complex Terrain Environments	$0	$122,039	$122,039	4/27/2018	9/30/2018	
LANL-20180725ER	Experimental Signatures for Dynamic Plutonium Hydriding	$0	$353,135	$353,135	4/23/2018	9/30/2018	
LANL-20180726ER	Elucidating the Unexpected High Temperature Strength of Additively Manufactured Ferritic/Martensitic Steels	$0	$186,744	$186,744	5/14/2018	9/30/2018	
LANL-20180727ER	Integrating MAGPIE and Functional Uncertainty Constrained by Law and Experiment	$0	$105,601	$105,601	5/14/2018	9/30/2018	
LANL-20180728ER	Control of Turbulence by Design	$0	$138,748	$138,748	4/23/2018	9/30/2018	
LANL-20180729ER	Assessment of Pulsed-Power-Driven Inertial Confinement Fusion for Extremely High Thermonuclear Yield	$0	$72,332	$72,332	5/14/2018	9/30/2018	
LANL-20180730ER	Fusing Hard and Soft Data for Activity-Based Intelligence in Denied Areas	$0	$247,807	$247,807	5/14/2018	9/30/2018	
LANL-20180731ER	Overturning a Staple of Radiation Belt Physics: Explaining the Formation of the Inner Electron Belt	$0	$97,539	$97,539	5/14/2018	9/30/2018	
LANL-20180732ER	Laser-driven High-Collimated Neutron Pulse Source for High Precision Radiography and Global Security Applications	$0	$54,555	$54,555	5/14/2018	9/30/2018	
LANL-20180735ER	Actionable Intelligence for Maintenance and Reliability through Sensor Data	$0	$223,041	$223,041	5/14/2018	9/30/2018	
LANL-20180736ER	Informatics Based Design of Low-Dimensional Materials	$0	$137,732	$137,732	4/27/2018	9/30/2018	
LANL-20180737ER	Neuromorphic Implementation of Back-Propagation Algorithm	$0	$73,746	$73,746	4/23/2018	9/30/2018	
LANL-20180738ER	Phase Transformation in Magnesium at Ultra-high-pressure	$0	$74,969	$74,969	5/2/2018	9/30/2018	
LANL-20180739ER	A New Method for Computer-Guided Design and Optimization of Noncovalent Molecular Recognition Motifs	$0	$75,823	$75,823	5/14/2018	9/30/2018	
LANL-20180740ER	Climate-driven Disease Models	$0	$74,539	$74,539	5/14/2018	9/30/2018	
LANL-20180741ER	Low Level Radio Frequency System for Compact All Solid-state Accelerators for Space Deployments	$0	$254,870	$254,870	5/2/2018	9/30/2018	
LANL-20180742ER	Detection of Fake, Complex, Automatically-generated Signals via Bayesian Compressed Signaling	$0	$108,934	$108,934	6/11/2018	9/30/2018	
LANL-20180743ER	Integrating Los Alamos National Laboratory Developed Visual Analytics for Forecasting Infectious Disease Outbreaks	$0	$171,855	$171,855	6/14/2018	9/30/2018	
LANL-20180744PRD3	Development of an Innovative Mechanical Testing System and Techniques for Characterizing Irradiated Advanced Cladding Concepts and Novel Materials	$0	$39,059	$39,059	6/11/2018	6/10/2020	
LANL-20180745PRD3	Machine Learning of Membrane Transport of Signals and Drugs	$0	$10,014	$10,014	9/4/2018	9/3/2020	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
LANL-20180746PRD3	Principles for Optimal Establishment and Resilience of Microbial Communities	$0	$34,821	$34,821	6/11/2018	6/10/2020	
LANL-20180747PRD3	Ferromagnetism and Spin Fluctuations in the Atomically-Thin Limit	$0	$18,344	$18,344	8/13/2018	8/12/2020	
LANL-20180748PRD3	Unraveling Nature's Mysteries at the World's Highest Energy Colliders	$0	$31,485	$31,485	6/25/2018	6/24/2020	
LANL-20180749ER	Magnetic Coupling to the Ionospheric Alfven Resonator	$0	$57,062	$57,062	7/12/2018	9/30/2018	
LANL-20180750ER	Modeling Glycan Dynamics and Occupancy using Molecular Dynamics Simulations and Machine Learning	$0	$77,349	$77,349	6/20/2018	9/30/2018	
LANL-20180752ER	Integrating Mechanistic Models with Machine Learning and Statistical Approaches to Predict Individual Disease Risks Using Electronic Health Records	$0	$59,785	$59,785	7/9/2018	9/30/2018	
LANL-20180753PRD3	An Atomtronic Rotation Sensor	$0	$22,221	$22,221	7/30/2018	7/29/2020	
LANL-20189999ER	Post-project Debits and Credits	$0	($662,754)	($662,754)	10/1/2017	9/30/2018	
	Total # of Projects for LANL: 343	**Total Equipment Cost for LANL: $0**		**Total Other Cost for LANL: $123,714,553**		**Total Cost for LANL: $123,714,553**	
LBNL - L. Berkeley National Lab							
LB16001	Development of a Compact Laser-Driven Ion Beam Accelerator for Discovery Plasma Science	$0	$471,311	$471,311	10/1/2015	9/30/2018	
LB16016	Urban Integrated System: A Data and Computing Platform for Urban Systems	$0	$341,247	$341,247	10/1/2015	9/30/2018	
LB16018	Science of Scaling - The initial focus will be on using batteries as an exemplar system to develop core competencies in the area of scaling science; capabilities that will be equally applicable to other energy systems beyond batteries (e.g., fuel cells, photo-electrochemical cells). We will develop capability in three broad areas (i) process modeling development (ii) visualization to enable accurate model verification and (iii) development of new modular processing techniques. These capabilities will be developed by taking advantage of the user facilities at the Lab, including, Materials Project, Advanced Light Source, National Energy Research Scientific Computing Center, and National Center for Electron Microscopy. Our plan is to develop core competencies in the area of computation (synthesis of materials and linking process conditions to performance), in situ visualization and modular processing of next-generation devices.	$0	$169,909	$169,909	10/1/2015	9/30/2018	
LB16019	The Grid Initiative - Data Driven Approach for Monitoring and Control of Distribution System Assets	$0	$273,340	$273,340	10/1/2015	9/30/2018	
LB16026	Plant Growth Promoting Microbes: Signaling and Mechanisms	$0	$218,459	$218,459	10/1/2015	9/30/2017	
LB16037	Enabling Technologies for Next Generation Receivers to Measure the Polarization of Cosmic Microwave Background	$0	$350,215	$350,215	10/1/2015	9/30/2018	
LB16038	Ultrahigh Voltage and Light Collection in Liquid Xenon Dark Matter Experiments	$0	$438,247	$438,247	10/1/2015	9/30/2018	
LB16040	Volumetric Absorption of Solar Radiation in Liquids and Gases by Tuning the Emissivity of Surfaces	$0	$434,158	$434,158	10/1/2015	9/30/2018	
LB16041	Design of High-Energy Density Lithium-Ion Systems	$0	$384,856	$384,856	10/1/2015	9/30/2018	
LB16043	Upgrade to the Relativistic Heavy Ion Collider Accelerator - We will develop a program investigating the gluonic structure of dense matter. Cold, dense matter will be probed using electron-ion collisions at a future collider, while the gluonic structure of hot, dense matter can be studied by measuring direct photons produced in heavy ion collisions at the Large Hadron Collider. The first goal of this proposal is to establish a leading role in physics at the Electron Ion Collider. This will provide a basis for continued and enhanced block funding for Nuclear Science Division research, and will attract external funding for Electron Ion Collider detector research and development and construction. The second goal of this project is to produce physics now, studying the structure of hot, dense matter using the A Large Ion Collider Experiment at the Large Hadron Collider.	$0	$329,081	$329,081	10/1/2015	9/30/2018	
LB16044	Designing Efficient Energy Conversion Pathways for Synthetic Organisms	$0	$444,408	$444,408	1/20/2016	9/30/2018	
LB17001	Soft X--ray Interferometry	$0	$234,076	$234,076	10/1/2016	9/20/2018	
LB17002	Interfacial Chemical Kinetics via Pattern-Enhanced In-Situ Soft X-Ray Scattering	$0	$243,430	$243,430	10/1/2016	9/30/2018	
LB17004	Developing Science Based Scalable Approaches to Groundwater Banking	$0	$488,263	$488,263	10/1/2016	9/30/2019	
LB17005	Identifying Bioactive Compounds Across the Tree of Life: from Bacteria, to Plants, to Human Organoids	$0	$387,496	$387,496	10/1/2016	9/30/2018	
LB17006	Impact of Gut Microbiome on Genetic Susceptibility to Chemically Induced Colon Cancer	$0	$255,984	$255,984	10/1/2016	9/30/2018	
LB17007	Biosurfactant Production by Engineering Microbial One Carbon Conversion	$0	$308,153	$308,153	10/1/2016	9/30/2019	
LB17008	Advancing Innovation Decision Science: Mapping Theory to Technical Change in Clean Energy	$0	$293,375	$293,375	10/1/2016	9/30/2018	
LB17009	Remote Monitoring of Soil-Plant Biome Responses to Water and Metal Stress	$0	$253,135	$253,135	10/1/2016	9/30/2018	
LB17010	Gas-Phase Ion Chemistry of Late Actinide and Early Transactinide Elements	$0	$128,512	$128,512	10/1/2016	9/30/2018	
LB17011	Probing Reactive Intermediates in Microenvironments	$0	$237,695	$237,695	10/1/2016	9/30/2018	
LB17012	Developing a Scalable Simulation and Analysis Framework for Cosmic Microwave Background-S4 on Many integrated Core-Based Supercomputers	$0	$351,197	$351,197	10/1/2016	9/30/2018	
LB17013	Enabling Extreme-Scale Many-Query Computational Physics	$0	$170,835	$170,835	10/1/2016	9/30/2018	
LB17014	High Performance Computing for Large-Scale Mobility Modeling	$0	$237,680	$237,680	10/1/2016	9/30/2018	
LB17015	Continuing Digital Computing Performance Scaling Post Moore's Law	$0	$255,433	$255,433	10/1/2016	9/30/2018	
LB17016	Acceleration of Temporal Integration for Real Time - Time Dependent Density Functional Theory	$0	$256,053	$256,053	10/1/2016	9/30/2018	
LB17017	Scaling Interactive Science for Data-Intensive Discovery	$0	$246,202	$246,202	10/1/2016	9/30/2018	
LB17018	Deconvoluting Tissue Heterogeneity Through Single-Cell Transcriptomics	$0	$178,139	$178,139	10/1/2016	9/30/2018	
LB17019	A Systems Biology Approach to Dissecting Regulatory and Metabolic Networks of Filamentous Fungi Involved in Carbon Cycling	$0	$301,713	$301,713	10/1/2016	9/30/2019	
LB17020	Discovering of the Genetic Basis of a Beneficial Microbiome to Improve Crop Productivity	$0	$385,150	$385,150	10/1/2016	9/30/2018	
LB17022	Chemistry in Confined Spaces to Enable Desalination and Separations.	$0	$160,251	$160,251	10/1/2016	9/30/2018	
LB17023	Advancement of a High-Impact Desalination Technology	$0	$298,952	$298,952	10/1/2016	9/30/2019	
LB17024	Nanometer Complementary Metal Oxide Semiconductors for Custom Computing and Future Detectors	$0	$182,947	$182,947	10/1/2016	9/30/2018	
LB17025	Dark Fiber and Distributed Acoustic Sensing : Opportunities for Critical Infrastructure and Environmental Monitoring	$0	$247,316	$247,316	10/1/2016	9/30/2018	
LB17026	Differentiation Within Order: Designing and Probing Bio-Inspired Optical Networks for Patterning Assemblies of Nanoparticles	$0	$135,909	$135,909	10/1/2016	9/30/2018	
LB17030	Multimodal Imaging and Spectroscopy of Solid-Liquid Interfaces	$0	$251,859	$251,859	10/1/2016	9/30/2019	
LB17031	Research and Development Towards an Electron-Ion Collider	$0	$346,154	$346,154	10/1/2016	9/30/2018	
LB17033	Theoretical Challenges for Electron-Ion Collider Physics	$0	$192,701	$192,701	10/1/2016	9/30/2019	
LB17034	Germanium Charge Coupled Devices	$0	$171,871	$171,871	10/1/2016	9/30/2019	
LB17036	Femtosecond Synchronization for Small-Scale Pump-Probe Ultrafast Experiments	$0	$297,879	$297,879	12/7/2016	9/30/2019	
LB17037	Automated Translation of Applications to Large Scale Programming Systems	$0	$209,871	$209,871	10/25/2016	9/30/2019	
LB18001	Atmospheric Observation and Forecasting	$0	$280,811	$280,811	10/1/2017	9/30/2019	
LB18002	Toward Accurately Predicting California Hydroclimate by Cracking the Tropical Storm King	$0	$309,825	$309,825	10/1/2017	9/30/2020	
LB18003	Bio-inspired Strategies for Enhancing Carbon Dioxide Reduction at Semiconductor-Liquid Junctions	$0	$278,454	$278,454	10/1/2017	9/30/2020	
LB18004	In-situ Investigation of Chemical Precursor Transformation: Towards a Predictive Science of Synthesis	$0	$288,056	$288,056	10/1/2017	9/30/2019	
LB18005	Algorithms for Computationally Expensive Black-Box Optimization Under Uncertainty	$0	$293,373	$293,373	10/1/2017	9/30/2019	
LB18006	Mitigating Fossil and Microbial Methane with New Materials for Distributed Energy Generation	$0	$288,939	$288,939	10/1/2017	9/30/2019	
LB18007	A Neuroeconomics Experiment to Study Routine Transportation Decision-Making Processes and Drivers	$0	$257,983	$257,983	10/1/2017	9/30/2019	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
LB18008	Harnessing Microbiome Data to Uncover Patterns of Microbial Mutualism	$0	$224,256	$224,256	10/1/2017	9/30/2019	
LB18009	High-Throughput Resolution of Viral-Host Linkages	$0	$133,571	$133,571	10/1/2017	9/30/2019	
LB18010	Selective Ion Capture via Electrodialysis with Porous Network Polymer Architectures	$0	$140,973	$140,973	10/1/2017	9/30/2019	
LB18011	Isotopic Constraints on the Chemical and Thermal Conditions of Thermogenic Methane Formation	$0	$119,672	$119,672	10/1/2017	9/30/2020	
LB18012	A New Approach to Predicting the Effect of Climate Extremes on California's Water Supply	$0	$305,695	$305,695	10/1/2017	9/30/2019	
LB18013	Atomic Electron Tomography of Disordered Materials	$0	$59,387	$59,387	10/1/2017	9/30/2019	
LB18014	Agile Hybrid Materials for a Sustainable Future	$0	$262,146	$262,146	10/1/2017	9/30/2020	
LB18015	Structure and Dynamics of Materials Interfaces	$0	$391,325	$391,325	10/1/2017	9/30/2018	
LB18016	Non-Equilibrium Metamaterials	$0	$189,008	$189,008	10/1/2017	9/30/2018	
LB18017	Pushing the Limits of High Purity Germanium Detector Performance: Rate and Position Resolution	$0	$239,655	$239,655	10/1/2017	9/30/2019	
LB18018	Joining forces against the Dark Universe: From the Cosmic Microwave Background to Large Scale Structure	$0	$449,547	$449,547	10/1/2017	9/30/2020	
LB18019	Next-Generation Data-Intensive Analysis Framework for High Energy and Nuclear Physics on High Performance Computers	$0	$207,394	$207,394	10/1/2017	9/30/2019	
LB18020	Developing High-Resolution Optical Microscopy Methods for Imaging Plants and Microbes	$0	$269,322	$269,322	10/1/2017	9/30/2020	
LB18021	Domain-Specific Communication Runtimes for the Post-Moore's Law High Performance Computing	$0	$196,615	$196,615	10/1/2017	9/30/2019	
LB18022	Active Learning of Ab Initio Force Fields with Applications to Large-Scale Simulations of Materials and Biophysical Systems	$0	$187,830	$187,830	10/1/2017	9/30/2019	
LB18023	Development of a Kilohertz Laser-Plasma Beamline for Ultrafast Electron Diffraction	$0	$163,801	$163,801	12/7/2017	9/30/2019	
LB18024	Revealing the Organization and Dynamics of Sensorimotor Cortex by Determining Structure-Dunction Mappings Across Micro-to-Mesoscales	$0	$389,744	$389,744	12/7/2017	9/30/2020	
LB18025	Unnatural Biosynthetic Pathways by Combining Biosynthetic Pathways with Artificial Metalloenzymes	$0	$339,342	$339,342	12/7/2017	9/30/2020	
LB18026	The Chemical Universe Through the Eyes of Generative Adversarial Neural Networks	$0	$302,599	$302,599	12/7/2017	9/30/2019	
LB18027	The AR1K Project: Engineering Agriculture through Machine Learning	$0	$230,676	$230,676	12/7/2017	9/30/2019	
LB18028	Efficient Desalination through Better Predictive Models	$0	$287,054	$287,054	10/1/2017	9/30/2019	
LB18029	Diversity-Oriented Materials from Biogenic Feedstocks	$0	$237,709	$237,709	12/7/2017	9/30/2019	
LB18030	Deep Learning for Science - improve performance/scalability for complex scientific data while improving the performance of deep neural net training. These methods will be developed in the context of science drivers from Electron Microscopy, Nuclear physics, Bioenergy, and Cosmology.	$0	$420,249	$420,249	12/7/2017	9/30/2020	
LB18031	High-Resolution Ultra-Dense Seismic Array Imaging of Geological Properties for Regional Seismic Hazard and Risk Assessment	$0	$63,604	$63,604	10/1/2017	9/30/2019	
LB18032	Precision Beam Instrumentation for Parity Violation Experiments	$0	$85,283	$85,283	2/26/2018	9/30/2020	
LB18033	Ultrastable Superconducting Electron Microscope	$0	$194,147	$194,147	6/1/2018	9/30/2019	
LB18034	Computational Materials Discovery and Device Simulation	$0	$97,299	$97,299	7/19/2018	9/30/2019	
LB18035	Novel Electronic Nanostructured Materials for Low Power Electronics	$0	$80,742	$80,742	7/19/2018	9/30/2019	
LB18036	Post-Moore Architecture and Device Level Simulation and Exploration	$0	$101,561	$101,561	7/19/2018	9/30/2019	
LB18037	Understanding Fundamental Scientific Challenges in Scaling New Low Power Electronic Materials and Devices	$0	$24,386	$24,386	7/19/2018	9/30/2019	
LB18038	Improving Bioenergy Yield Under Drought Stress from Field to Lab	$0	$18,246	$18,246	8/6/2018	9/30/2020	
LB18039	Computational Design of Next Generation Materials for Quantum Sensing and Detection	$0	$8,263	$8,263	8/20/2018	9/30/2020	
LB18040	Developing Theory of Photosynthetic Acclimation from First Principles	$0	$338,838	$338,838	10/1/2017	9/30/2019	
	Total # of Projects for LBNL: 81	**Total Equipment Cost for LBNL: $0**		**Total Other Cost for LBNL: $20,320,842**		**Total Cost for LBNL: $20,320,842**	
LLNL - L. Livermore National Lab							
15-ERD-039	Failure Recovery Abstractions for Large-Scale Parallel Applications	$0	$60,250	$60,250	12/1/2014	11/30/2017	
16-ERD-003	Accelerated Discovery of Advanced Combustion Fuels	$0	$275,010	$275,010	10/1/2015	9/30/2018	
16-ERD-005	In-Memory Associative Indexing: An Approach to Efficient High-Performance Computing	$0	$670,300	$670,300	10/1/2015	9/30/2018	
16-ERD-006	Building Computerized Tomography Tools for Precision Additive Manufacturing	$0	$564,680	$564,680	10/1/2015	9/30/2018	
16-ERD-007	Characterizing Host-Pathogen Immunity Gut-Brain Interactions	$0	$740,900	$740,900	1/5/2016	1/4/2019	
16-ERD-008	Inferring Nuclear Fireball Properties from Experimental Data	$0	$479,550	$479,550	10/1/2015	9/30/2018	
16-ERD-010	In Situ Probes of Granular Media Under Compression	$0	$375,300	$375,300	10/1/2015	9/30/2018	
16-ERD-011	New Quantum Simulation Capability for Ultrahigh-Temperature, High-Energy-Density Science	$0	$391,740	$391,740	10/1/2015	9/30/2018	
16-ERD-013	Image Analysis for Dark Energy and Space Surveillance Applications	$0	$697,560	$697,560	10/1/2015	9/30/2018	
16-ERD-014	High-Fidelity Fracture Model for Hydraulically Fractured Shale Reservoirs	$0	$494,520	$494,520	10/1/2015	9/30/2018	
16-ERD-016	Mechanisms of Pulsed-Laser Ablation, Damage, and Failure in Various Classes of Materials	$0	$745,140	$745,140	10/1/2015	9/30/2018	
16-ERD-018	Modeling Spatial and Temporal Coupling in High-Contrast Grating Compressors Utilizing High-Performance Computing	$0	$458,480	$458,480	10/1/2015	9/30/2018	
16-ERD-019	Materials Informatics for Synthesis, Optimization, and Scale-Up of Advanced Materials	$0	$708,620	$708,620	3/3/2016	3/2/2019	
16-ERD-020	Decoding the X-Ray Cipher of the Universe in the Laboratory	$0	$408,670	$408,670	10/1/2015	9/30/2018	
16-ERD-022	Nucleosynthesis for Science and Security	$0	$776,170	$776,170	3/1/2016	2/28/2019	
16-ERD-023	Computational Framework for Data Assimilation and Uncertainty Management of Large-Dimensional Dynamics Models	$0	$530,050	$530,050	10/1/2015	9/30/2018	
16-ERD-024	Extending Laser-Driven X-Ray Sources to High-Energy-Density Science Facilities	$0	$286,240	$286,240	10/1/2015	9/30/2018	
16-ERD-025	Topology Optimization of Multifunctional Materials	$0	$388,460	$388,460	10/1/2015	9/30/2018	
16-ERD-026	Methods for Advanced Cyber Security - Classified Project	$0	$470,160	$470,160	10/1/2015	9/30/2018	
16-ERD-033	Mesocrystal Architectures	$0	$427,420	$427,420	10/1/2015	9/30/2018	
16-ERD-034	Multimodal Learning on Big Brain Data	$0	$533,680	$533,680	10/1/2015	9/30/2018	
16-ERD-035	The Engineered Micro-Sensor Array	$0	$528,510	$528,510	10/1/2015	9/30/2018	
16-ERD-036	Improving Simulation Workflows: A Data Analytics Approach	$0	$470,940	$470,940	10/1/2015	9/30/2018	
16-ERD-037	Ultrafast Shock Kinetics of High-Atomic-Number Materials with High Throughput	$0	$349,630	$349,630	11/12/2015	9/30/2018	
16-ERD-038	Active Adaptive Control of High-Energy, High-Repetition-Rate, Short-Pulse Lasers	$0	$347,660	$347,660	10/1/2015	9/30/2018	
16-ERD-040	Controlling Detonative Phenomena with High-Explosives Material Architecture	$0	$670,790	$670,790	10/9/2015	9/30/2018	
16-ERD-043	Deformation Mechanisms in Body-Centered Cubic Metals at High Pressures and Strain Rates	$0	$29,870	$29,870	3/30/2016	9/30/2018	
16-ERD-045	HDRScope-The High Dynamic-Range Oscilloscope	$0	$369,520	$369,520	2/26/2016	2/25/2019	
16-ERD-047	Parallel Two-Photon Polymerization for Sub-Micrometer Additive Manufacturing	$0	$656,810	$656,810	3/14/2016	3/13/2019	
16-ERD-049	Laser Beam Propagation Through Deep Turbulence	$0	$1,577,630	$1,577,630	5/9/2016	5/8/2019	
16-ERD-051	Optimizing Engineered Flow-Through Electrodes for Energy Applications	$0	$673,000	$673,000	5/10/2016	5/9/2019	
16-LW-022	Extreme Nonlinear Optics of Plasmas	$0	$90,920	$90,920	11/4/2015	9/30/2018	
16-SI-001	The New Frontier of Nuclear Science: Nuclear Reactions and Radiochemistry at the National Ignition Facility	$0	$1,631,210	$1,631,210	10/1/2015	9/30/2018	
16-SI-002	Forensic Science of Genetically Variant Peptides	$0	$1,618,080	$1,618,080	10/1/2015	9/30/2018	
16-SI-003	Fabrication of Functionally Graded Optical Components Using Additive Manufacturing	$0	$1,813,730	$1,813,730	10/1/2015	9/30/2018	
16-SI-004	Enhanced Coherence for Quantum Sensing and Simulation	$0	$2,197,480	$2,197,480	10/1/2015	9/30/2018	
17-ERD-001	Uncovering the Origins of the Solar System with Cosmochemical Forensics	$0	$449,680	$449,680	10/1/2016	9/30/2019	
17-ERD-002	The Origins of Matter on Near-Exascale Supercomputing	$0	$239,580	$239,580	10/1/2016	9/30/2019	
17-ERD-003	Enhanced Surface Laser-Damage Resistance of Nonlinear Crystals	$0	$466,560	$466,560	10/1/2016	9/30/2019	
17-ERD-004	Positioning, Navigation, and Timing with High-Accuracy Astrometry	$0	$341,420	$341,420	10/1/2016	9/30/2019	
17-ERD-005	Science of Finishing of Novel Optical Materials	$0	$628,340	$628,340	10/1/2016	9/30/2019	
17-ERD-006	Control of Superconducting Quantum Circuits	$0	$318,670	$318,670	10/1/2016	9/30/2019	
17-ERD-009	High-Dimensional Spectral-Sampling Techniques	$0	$329,230	$329,230	11/14/2016	9/30/2019	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
17-ERD-010	Exploring Laser-Produced Relativistic Pair Plasma Jets	$0	$445,630	$445,630	1/9/2017	4/8/2020	LDRD is being suspended for 3 months waiting for a critical piece of equipment to be fixed (this fix is to be completed by the end of Dec, 2018). Expected End Date changed to 4/8/20.
17-ERD-011	Characterizing Carbon Nucleation in Shocked Energetic Materials	$0	$267,100	$267,100	10/1/2016	9/30/2019	
17-ERD-013	Engineering a Therapeutic Microbe for Infection-Site Delivery of Encapsulated Antimicrobial Peptides	$0	$324,340	$324,340	11/15/2016	9/30/2019	
17-ERD-014	Kinetics of Incipient Stages of Phase Transitions	$0	$444,140	$444,140	10/24/2016	9/30/2019	
17-ERD-015	Fiber-Optic Acoustic Sensors for Geophysical Applications	$0	$533,000	$533,000	10/1/2016	9/30/2019	
17-ERD-016	An Alternative Rare-Event Detector	$0	$323,270	$323,270	10/1/2016	9/30/2019	
17-ERD-017	Fullerene-Grafted Graphene as an Electrical Energy Storage Material	$0	$318,280	$318,280	10/1/2016	9/30/2019	
17-ERD-019	Synthetic Biology and Computational Modeling for Prediction of Viral Virulence	$0	$440,780	$440,780	10/1/2016	9/30/2019	
17-ERD-020	Understanding Plasma Divertor Detachment in Fusion Power Reactors	$0	$414,970	$414,970	10/1/2016	9/30/2019	
17-ERD-022	Probabilistic Modeling for Nuclear Fission and Heavy-Ion Collisions	$0	$356,220	$356,220	10/1/2016	9/30/2019	
17-ERD-023	Detecting Data-Races in High-Performance Computing	$0	$345,180	$345,180	10/1/2016	9/30/2019	
17-ERD-024	Simulation of Biased Random Walks in an Asynchronous Graph Framework	$0	$677,890	$677,890	10/1/2016	9/30/2019	
17-ERD-025	Effects of Pressure-Induced Ionization Potential Depression on Material Properties	$0	$338,520	$338,520	10/1/2016	9/30/2019	
17-ERD-026	Projection-Based Model Reduction with Applications in Transport and Hydrodynamics Simulation	$0	$486,340	$486,340	10/1/2016	9/30/2019	
17-ERD-027	Effects of Magnetic Fields on Transport in Laser-Driven Nonequilibrium Plasmas	$0	$284,460	$284,460	10/1/2016	9/30/2019	
17-ERD-029	Understanding Material Strength Variabilities and Uncertainties for Component Qualification	$0	$437,010	$437,010	3/23/2017	3/22/2020	
17-ERD-030	Next-Generation Search for Solar Axion Dark Matter with the International Axion Observatory	$0	$175,660	$175,660	10/1/2016	9/30/2019	
17-ERD-031	Microbial Characterization of Combat-Patient Wounds to Improve Healing	$0	$459,730	$459,730	3/21/2017	3/20/2020	
17-ERD-032	The Design of a Solid-State Streak Detector	$0	$537,830	$537,830	10/31/2016	9/30/2019	
17-ERD-033	Technologies for High-Energy, Short-Pulse Laser Systems Beyond the Kilowatt Barrier	$0	$1,417,490	$1,417,490	10/1/2016	9/30/2019	
17-ERD-034	Optically Safer, Power-Scalable Laser Systems for Defense Applications	$0	$559,880	$559,880	10/1/2016	9/30/2019	
17-ERD-035	Multiple-Rate Integrators for Differential Equations	$0	$326,070	$326,070	10/1/2016	9/30/2019	
17-ERD-036	Learning Interactions in Complex Biological Systems	$0	$894,520	$894,520	10/1/2016	9/30/2019	
17-ERD-037	Rapid Closed-Loop Control of Additive Manufacturing with Machine Learning	$0	$327,790	$327,790	11/30/2016	11/29/2019	
17-ERD-038	Investigation of Ultrahigh-Pressure Phase Transitions in Metals with a Toroidal Diamond Anvil Cell	$0	$372,290	$372,290	10/1/2016	9/30/2019	
17-ERD-039	A Short-Pulse, Laser-Driven Particle Beam Capability	$0	$621,590	$621,590	10/1/2016	9/30/2019	
17-ERD-040	Quantum Levitation of Fuel Capsules for Inertial-Confinement Fusion	$0	$456,470	$456,470	10/1/2016	9/30/2019	
17-ERD-041	Modeling Thermal and Quantum Magnetic Fluctuations in Correlated Materials	$0	$253,450	$253,450	10/1/2016	9/30/2019	
17-ERD-042	In Situ Diagnostics for Accelerated Fabrication and Manufacturing of Advanced Materials	$0	$392,460	$392,460	3/20/2017	3/19/2020	
17-ERD-043	Computational Design of Broadly Neutralizing Vaccines for Highly Mutable Pathogens	$0	$526,810	$526,810	10/1/2016	9/30/2019	
17-ERD-045	Probabilistic Predictions and Uncertainty Estimation for Radiological and Nuclear Effects Modeling	$0	$336,820	$336,820	4/3/2017	4/2/2020	
17-ERD-046	Design and Optimization of Compact Multi-Mission Telescopes	$0	$319,230	$319,230	10/1/2016	9/30/2019	
17-ERD-047	Electrodeposition of Gradient-Density Metal Films from Ionic Liquids	$0	$389,260	$389,260	10/1/2016	9/30/2019	
17-ERD-048	Film Growth Dynamics During Pulsed Sputter Deposition	$0	$399,820	$399,820	10/1/2016	9/30/2019	
17-ERD-050	A Diamond Total-Internal-Reflection Photoconductive Switch	$0	$409,010	$409,010	10/1/2016	9/30/2019	
17-ERD-052	Integrating Climate Simulations and Paleontology Data to Constrain California Drought Risks	$0	$514,450	$514,450	10/1/2016	9/30/2019	
17-ERD-054	Three-Dimensional Bio-Printed Microenvironments for Studying Cancer Metastasis	$0	$528,620	$528,620	10/1/2016	9/30/2019	
17-ERD-056	Advanced Laser Diode Packaging	$0	$276,510	$276,510	3/21/2017	9/30/2018	
17-ERD-059	Measuring Atmospheric Gas Using Small Satellites	$0	$360,260	$360,260	10/1/2016	9/30/2019	
17-ERD-060	Microphysics Studies of Hohlraum Dynamics	$0	$163,900	$163,900	10/1/2016	9/30/2019	
17-ERD-063	Advanced Adaptive Optics Algorithms for Astronomical and X-ray Applications	$0	$17,150	$17,150	11/10/2016	10/31/2017	
17-ERD-069	New Framework to Prevent Catastrophic Damage to Laser Diodes	$0	$818,280	$818,280	2/16/2017	9/30/2019	
17-ERD-072	An Optical Interferometry Diagnostic for Hohlraum Plasma Characterization Experiments on the National Ignition Facility	$0	$214,620	$214,620	3/7/2017	9/30/2018	
17-ERD-075	High-Pressure Thermal Conductivity of Iron	$0	$138,860	$138,860	2/22/2017	9/30/2018	
17-ERD-076	Exploring Laser Directed-Energy Lethality and Vulnerability	$0	$337,010	$337,010	3/3/2017	9/30/2018	
17-ERD-079	Study of Iron K-Alpha Spectra in a Compact X-Ray Atmosphere	$0	$103,800	$103,800	3/9/2017	9/30/2018	
17-ERD-081	Simulations of Interpenetrating Plasmas	$0	$557,570	$557,570	3/27/2017	3/26/2020	
17-ERD-084	Measuring the Asymptotic Behavior of Self-Generated Magnetic Fields in a Hohlraum Geometry	$0	$257,700	$257,700	3/10/2017	9/30/2018	
17-ERD-085	Metallic Helium at Extreme Density Inside Giant Planets and White Dwarf Stars	$0	$82,270	$82,270	3/2/2017	9/30/2018	
17-ERD-086	Hybrid Drive on the National Ignition Facility	$0	$70,660	$70,660	2/17/2017	9/30/2018	
17-ERD-088	Probing the Interface Stability of Implosions	$0	$110,900	$110,900	3/15/2017	9/30/2018	
17-ERD-091	Numerical Simulations of Dust-Grain Collisions with Interstellar Spacecraft	$0	$10,930	$10,930	2/21/2017	9/30/2018	
17-ERD-096	Real-Time Decision Making in Swarm Situations Using Belief Networks	$0	$203,960	$203,960	3/2/2017	9/30/2018	
17-ERD-099	Laser Management to Minimize Absorption on Optical Surfaces of Diode-Pumped Advectively Cooled Gas Lasers	$0	$504,450	$504,450	2/16/2017	9/30/2019	
17-ERD-101	Robust Decentralized Signal Processing and Distributed Control of Autonomous Sensor Networks	$0	$744,030	$744,030	2/16/2017	9/30/2019	
17-ERD-105	A Compact High-Power, Radio-Frequency Directed-Energy Source	$0	$281,540	$281,540	3/2/2017	9/30/2018	
17-ERD-109	A High-Fluence, High-Energy X-Ray Source Using Laser Plasma Instabilities	$0	$64,170	$64,170	3/2/2017	9/30/2018	
17-ERD-110	Measuring Astrophysically Relevant Reaction Rates in a High-Energy-Density Laboratory	$0	$133,420	$133,420	3/7/2017	9/30/2018	
17-ERD-114	Planar Ceramic Light Guides for Solar Concentrators and Laser Amplifiers	$0	$58,460	$58,460	1/18/2017	1/17/2018	
17-ERD-115	Detection and Attribution of Climate-Driven Impacts on Crop Yields	$0	$54,710	$54,710	1/18/2017	9/30/2018	
17-ERD-117	A Quantitative Methodology for Measuring Cyber Risk to Critical Infrastructure	$0	$520,590	$520,590	6/19/2017	6/18/2020	
17-ERD-118	Foams in Hohlraums	$0	$607,320	$607,320	6/22/2017	6/21/2020	
17-ERD-119	Next-Generation Hohlraums for High Coupling Efficiency	$0	$795,430	$795,430	5/26/2017	5/25/2020	
17-ERD-120	A Search for Intermediate-Mass Black Hole Dark Matter	$0	$370,230	$370,230	5/26/2017	5/25/2020	
17-ERD-121	Engineered and Instrumented Three-Dimensional Tumor-Immune Model System	$0	$1,168,810	$1,168,810	5/25/2017	9/30/2018	
17-ERD-122	ARCHER: Advanced Radiographic Capability High Energy and Resolution	$0	$233,920	$233,920	7/17/2017	9/30/2018	
17-FS-007	Material Logic - This project will explore the feasibility of additively manufacturing microscale mechanical logic gates (the essential components of digital circuits that operate in binary logic) with applications to materials that can perform computations.	$0	$119,420	$119,420	5/4/2017	5/3/2018	
17-FS-008	Optimizing Application Performance in Multi-Constraint Computing Environments	$0	$17,920	$17,920	1/9/2017	1/8/2018	
17-FS-012	Feasibility of Low-Energy Nuclear Physics Research Using LLNL Capabilities and Soreq Applied Research Accelerator Facility Beams	$0	$39,040	$39,040	7/7/2017	7/6/2018	
17-FS-027	Printed Biocatalysts for Natural Gas Upgrading	$0	$25,110	$25,110	4/3/2017	4/2/2018	
17-FS-030	Agile, Compact Monolithic Beam Director	$0	$54,660	$54,660	2/22/2017	2/21/2018	
17-FS-031	Thermal Conductivity Measurements in Convergent Geometry	$0	$62,110	$62,110	3/3/2017	3/2/2018	
17-FS-035	Plasmonic Control of Short Pulses in Optical Fibers	$0	$86,980	$86,980	4/3/2017	4/2/2018	
17-FS-037	Exploring a New Option for Improving Detection of Highly Enriched Uranium	$0	$132,780	$132,780	8/10/2017	8/10/2018	
17-LW-006	Nanometer-Particle Colloid Capsule Composites	$0	$264,910	$264,910	10/1/2016	9/30/2018	
17-LW-009	Unraveling Force Chains and Failure in Granular Materials	$0	$175,640	$175,640	10/1/2016	9/30/2018	
17-LW-012	Discovering Phase Behavior of Materials Interfaces with Evolutionary Algorithms	$0	$302,790	$302,790	10/1/2016	9/30/2018	
17-LW-013	Hierarchical Nanometer-Scale Porous Copper Flow-Through Electrodes for Efficient Carbon Dioxide Reduction	$0	$263,220	$263,220	10/1/2016	9/30/2018	
17-LW-020	Modernizing the Fission Basis	$0	$265,730	$265,730	10/1/2016	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
17-LW-021	Real-Time Exhaled Breath Analysis for Biosecurity and Biomedicine	$0	$285,690	$285,690	10/1/2016	9/30/2018	
17-LW-029	Improving Subsurface Fluid Characterization by Coupling Seismic and Electromagnetic Phenomena	$0	$258,460	$258,460	10/1/2016	9/30/2018	
17-LW-035	Development of Integrated Systems for Discovering the Chemical Properties of the Heaviest Elements	$0	$224,520	$224,520	10/1/2016	9/30/2018	
17-LW-038	Investigating the Role of Innate Immunity in Viral Encephalitis Caused by Rift Valley Fever Virus	$0	$289,810	$289,810	10/1/2016	9/30/2019	
17-LW-044	Event-by-Event Determination of Antineutrino Direction	$0	$271,930	$271,930	10/1/2016	9/30/2018	
17-LW-051	Nanometer-Scale, Particle-Based Immunotherapy for Cancer Treatment	$0	$283,170	$283,170	10/1/2016	9/30/2018	
17-SI-001	Advanced Multilayer Systems for National Security	$0	$1,576,290	$1,576,290	10/1/2016	9/30/2019	
17-SI-002	An Investigational Platform of the Human Brain for Understanding Complex Neural Function	$0	$1,796,950	$1,796,950	10/1/2016	9/30/2019	
17-SI-003	Large-Scale Multimodal Deep Learning for Nuclear Nonproliferation Analysis	$0	$2,176,230	$2,176,230	10/1/2016	9/30/2019	
17-SI-004	Variable Precision Computing	$0	$1,606,620	$1,606,620	10/1/2016	9/30/2019	
17-SI-005	Computational Design Automation	$0	$2,037,140	$2,037,140	10/1/2016	9/30/2019	
18-ERD-001	Accurate Temperature Determination from X-Ray Diffraction and Extended X-Ray Absorption Fine Structure Measurements	$0	$341,560	$341,560	2/1/2018	1/31/2021	
18-ERD-002	High-Order Finite Elements for Thermal Radiative Transfer on Curved Meshes	$0	$460,940	$460,940	10/1/2017	9/29/2020	
18-ERD-003	Next-Generation Debris Diagnostics	$0	$651,350	$651,350	10/1/2017	9/29/2020	
18-ERD-004	Functional Photoresists for Energy Applications	$0	$918,870	$918,870	10/1/2017	9/29/2020	
18-ERD-005	Anti-Reflective Meta-Surfaces for High-Power Lasers	$0	$546,140	$546,140	10/1/2017	9/29/2020	
18-ERD-006	XPlacer: Extensible and Portable Optimizations of Data Placement in Memory	$0	$608,040	$608,040	10/1/2017	9/29/2020	
18-ERD-007	Simulating Magnetized Particle Dynamics in Z-Pinch Plasmas	$0	$360,890	$360,890	10/1/2017	9/29/2020	
18-ERD-008	Quantifying Uncertainties of Microscopic Nuclear Theories	$0	$213,610	$213,610	10/1/2017	9/29/2020	
18-ERD-010	A Design Platform for Electrochemical Conversion of Carbon Dioxide	$0	$599,380	$599,380	10/1/2017	9/30/2018	
18-ERD-011	Longitudinal Monitoring of Ribonucleic Acid Content of a Live Cell with a Nanotube Pore Interface	$0	$381,000	$381,000	10/1/2017	9/29/2020	
18-ERD-012	Probing Liquid Phases and f-Electron Systems at the Dynamic Compression Sector	$0	$445,980	$445,980	10/1/2017	9/29/2020	
18-ERD-013	Developing Photonuclear Experimental Capabilities for Nuclear Science and Security	$0	$253,210	$253,210	10/1/2017	9/29/2020	
18-ERD-014	X-Ray Optics Solutions for Studying Mesoscale Science	$0	$449,890	$449,890	1/4/2018	1/3/2021	
18-ERD-015	Direct Measurement of Mass-Temperature Distributions in the Core of Implosions on the National Ignition Facility	$0	$403,660	$403,660	10/1/2017	9/29/2020	
18-ERD-016	Pioneering Stable Isotope Signatures of Nuclear Proliferation	$0	$559,290	$559,290	10/1/2017	9/29/2020	
18-ERD-017	Deep Multitask Learning for Predictive Oncology	$0	$577,670	$577,670	10/1/2017	9/29/2020	
18-ERD-021	Methods for Explainable Artificial Intelligence	$0	$276,380	$276,380	11/13/2017	11/12/2020	
18-ERD-024	Selective Removal of Ions from Aqueous Solutions	$0	$479,780	$479,780	10/1/2017	9/29/2020	
18-ERD-025	Integration of Quantification of Margins and Uncertainties Methodology into Parallel Discrete Event Simulator Framework	$0	$353,110	$353,110	10/1/2017	9/29/2020	
18-ERD-027	Algebraic Multigrid Preconditioners for Scalable Simulation of Reservoir Geomechanics and Multiphase Flow	$0	$564,430	$564,430	10/1/2017	9/29/2020	
18-ERD-028	The Next Breakthroughs in Neutrino Physics - Explore detection schemes and a novel xenon production technique for use in next-generation experiments to uncover the underlying physics behind rare and subtle neutrino interactions. This research will have applications in nuclear reactor monitoring projects, forensics detection technology, and cross-section measurements relevant to national goals to reduce global nuclear security threats.	$0	$622,370	$622,370	10/1/2017	9/29/2020	
18-ERD-029	Arbitrary Control and Characterization of Laser Waveforms and Interactions at Picosecond Resolution over Long Record Lengths	$0	$401,780	$401,780	10/1/2017	9/29/2020	
18-ERD-031	Quantum Non-Equilibrium Dynamics of Electronic Transport in Nonlinear Regimes	$0	$471,570	$471,570	10/1/2017	9/29/2020	
18-ERD-032	Porous Metals via Ice Templating	$0	$626,190	$626,190	10/1/2017	9/29/2020	
18-ERD-033	Pressure Ionization in Ultra-High-Density Plasmas	$0	$329,950	$329,950	10/1/2017	9/29/2020	
18-ERD-034	Construction of Genetic Sense-and-Respond Modules to Detect Viral Infection	$0	$511,010	$511,010	10/1/2017	9/29/2020	
18-ERD-035	A Computational Approach to Improve Prediction of Off-Target Drug Binding Using Membrane Bilayer Effects	$0	$522,170	$522,170	10/1/2017	9/29/2020	
18-ERD-038	Energy Scaling of Thin-Disk Lasers	$0	$427,880	$427,880	10/1/2017	9/29/2020	
18-ERD-039	Predictive Modeling of Correlated Noise in Superconducting Circuits	$0	$405,820	$405,820	10/1/2017	9/29/2020	
18-ERD-041	Stable Isotope Probing and Viromics: Quantifying Virus-Host and Carbon Cycling Dynamics in Soil with Isotope-Targeted Metagenomics	$0	$399,440	$399,440	10/1/2017	9/29/2020	
18-ERD-042	Optical Interconnect for High-Density Neural Signals	$0	$283,270	$283,270	10/1/2017	9/29/2020	
18-ERD-044	Detection of Upwind Pathogens Using Aircraft and Ground Stations	$0	$205,340	$205,340	12/14/2017	9/30/2019	
18-ERD-045	A Handheld Medical Diagnostic Device for Harsh Environments	$0	$372,860	$372,860	11/27/2017	9/30/2019	
18-ERD-046	Plasma Photonics: Manipulating Light Using Plasmas	$0	$200,650	$200,650	1/9/2018	1/8/2021	
18-ERD-047	Study of Kinetic Plasma Dynamics and Yield Degradation in Inertial Confinement Fusion	$0	$91,390	$91,390	12/14/2017	9/30/2018	
18-ERD-048	High-Fidelity Kinetic Modeling of Plasmas in Z-Pinch and Pulsed-Power Configurations	$0	$148,570	$148,570	12/14/2017	9/30/2019	
18-ERD-049	Modeling Nuclear Cloud Rise and Fallout in Complex Environments	$0	$174,600	$174,600	2/7/2018	2/6/2021	
18-ERD-050	Improving Density Functional Theory for Warm Dense Matter	$0	$102,040	$102,040	12/18/2017	9/30/2018	
18-ERD-051	Dependency Resolution for High-Performance Computing Software	$0	$82,150	$82,150	12/18/2017	9/30/2018	
18-ERD-052	Flash X-Ray Computed Tomography for Three-Dimensional Characterization of Explosive Performance	$0	$461,550	$461,550	2/21/2018	2/20/2021	
18-ERD-053	The Development of High-Order Interface Tracking Schemes for the Simulation of Multiphase Flows	$0	$115,700	$115,700	12/20/2017	9/30/2020	
18-ERD-054	Advancing Measurements and Understanding of the Rate and Structure of Atmospheric Warming	$0	$154,650	$154,650	12/20/2017	9/30/2020	
18-ERD-055	Electron Energy Loss Spectroscopy of Liquids at Liquid-Solid Interfaces	$0	$62,110	$62,110	12/20/2017	9/30/2018	
18-ERD-056	Emerging Radiography and Potential Diagnostic Applications	$0	$113,980	$113,980	1/17/2018	9/30/2018	
18-ERD-057	Influence of Process Parameters and Alloy Composition on Crack Mitigation in Selective Laser Melting	$0	$142,590	$142,590	1/29/2018	9/30/2020	
18-ERD-058	Laying the Foundation for a Predictive Theory of Electroweak Nuclear Phenomena	$0	$120,010	$120,010	1/29/2018	9/30/2019	
18-ERD-059	Exploring Deuterium-Tritium Gas-Filled Hohlraums as a High-Yield Neutron Source	$0	$41,100	$41,100	3/14/2018	9/30/2019	
18-ERD-060	Metal Ejecta: Transport, Interaction, and Recollection	$0	$117,540	$117,540	4/18/2018	4/17/2021	
18-ERD-061	Defining the Direction of Nuclear-Plasma Interaction Research at the National Ignition Facility	$0	$90,460	$90,460	3/27/2018	3/26/2019	
18-ERD-062	Bioprinting Breast Cancer In Situ to Study Cell Communication in Disease Progression	$0	$63,720	$63,720	6/6/2018	6/5/2021	
18-ERD-063	Imaging Dynamics of Defects Far from Equilibrium	$0	$50,180	$50,180	7/27/2018	6/30/2021	
18-FS-001	Carbons with Designed Chemistry and Porosity	$0	$152,970	$152,970	3/19/2018	9/30/2018	
18-FS-002	Flexible Nondestructive Inspection for Multilayer Metallic Structures	$0	$106,310	$106,310	3/19/2018	9/30/2018	
18-FS-003	Bridging the Material Modeling Gap Between Research and Design	$0	$13,340	$13,340	1/24/2018	7/18/2018	
18-FS-004	Additive Manufacturing of Post-Detonation Surrogate Debris Reference Materials	$0	$94,060	$94,060	1/24/2018	1/23/2019	
18-FS-006	Long-Term Biomarkers of Chemical Agent Exposure	$0	$106,150	$106,150	2/1/2018	9/30/2018	
18-FS-009	Brain Connectomics: Opportunities for High-Performance Computing	$0	$115,090	$115,090	3/19/2018	1/31/2019	
18-FS-010	Exploratory Design Study Towards the First Plasma-Electron Screening Experiment	$0	$131,600	$131,600	10/1/2017	9/30/2018	
18-FS-011	One-Step Drop Generation of Low-Density Foam Shells	$0	$174,030	$174,030	10/1/2017	9/30/2018	
18-FS-012	Using Direct Ink Writing to Make a Three-Dimensional Electromagnet	$0	$84,370	$84,370	3/19/2018	9/30/2018	
18-FS-014	Machine-Based Quantification of Satellite Image Quality	$0	$125,880	$125,880	10/1/2017	9/30/2018	
18-FS-015	New Approaches for Manufacturing and Evaluating Novel Bio-Inspired Materials	$0	$35,670	$35,670	10/1/2017	9/30/2018	
18-FS-016	Beyond Binary Reactions: A Generalized Microscopic R-Matrix Theory with Two- and Three-Particle Asymptotic Configurations	$0	$77,760	$77,760	10/1/2017	9/30/2018	
18-FS-017	Exploring the Feasibility of Using Corona Fusion Targets for Studying Plasma Interpenetration and Electron-Ion Equilibration	$0	$101,590	$101,590	10/1/2017	9/30/2018	
18-FS-018	Compressed Numerics to Reduce Data Movement in Numerical Simulations	$0	$106,450	$106,450	10/1/2017	9/30/2018	
18-FS-019	Novel Methods for Predicting Properties of Complex Reactive Solid Interfaces	$0	$78,570	$78,570	10/1/2017	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
18-FS-020	Exploring Growth Rate and Pathogenicity in Pathogens	$0	$69,790	$69,790	10/10/2017	9/30/2018	
18-FS-021	Developing Models of High-Mass Nuclear Events for Detection and Forensics	$0	$147,860	$147,860	1/3/2018	9/30/2018	
18-FS-023	Experimental Determination of the Uranium-239 Neutron Capture Reaction by Measurement of Uranium-240 by Accelerator Mass Spectrometry	$0	$122,870	$122,870	1/16/2018	1/15/2019	
18-FS-024	Determining the Rate of Natural Carbonate Precipitation Using Bomb-Pulse Radiocarbon Dating	$0	$150,600	$150,600	2/22/2018	9/30/2018	
18-FS-026	Development of a Low-Cost High-Throughput Ejecta Drive	$0	$51,390	$51,390	1/16/2018	1/15/2019	
18-FS-027	Laser-Driven Megavolt X-Ray and Neutron Source Optimization	$0	$174,550	$174,550	1/16/2018	9/30/2018	
18-FS-030	Enhanced Removal of Inorganic Carbon from Seawater: A Carbon Mitigation Feasibility Study	$0	$147,830	$147,830	2/21/2018	9/30/2018	
18-FS-031	Exploring the Use of Cell Wall Binding Domains to Purify Gram-Negative Bacteria from Bodily Fluids	$0	$148,790	$148,790	2/6/2018	9/30/2018	
18-FS-032	Solid Nanoadhesives for Precision Assembly	$0	$126,230	$126,230	3/6/2018	9/30/2018	
18-FS-034	Developing a Carbon Model for the U.S. Economy	$0	$142,700	$142,700	2/21/2018	9/30/2018	
18-FS-035	Vapor-Phase Spectroscopy of High-Explosives Chemistry with Tritium and Depleted Uranium	$0	$120,340	$120,340	3/19/2018	9/30/2018	
18-FS-036	Engineering a Quantum Methuselah Using Phononic Band Gaps	$0	$126,630	$126,630	3/14/2018	3/13/2019	
18-FS-037	An Adaptable Network-Based Method for Bonding Plastics	$0	$78,100	$78,100	3/6/2018	9/30/2018	
18-FS-038	Multiscale Model for Chemical Degradation of Materials	$0	$102,980	$102,980	3/6/2018	3/5/2019	
18-FS-039	Short-Pulse Laser Ablation of Energetic Materials for Threat Object Interrogation	$0	$116,850	$116,850	2/15/2018	2/14/2019	
18-FS-040	Wire-Arc Additive Manufacturing for Reactive Metals	$0	$116,540	$116,540	2/28/2018	9/30/2018	
18-FS-041	Micro-Optical Gas Sensors	$0	$172,570	$172,570	3/14/2018	9/30/2018	
18-FS-045	Feasibility of Predicting the Characteristics of the Ultraviolet, Visible, and Infrared Emissions from a Nuclear Explosion	$0	$79,760	$79,760	7/23/2018	9/30/2018	
18-LW-003	Construction of Solar Cells from Colloidal Nanocrystals through Electrophoretic Deposition	$0	$285,830	$285,830	10/1/2017	9/30/2019	
18-LW-022	Directly Probing Spin Fluctuations in Quantum Spin Liquids with X-Ray Free Electron Lasers	$0	$225,210	$225,210	10/1/2017	9/30/2019	
18-LW-036	The Mechanochemical Genesis of Prebiotics	$0	$274,060	$274,060	10/1/2017	9/30/2019	
18-LW-037	Innate Persistence of Human Immune Memory T Cells	$0	$277,720	$277,720	10/1/2017	9/30/2019	
18-LW-038	Towards the World's First Nuclear Clock	$0	$315,490	$315,490	10/1/2017	9/30/2019	
18-LW-039	Rapid Detection of Candidates for Vaccines Against Biothreat Agents	$0	$187,540	$187,540	10/1/2017	9/30/2019	
18-LW-046	Catching Villains: Finding Single Cells Responsible for Cancer Drug Resistance and Metastasis	$0	$275,150	$275,150	10/1/2017	9/30/2019	
18-LW-055	Protein Factory on a Chip for Rapid Therapeutics	$0	$271,440	$271,440	10/1/2017	9/30/2019	
18-LW-057	Toward Artificial Neurons: Biomimetic Signal Propagation in Synthetic Nanochannel Systems	$0	$274,250	$274,250	10/1/2017	9/30/2019	
18-LW-061	Probing Photon Fusion for New Physics at the Large Hadron Collider Using Proton Tagging	$0	$291,340	$291,340	10/1/2017	9/30/2019	
18-LW-062	Building a Predictive Fission-Rate Model	$0	$126,970	$126,970	10/1/2017	9/30/2019	
18-LW-063	Metallopolymers as an Emergent Class of Materials for Additive Manufacturing of Graded Density Gold Foams	$0	$261,260	$261,260	10/1/2017	9/30/2019	
18-LW-064	Structure of Ionic Liquids Under Nanoconfinement in Energy Applications	$0	$280,430	$280,430	10/1/2017	9/30/2019	
18-LW-078	A Machine Learning System to Guide Clinical Procedures in Real-Time	$0	$241,090	$241,090	10/1/2017	9/30/2019	
18-SI-001	Developing and Characterizing New Tools for Actinide Processing Science	$0	$2,294,800	$2,294,800	10/1/2017	9/29/2020	
18-SI-002	Learning-Based Predictive Models: A New Approach to Integrating Large-Scale Simulations and Experiments	$0	$2,571,450	$2,571,450	10/1/2017	9/29/2020	
18-SI-003	A New Science-based Paradigm Enabling Microstructure-Tailored Additive Manufacturing of Metals	$0	$2,238,550	$2,238,550	10/1/2017	9/29/2020	
18-SI-004	Unlocking the Mysteries of High-Explosive Science	$0	$1,760,420	$1,760,420	10/1/2017	9/29/2020	
	Total # of Projects for LLNL: 235	**Total Equipment Cost for LLNL: $0**		**Total Other Cost for LLNL: $98,328,160**		**Total Cost for LLNL: $98,328,160**	
NNSS - Nevada National Security Site							
J1701028	Quasielastic plastic flow	$0	$200,665	$200,665	10/1/2017	9/30/2018	
J1701037	X-Ray Phase Contrast Imaging	$0	$492,060	$492,060	10/1/2016	9/30/2019	
J1701038	Single-crystal x-ray spectro-polarimeter	$0	$163,494	$163,494	10/1/2017	9/30/2019	
J1701045	Laser-Generated Ultra-High-Energy Density Plasma	$0	$984	$984	10/1/2014	9/30/2017	
J1701086	Multi-Frame X-Ray imaging using Streak Camera with Patterned Photocathode	$0	$171,122	$171,122	10/1/2015	9/30/2018	
J1701158	Strategic studies in dynamic material response	$0	$455,621	$455,621	10/1/2017	9/30/2020	
J1701195	Enhanced Dynamic Materials Research	$0	$13,284	$13,284	10/1/2014	9/30/2017	
J1702016	A multi-axial time resolved spectroscopic technique	$0	$257,318	$257,318	10/1/2015	9/30/2018	
J1702046	X-ray Doppler Velocimetry	$0	$181,578	$181,578	10/1/2015	9/30/2018	
J1702077	Semiconductor-Based High-Yield X-Ray Photocathode	$0	$183,938	$183,938	10/1/2016	9/30/2019	
J1703067	Dynamic Test Prediction and Characterization	$0	$266,268	$266,268	10/1/2016	9/30/2019	
J1703086	Advanced Algorithms for Nuclear Weapon Performance Analysis	$0	($7,197)	($7,197)	10/1/2015	9/30/2017	
J1703097	Man-Portable Dense Plasma Focus	$0	$264,283	$264,283	10/1/2016	9/30/2019	
J1703137	Gas Gun-Configured Magnetic Flux Compression	$0	$6,400	$6,400	10/1/2016	9/30/2017	
J1703287	Flexible Intelligent Multi-Node Chemical/Biological/Radiological/Nuclear Environment Simulator	$0	$232,244	$232,244	10/1/2016	9/30/2018	
J1703356	Correlation between hot spots and three-dimensional defect structure	$0	$135,467	$135,467	10/1/2015	9/30/2018	
J1703496	Next-Generation Photo-Multiplier Detectors	$0	$327,635	$327,635	10/1/2015	9/30/2018	
J1704027	Algorithm Development for Targeted Isotopes	$0	$193,531	$193,531	10/1/2016	9/30/2019	
J1704047	Enhancements to Rad/Nuke Search Algorithms	$0	$630	$630	10/1/2016	9/30/2017	
J1705027	Gas-Phased Ion-Neutral Interactions of Cerium Ions with Deuterium	$0	$198,352	$198,352	10/1/2016	9/30/2019	
J1705097	Simultaneous Raman and Pyrometric Temperature Measurements	$0	$230,092	$230,092	10/1/2016	9/30/2018	
J1705108	A spectral evaluation of the application of super-resolution imagery	$0	$202,627	$202,627	10/1/2017	9/30/2019	
J1705117	Dynamic Measurement of Chemical Composition/Reaction	$0	$217,224	$217,224	10/1/2016	9/30/2018	
J1705138	Dark-fringe velocimeter for measuring fast transient features in shock waves	$0	$265,936	$265,936	10/1/2017	9/30/2018	
J1705188	Dynamic algorithms for aerial measurements	$0	$241,221	$241,221	10/1/2017	9/30/2018	
J1705237	Large-Area photonic Doppler velocimetry	$0	$3,690	$3,690	10/1/2016	9/30/2017	
J1705247	Transient Radio Frequency and Optical Plasma Signatures	$0	$313,942	$313,942	10/1/2016	9/30/2018	
J1705318	Fast Raman spectroscopy measurements	$0	$218,708	$218,708	10/1/2017	9/30/2018	
J1705388	Improvised chemical device source term determinations	$0	$230,276	$230,276	10/1/2017	9/30/2018	
J1705397	Drone Video Platform	$0	$472,647	$472,647	4/1/2016	9/30/2018	
J1705448	Triggerable mode-locked laser for synchronization with dynamic compression experiments	$0	$119,520	$119,520	10/1/2017	9/30/2018	
J1705786	Red, green, and blue wavefront sensor for turbulence mitigation	$0	($580)	($580)	10/1/2015	9/30/2017	
J1706155	Unmanned Aircraft System for Remote Contour Mapping	$0	$131	$131	10/1/2014	9/30/2017	
J1706158	Real-time modification of a modulated wireless digital bit stream	$0	$275,450	$275,450	10/1/2017	9/30/2018	
J1706186	Silicon Strip Cosmic Muon Detectors for Homeland Security	$0	$519,903	$519,903	10/1/2015	9/30/2018	
J1706248	Adaptive source localization	$0	$171,617	$171,617	10/1/2017	9/30/2018	
J1706287	High-Performance Digital Multichannel Analyzer	$0	$3,087	$3,087	10/1/2016	9/30/2017	
J170FS18	Feasibility Study - Tritiated Laser Targets	$0	$56,737	$56,737	10/1/2017	9/30/2018	
J170FS28	Feasibility Study - Unmanned Aerial System Autonomous Mission and Detector Response	$0	$71,938	$71,938	10/1/2017	9/30/2018	
J170FS57	Feasibility Study - Unmanned Aerial System Programming for Autopilot Simulator	$0	$4,952	$4,952	4/1/2017	9/30/2017	
J170FS67	Feasibility Study - Apollo Gamma Imager	$0	$6,042	$6,042	4/1/2017	9/30/2017	
	Total # of Projects for NNSS : 41	**Total Equipment Cost for NNSS : $0**		**Total Other Cost for NNSS : $7,362,837**		**Total Cost for NNSS : $7,362,837**	
NREL - National Renewable Energy Lab							
0600.10000.02.01.03	Closed Project Crosswalk	$0	$45,939	$45,939	10/1/2017	9/30/2018	
0600.10001.16.01.01	Using Computational Modeling to Engineer Native Enzymes to Produce Shorter Fatty Acids for Fuels	$0	$115,391	$115,391	6/13/2016	6/12/2018	
0600.10001.16.02.01	Enabling Synthetic Ribonucleic Acid Technologies using Thermophiles	$0	$111,033	$111,033	6/6/2016	6/5/2018	
0600.10001.17.01.01	Glycopolymer Forge	$0	$205,706	$205,706	10/1/2016	9/30/2018	
0600.10001.17.03.01	Pilot Plant Testing of the Side-Saddle CoTreatment Concept	$0	$12,646	$12,646	7/1/2017	12/30/2017	
0600.10001.18.40.01	Development of Novel 13-Carbon Nuclear Magnetic Resonance Fluxomic Approaches for Improved Bioproduct Development	$0	$49,271	$49,271	12/15/2017	9/30/2019	
0600.10001.18.41.01	Bioenergetics Relevant Biosensor Systems	$0	$39,537	$39,537	12/15/2017	9/30/2018	
0600.10001.18.42.01	Reductive Acetyl Coenzyme A Bi-cycle for Syngas Bioconversion	$0	$247,290	$247,290	10/1/2017	9/30/2019	
0600.10001.18.43.01	Extracellular Nanoparticle Biosynthesis for Engineering Microbial Electrosynthesis	$0	$51,009	$51,009	12/15/2017	9/30/2018	
0600.10001.18.93.01	Advanced Membrane Science Computation	$0	$45,222	$45,222	5/29/2018	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
0600.10001.18.94.01	Supercharged Enzyme Design to Decrease the Cost of Biofuels and Biochemicals	$0	$25,512	$25,512	5/29/2018	9/30/2018	
0600.10002.18.33.01	Realistic, in-situ Modeling of Premier and Developing Catalysts for the Electrolysis of Water for the Hydrogen Economy	$0	$129,584	$129,584	1/3/2018	1/2/2020	
0600.10003.18.91.01	Next-Generation Materials and Designs for Building Thermal Energy Storage	$0	$19,415	$19,415	6/30/2018	9/30/2018	
0600.10003.18.92.01	Optimized, Precise Thermal Exchange Utilizing Additive Manufacturing Techniques	$0	$19,403	$19,403	6/30/2018	9/30/2018	
0600.10003.18.93.01	Tailored Nanomaterials for Solar Thermochemical Water-Splitting at Dramatically Reduced Solar Concentration	$0	$18,974	$18,974	6/30/2018	9/30/2018	
0600.10004.17.01.01	Uncertainty Quantification in Wind Plant Flow and Wake Loss Models	$0	$164,437	$164,437	5/8/2017	5/7/2019	
0600.10004.17.02.01	Innovative 10 Megawatt Offshore Floating Wind System	$0	$300,757	$300,757	10/1/2016	9/30/2018	
0600.10004.17.03.01	Manufacturing Validation of Wind Turbine Blade Spars	$0	$426,365	$426,365	10/1/2016	9/30/2018	
0600.10004.18.43.01	Innovative Blade Finishing at the Composites Manufacturing Education and Technology Facility: Enabling On-Site Manufacturing	$0	$323,155	$323,155	8/1/2017	9/30/2019	
0600.10004.18.72.01	Reverse Osmosis Membrane Transient Characterization Platform	$0	$15,642	$15,642	4/1/2018	9/30/2018	
0600.10005.16.02.01	Biochemical Production of Bio-Polymer Precursors: New Platform Chemicals for Advanced Materials from Sugars and Lignin	$0	$225,818	$225,818	10/1/2015	9/30/2018	
0600.10005.17.01.01	Accelerating Lignin Valorization with Cell-free Methods	$0	$165,876	$165,876	1/30/2017	1/29/2019	
0600.10005.17.01.02	Development of a High-Throughput, Recombineering System for Use in Diverse, Industrially-Relevant Biocatalysts	$0	$160,342	$160,342	1/30/2017	1/29/2019	
0600.10005.17.02.01	Fundamental Design of Earth-Abundant Metal-Oxide Catalysts	$0	$188,965	$188,965	10/1/2016	9/30/2018	
0600.10005.17.02.02	Atomic Layer Etching and Atomic Layer Deposition to Design Bifunctional Lewis Acid Catalysts for Biomass Transformation	$0	$222,228	$222,228	10/1/2016	9/30/2018	
0600.10005.18.10.01	Electrochemical Transformations to Enable Fuel and Chemical Production from the Carboxylate Platform	$0	$232,406	$232,406	10/1/2017	9/30/2019	
0600.10005.18.11.01	Microbial Interaction Metabolomics to Drive the Algae Nitrogen Economy	$0	$258,104	$258,104	10/1/2017	9/30/2019	
0600.10005.18.11.02	Elucidating the Intracellular Metabolism of White-rot Fungi during Lignin Decay	$0	$237,618	$237,618	10/1/2017	9/30/2019	
0600.10005.18.12.01	Plastics Upcycling	$0	$272,436	$272,436	10/1/2017	9/30/2019	
0600.10005.18.40.01	Tailoring the Active Site for Structure-Sensitive Electrocatalytic Carbon Dioxide Reduction through Nanoscaling, Alloying, and Ligand-Promoted Stabilization	$0	$160,723	$160,723	1/2/2018	9/30/2019	
0600.10005.18.76.01	Electrons for Dinner - The goal of this proposed effort is to determine the feasibility of producing protein via electrochemical approaches using carbon dioxide and atmospheric nitrogen	$0	$101,545	$101,545	3/23/2018	9/30/2018	
0600.10005.18.77.01	Phage-based Deoxyribonucleic Cargo Delivery Platform for Enhanced Strain Engineering	$0	$24,894	$24,894	7/1/2018	9/30/2019	
0600.10007.17.01.02	Creation of an Adaptive Remaining Lifetime Prediction Model of Power Electronics	$0	$315,702	$315,702	10/1/2016	9/30/2018	
0600.10007.17.05.00	Intersection Visibility to Enhance Safety, Mobility, and Energy	$0	$76,025	$76,025	10/1/2016	9/30/2018	
0600.10007.18.16.01	High-Performance and Reliable Packaging for Low-Cost Oxide-Based Power Electronic Devices	$0	$292,238	$292,238	10/1/2017	9/30/2019	
0600.10007.18.75.01	Transportation System Macro-Model: Methodology and Approach Identification	$0	$62,982	$62,982	5/21/2018	9/30/2018	
0600.10007.18.76.01	Electro-Thermal Co-Design for High-Performance Oxide-Based Packaging	$0	$46,055	$46,055	11/15/2017	9/30/2018	
0600.10008.17.01.01	Advanced Power Cycle Efficiency Improvement via Desalination-Enhanced Heat Rejection	$0	$198,523	$198,523	10/1/2016	9/30/2018	
0600.10008.17.01.02	Non-Intrusive Optics to Improve Concentrated Solar Power Performance	$0	$25,184	$25,184	2/1/2017	9/30/2018	
0600.10008.17.02.01	An Integrated Modular Building Systems Chassis for Expanding Technology-Driven Design, Manufacturing and Living	$0	$199,255	$199,255	10/1/2016	9/30/2018	
0600.10008.18.33.01	Combined Thermal Energy Storage & Moisture Control using Salt Hydrates	$0	$24,536	$24,536	8/20/2018	8/19/2020	
0600.10008.18.71.01	Evaluation of Emerging Building Envelope Concepts for Energy Efficiency and Grid Integration	$0	$44,312	$44,312	12/1/2017	9/30/2018	
0600.10009.16.02.02	Developing a New Class of Core-shell Quantum Dots for Luminescent Concentrators	$0	$144,776	$144,776	7/5/2016	7/3/2018	
0600.10009.17.01.01	Direct Write for Self-Assembled Lateral Heterojunction Perovskite Photovoltaics	$0	$234,392	$234,392	10/1/2016	9/30/2018	
0600.10009.17.01.02	Developing Superlattices of Perovskites (Methylammonium Lead Iodide) Containing Lead Quantum Dots	$0	$155,029	$155,029	1/3/2017	1/2/2019	
0600.10009.17.01.03	Doped Silicon Nanocrystals for Photovoltaics	$0	$166,076	$166,076	3/13/2017	3/12/2019	
0600.10009.17.02.01	Synthesis and Characterization of Well-Defined Organic Supramolecular Structures with Size-Dependent Optoelectronic Properties	$0	$167,724	$167,724	5/22/2017	5/21/2019	
0600.10009.17.03.01	Ultrafast Manipulation of Electron Spin for Quantum Computation	$0	$268,952	$268,952	10/1/2016	9/30/2018	
0600.10009.18.11.01	Low Capital Expense, Rapidly Manufactured, Perovskite Tandem Cells with Greater than 30 Percent Efficiency	$0	$256,655	$256,655	10/1/2017	9/30/2019	
0600.10009.18.11.02	Development of a Gradient Solid Electrolyte for All Solid-State Lithium-Ion Batteries	$0	$313,945	$313,945	10/1/2017	9/30/2020	
0600.10009.18.12.01	Carbon Nanotube Electronic Ratchets	$0	$245,355	$245,355	10/1/2017	9/30/2019	
0600.10009.18.12.02	Carbon Nanotube Electrodes for Perovskite Solar Cells	$0	$171,220	$171,220	10/1/2017	9/30/2019	
0600.10009.18.40.01	Redox Activity of Single-Walled Carbon Nanotube-Clostridium Hybrid for Microbial Electrosynthesis	$0	$407,018	$407,018	10/1/2017	9/30/2019	
0600.10009.18.71.01	Lithium-ion Battery Materials Recycling Enabled by Using Curtailed-Electric-Energy Powered Electrochemical Reactions	$0	$33,538	$33,538	1/2/2018	9/30/2018	
0600.10009.18.71.02	Energy Balance and Technoeconomic Analysis of Window-Integrated Photovoltaics	$0	$40,688	$40,688	3/15/2018	9/30/2018	
0600.10010.18.40.02	Autonomous Energy Systems	$0	$908,008	$908,008	1/2/2018	9/30/2020	
0600.10010.18.50.01	Increasing the Security and Resilience of the Electric Power System - Cybersecurity	$0	$476,883	$476,883	1/2/2018	9/30/2019	
0600.10010.18.50.02	Increasing the Security and Resilience of the Electric Power System - Migrogrids	$0	$152,856	$152,856	1/2/2018	9/30/2019	
0600.10010.18.50.03	Increasing the Security and Resilience of the Electric Power System - Value of Resiliency	$0	$251,015	$251,015	1/2/2018	9/30/2019	
0600.10010.90.01.02	Traveling Wave Based Grid Protection Systems	$0	$399	$399	3/1/2018	9/30/2018	
0600.10010.90.02.02	Hardware-in-the-Loop Testing in Integrated Energy Water Systems	$0	$9,854	$9,854	3/1/2018	9/30/2018	
0600.10010.90.02.03	Energy Water Land Benefits of Floating Solar Photovoltaics	$0	$11,276	$11,276	4/1/2018	9/30/2018	
0600.10010.90.02.04	Mixed-Integer Linear Program Techno-Economic Analysis with Optimal Power Flow	$0	$7,283	$7,283	7/1/2018	9/30/2018	
0600.10011.17.03.01	Potential Impacts of Resource Uncertainty on Power System Operations and Planning	$0	$361,658	$361,658	10/1/2016	9/30/2018	
0600.10011.17.04.01	Distributed Optimization and Control of Smart Multi-Energy Districts	$0	$192,679	$192,679	10/1/2016	9/30/2018	
0600.10011.17.04.02	Modeling and Simulation of Trans-active Energy Systems	$0	$81,613	$81,613	5/15/2017	9/30/2018	
0600.10011.18.14.01	Wide-bandgap Modular Architecture for Medium Voltage Energy Conversion in Utility-scale Wind and Solar	$0	$201,950	$201,950	10/1/2017	9/30/2019	
0600.10011.18.15.01	Scalable Forecasting for Improving Grid Efficiency and Resiliency	$0	$255,866	$255,866	10/1/2017	9/30/2019	
0600.10011.18.70.01	Evaluating the Potential Threat that Internet-Connected Smart Devices Pose to the Security of the United States Electric Grid	$0	$43,259	$43,259	6/1/2018	9/30/2018	
0600.10011.18.70.02	Renewable and Distributed Energy Resources Cybersecurity	$0	$32,653	$32,653	6/1/2018	9/30/2018	
0600.10011.18.75.01	Sensor Data-Driven Online Load Modeling	$0	$48,367	$48,367	6/1/2018	9/30/2018	
0600.10012.17.01.01	High-Efficiency Perovskite Photovoltaic Module by Scalable Deposition	$0	$262,224	$262,224	2/1/2017	9/30/2018	
0600.10012.17.02.01	Hydrogen-at-Scale - The objective of this project is to build a strong multi-directorate foundation at the National Renewable Energy Laboratory to support future Hydrogen-at-Scale work, and transform what are currently individual pockets of activity into a more cohesive strategic capability for the future.	$0	$310,527	$310,527	1/2/2017	9/30/2018	
0600.10012.17.02.03	Vapor Phase Deposition of Hybrid Halide Perovskites	$0	$193,339	$193,339	5/17/2017	9/30/2018	
0600.10012.18.40.01	High Performance Perovskites: Nucleating United States Capability in Perovskite Science and Technology	$0	$225,685	$225,685	1/2/2018	9/30/2020	
0600.10012.18.40.02	Advancing Beyond Density Functional Theory Methods and Application to Optoelectronic Perovskites	$0	$280,977	$280,977	1/2/2018	9/30/2019	
0600.10012.18.40.03	Epitaxy and Doping of Gallium Oxide for Future Power Electronic Applications	$0	$115,792	$115,792	1/2/2018	9/30/2018	
0600.10012.18.40.04	Materials Integration	$0	$201,820	$201,820	1/2/2018	9/30/2018	
0600.10012.18.90.01	Principal Investigator Initiated Innovative Idea	$0	$61,021	$61,021	12/1/2017	9/30/2018	
0600.10013.18.73.01	Long-term Performance of Fielded Photovoltaic Battery Storage Systems	$0	$47,002	$47,002	1/2/2018	9/30/2018	
0600.10014.17.01.01	In Operando X-Ray Photoelectron Spectroscopy Studies of Solid-State Lithium-Ion Battery Interfaces	$0	$198,787	$198,787	10/1/2016	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
0600.10014.17.04.01	Gallium Arsenide Bismides for Next Generation Electronics	$0	$151,258	$151,258	10/1/2016	9/30/2018	
0600.10014.17.05.01	Comprehensive Multi-Scale Battery Characterization	$0	$150,740	$150,740	10/1/2016	9/30/2018	
0600.10014.18.11.01	An Architecture to Accelerate Materials Development for Thermal Control	$0	$237,720	$237,720	10/1/2017	9/30/2019	
0600.10014.18.33.01	Precise Deposition of Novel Nitrides: Heteroepitaxial Integration with Existing Nitrides for Property Manipulation	$0	$65,428	$65,428	5/29/2018	5/28/2020	
0600.10014.18.74.01	Novel Power Electronic Materials	$0	$50,225	$50,225	1/2/2018	9/30/2018	
0600.10016.17.02.01	Capacity Expansion Planning for the 21st Century	$0	$398,224	$398,224	10/1/2016	9/30/2018	
0600.10016.17.03.01	Fast Learning for Immersive Engagement in Energy Simulations	$0	$171,060	$171,060	1/2/2017	9/30/2018	
0600.10016.18.44.01	An Integrated Modeling Approach to Representing Complex Energy Systems	$0	$599,098	$599,098	10/1/2017	9/30/2018	
0600.10016.18.73.01	Analyst-Driven Steering of Wind Technology Research and Development Pathways Across Broad Geographic Scales	$0	$73,671	$73,671	3/15/2018	9/30/2018	
0600.10016.18.75.01	Integrating Advanced Reservoir Simulator in Techno-Economic Geothermal Energy Software Tool	$0	$74,587	$74,587	10/1/2017	9/30/2018	
0600.10016.18.76.01	Physics-based and Economic Models: Linking Cadmium Telluride Cell and Module Modeling with the System Advisor Model	$0	$43,159	$43,159	6/6/2018	9/30/2018	
0600.10016.18.91.01	Future of Utility	$0	$4,300	$4,300	6/2/2018	9/30/2018	
0600.10016.18.94.01	Artificial Intelligence and Energy Consumption	$0	$6,578	$6,578	6/2/2018	9/30/2018	
0600.10016.18.95.01	Photovoltaic Recycling	$0	$7,728	$7,728	6/2/2018	9/30/2018	
	Total # of Projects for NREL: 95	**Total Equipment Cost for NREL: $0**		**Total Other Cost for NREL: $15,473,992**		**Total Cost for NREL: $15,473,992**	
ORNL - Oak Ridge National Lab							
7786	Impact of extreme weather events on plant species, competition and ecological function	$0	$110,669	$110,669	10/8/2015	9/30/2018	
7792	Tunable Interfaces for Controlled Complexity	$0	$96,863	$96,863	10/8/2015	9/30/2018	
7795	Probing the Electromechanical Response Mechanism in Nanostructured Ionic Polymers: Towards Rational Design, Tailored Synthesis, and Optimized Properties	$0	$112,612	$112,612	10/8/2015	9/30/2018	
7804	Urban Typologies: Towards an Oak Ridge National Laboratory Urban Information System	$0	$68,866	$68,866	10/8/2015	9/30/2018	
7807	A Scalable, Resilient, and Efficient Data Service for Exascale Computing	$0	$64,473	$64,473	10/8/2015	9/30/2018	
7812	Observing hidden structure underpinning emergent functionality in mesoscale materials	$0	$78,341	$78,341	10/8/2015	9/30/2018	
7825	Understanding Selective Hydrogenation by In situ Neutron Vibrational Spectroscopy	$0	$68,139	$68,139	10/8/2015	9/30/2018	
7832	Fundamental insights into the mechanism of ionic transport in ionic materials	$0	$70,405	$70,405	10/8/2015	9/30/2018	
7836	Fundamental Neutrino Interactions at the Spallation Neutron Source	$0	$83,148	$83,148	10/8/2015	9/30/2018	
7847	Designing and Controlling Ordered Mesocale Tilings and Tessellations	$0	$59,486	$59,486	10/8/2015	9/30/2018	
7852	A virtual testbed for silicon donor quantum bits	$0	$61,323	$61,323	10/8/2015	9/30/2018	
7856	An Experimental and Computational Framework for Directed Succession: Unraveling Cobamide Control of Microbial Community Assembly, Structure and Function	$0	$94,126	$94,126	10/9/2015	9/30/2018	
7857	Real-time Urban Activity Monitoring using Pervasive Sensor Network	$0	$21,286	$21,286	10/9/2015	9/30/2018	
7864	Mini-Apps for Data-Intensive Discovery on Big Data Architectures	$0	$34,162	$34,162	10/9/2015	9/30/2018	
7868	Elucidating the Influence of Reversible Non-Covalent Interactions on Dynamic Properties for Rational Design of Soft Materials	$0	$42,015	$42,015	10/9/2015	9/30/2018	
7886	Advancing additive manufacturing processes through multi-scale characterization using neutron scattering techniques correlated with mesoscale polycrystal deformation simulation	$0	$112,244	$112,244	10/9/2015	9/30/2018	
7890	Positioning and Characterization of Single Dopants	$0	$75,747	$75,747	10/9/2015	9/30/2018	
7918	Ultra-low Cost, Passive Wireless Sensor Networks Enabling Unprecedented Visibility, Monitoring and Control of Buildings, Grid, Energy Extraction/Delivery, and Environment	$0	$67,603	$67,603	10/9/2015	9/30/2018	
7922	Modeling and Simulation of Tokamak Disruptions in International Thermonuclear Experimental Reactor Plasmas	$0	$75,974	$75,974	10/9/2015	9/30/2018	
7938	Rational design of deuterated conjugated polymers with controlled spin-polarized electron transport	$0	$122,949	$122,949	10/9/2015	9/30/2018	
7950	Predicting Propagation Consequences of Perturbations in Synergistically-Interacting Infrastructure Networks	$0	$41,788	$41,788	10/9/2015	9/30/2018	
7970	Room temperature electrochemical activation of Nitrogen	$0	$19,174	$19,174	10/9/2015	9/30/2018	
7998	Integration of Accurate Theoretical/Computational Approaches with Experimental Techniques for the Understanding of Two-Dimensional Layered Nanomaterials	$0	$101,740	$101,740	10/8/2015	9/30/2018	
8018	From Spins to Stars: Informing Explosive Astrophysical Scenarios through Indirect Measurements on Radioactive Nuclei	$0	$78,304	$78,304	7/16/2015	5/25/2018	
8033	Evolution of solvent production in competitive microbial communities	$0	$90,830	$90,830	8/26/2015	7/25/2018	
8046	Preparation of Advanced Hard-Matter Materials through Metal-Organic Framework Templating	$0	$156,737	$156,737	10/8/2015	9/30/2018	
8085	Programming and Usability of Neuromorphic Computing	$0	$138,407	$138,407	11/4/2015	9/30/2018	
8086	Effects of tree mortality on belowground community structure, function, and carbon cycling	$0	$160,800	$160,800	11/4/2015	9/30/2018	
8090	Quantum Information from Ultrafast Time-Frequency Entangled Photons	$0	$137,099	$137,099	11/4/2015	9/30/2018	
8091	Novel Mathematical and Computational Modeling for Maxwell's problems in Dispersive Media	$0	$125,970	$125,970	12/9/2015	9/30/2018	
8174	Geobiology: Chemical interfaces, gradient drivers and mechanisms	$0	$127,620	$127,620	2/4/2016	9/30/2018	
8215	Detector and Source Development for Fundamental Neutron Physics at the Spallation Neutron Source	$0	$165,608	$165,608	5/23/2016	5/22/2019	
8224	Development and Testing of Fiber-Optic Bolometers for Fusion Plasmas	$0	$21,869	$21,869	5/23/2016	2/1/2018	
8235	An Expert System for Automated Modeling of Small-Angle Neutron Scattering Data	$0	$139,523	$139,523	10/4/2016	9/30/2019	
8237	Integrated Computational Environment-Modeling & Analysis for Neutrons	$0	$346,075	$346,075	10/4/2016	9/30/2019	
8241	A design basis for future iron-based superalloys	$0	$354,109	$354,109	10/4/2016	9/30/2019	
8251	Characterization of diazotrophs in the endosphere microbiome of bioenergy crop Sorghum	$0	$333,924	$333,924	10/4/2016	9/30/2019	
8253	Flexible Intelligent Real-time direct current-alternating current grid Emulator	$0	$303,422	$303,422	10/4/2016	9/30/2019	
8264	Toward the Exceptionally Stable Anion Conducting Materials	$0	$400,586	$400,586	10/4/2016	9/30/2019	
8270	Understanding the microbially-driven mechanisms behind the rapid responses of soils to short-term disturbance events that result in large nitrous oxide emission pulses	$0	$328,035	$328,035	10/4/2016	9/30/2019	
8272	Integrating Small-Angle Neutron Scattering with Molecular Simulation to Determine Structural Ensembles of Complex Biological Systems	$0	$257,749	$257,749	10/4/2016	9/30/2019	
8274	Time-of-flight Neutron Imaging of Nuclear Materials	$0	$268,784	$268,784	10/4/2016	9/30/2019	
8277	Understanding High Performance Computing Applications for Evidence-based Co-design	$0	$208,722	$208,722	10/4/2016	9/30/2018	
8291	High-Fidelity Multiphysics Nuclear Reactor Core Simulations of Molten Salt Reactors	$0	$379,283	$379,283	10/4/2016	9/30/2019	
8294	Integrating Multimodal Optical Imaging, Analytics, Neutron Scattering and Ab Initio Calculations to Resolve Interfacial Structure and Ultrafast Dynamics	$0	$396,487	$396,487	10/4/2016	9/30/2019	
8297	Enabling Quantum Acceleration in Scientific High Performance Computing	$0	$227,102	$227,102	10/4/2016	9/30/2018	
8301	Designing and programming exascale memory hierarchies	$0	$298,782	$298,782	10/4/2016	9/30/2018	
8307	Multimodal Chemical Imaging of Nanoscale Transformations Away from Equilibrium	$0	$271,214	$271,214	6/6/2016	9/30/2018	
8309	Impact of Climate Change Drivers on Virome-Microbiome-Plant Host Dynamics in Relation to Nitrogen and Carbon Cycling	$0	$276,954	$276,954	10/4/2016	9/30/2019	
8310	Controlled, Volumetric Combustion Synthesis as an Enabler for the Additive Manufacture of Advanced Engineering Ceramics	$0	$265,951	$265,951	10/4/2016	9/30/2018	
8319	Data Transfer Kit- Enabling Multiscale and Multiphysics Simulations at Exascale	$0	$303,825	$303,825	10/4/2016	9/30/2018	
8321	Genome Wide Association Viriome/Microbiome Analysis	$0	$181,847	$181,847	10/4/2016	9/30/2019	
8339	Energy-Efficient Training Protocol for Scalable Deep Learning	$0	$311,539	$311,539	10/4/2016	9/30/2019	
8347	Dissipation Driven Quantum State Engineering On-Chip	$0	$318,645	$318,645	10/4/2016	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
8350	High-Energy-Density, Organic Radical-Mediated Redox Flow Batteries	$0	$407,297	$407,297	10/4/2016	9/30/2018	
8360	Understanding rheology of fiber reinforced soft matter structural composites: From microscopic structures to macroscopic mechanical properties	$0	$422,731	$422,731	10/4/2016	9/30/2018	
8372	Energy Routing Technology for Automated Building Control	$0	$259,742	$259,742	10/4/2016	9/30/2018	
8381	Next-generation neuromorphic coprocessor power consumption in the beyond exascale era	$0	$277,541	$277,541	10/4/2016	9/30/2018	
8389	Optimizing Measurements for Environmental Model Validation Using Sampling Theory	$0	$238,062	$238,062	10/4/2016	9/30/2018	
8391	Functional polymers as cathodes for electric energy storage applications	$0	$294,854	$294,854	10/4/2016	9/30/2018	
8396	High Mobility Printed Semiconductor Devices Using Magnetic Field Processing	$0	$349,759	$349,759	10/4/2016	9/30/2018	
8397	Fabricating Qubits from Low-Dimensional Materials	$0	$335,670	$335,670	10/4/2016	9/30/2018	
8404	Deep Learning for Automated Feature Discovery to Enhance Cyber Threat Detection	$0	$317,078	$317,078	10/4/2016	9/30/2018	
8420	Developing a Highly Efficient, Multiscale Modeling Framework for Hierarchical Materials	$0	$224,706	$224,706	10/4/2016	9/30/2018	
8423	Bringing the Density Matrix Renormalization Group Scientific Application to Exascale	$0	$263,304	$263,304	10/4/2016	9/30/2018	
8432	A Quantum Interconnect for Matter Quantum Bits Based on Frequency Encoded Photonic Qubits	$0	$350,240	$350,240	10/4/2016	9/30/2018	
8440	Challenges for Analysis and Modeling of Grazing Incidence Neutron Scattering at Pulsed Sources	$0	$223,007	$223,007	10/4/2016	9/30/2018	
8449	Data Analysis Parallel Package Maker - A Lego Set for Big Data Scientists	$0	$281,797	$281,797	10/4/2016	9/30/2018	
8455	Supercomputers to Superalloys	$0	$350,712	$350,712	10/4/2016	9/30/2018	
8458	A system for Rapid Cyber Hypothesis Evolution and Resolution--bringing data analytics to cyber analysts' fingertips	$0	$390,466	$390,466	10/4/2016	9/30/2018	
8460	Research & Development for a One-Ton Neutrinoless Double-Beta Decay Search	$0	$421,144	$421,144	10/4/2016	9/30/2018	
8475	Contributing to transportation sustainability through utilization of connected and automated vehicle technologies	$0	$152,555	$152,555	5/23/2016	11/30/2018	
8481	Multi-index sequential Monte Carlo sampler	$0	$49,581	$49,581	10/4/2016	3/30/2018	
8485	Carbon NanoTubes -Modified Oleophilic Surfaces for Lubricant-Starved Applications	$0	$94,985	$94,985	1/24/2018	5/30/2019	
8497	Direct catalytic conversion of methane to ethanol	$0	$51,688	$51,688	10/4/2016	3/30/2018	
8498	Nanofabrication of Diffraction Holograms for Novel Imaging & Spectroscopy Using Oak Ridge National Laboratory's New monochromated and aberration-corrected-scanning transmission electron microscope	$0	$64,560	$64,560	10/4/2016	3/30/2018	
8503	Structure and Modeling of Time Resolved Polarization Switching in Selected Organic Ferroelectrics	$0	$50,280	$50,280	11/9/2016	3/30/2018	
8505	Merging ecology and materials science to trace environmental energy contamination using biogenic calcium carbonates	$0	$37,618	$37,618	10/4/2016	3/30/2018	
8513	In Situ Closed-Cell Gas-Reaction Technology for Scanning Transmission Electron Microscope Characterization of Reaction Mechanisms in High Temperature Structural Materials	$0	$28,652	$28,652	10/31/2016	3/30/2018	
8522	Exploring thermal transport in nanostructured materials for thermal energy conversion and management	$0	$147,948	$147,948	11/28/2016	9/30/2018	
8529	An approach for diesel-like efficiency from Spark-ignition combustion using market fuels with increased stroke-to-bore ratio and Exhaust Gas Recirculation dilution	$0	$57,827	$57,827	12/2/2016	3/30/2018	
8536	Development of Model-Based Cosmic Ray Muon Tomography with Momentum Measurement for Non Destructive Assessment of Used Nuclear Fuel	$0	$21,251	$21,251	10/18/2016	9/30/2018	
8537	Scalable First Principles Calculations for Materials with Disorder and Defects	$0	$64,177	$64,177	10/24/2016	3/30/2018	
8541	Next Generation Multifunctional Fibers via Embedded Nanomaterials	$0	$148,633	$148,633	11/28/2016	9/30/2018	
8563	Scalable Dimensionality Reduction for Non-negative High Order Tensors	$0	$93,303	$93,303	12/7/2016	3/30/2018	
8578	Use of Coded Apertures as X-Ray Screens	$0	$42,660	$42,660	1/27/2017	6/30/2018	
8585	Development and Application of Computational Methodologies for the Investigation of Soft Matter Molecular and Electronic Structure and Dynamics	$0	$488,509	$488,509	3/30/2017	3/30/2019	
8591	Net-shaping and Additive Manufacturing of Thermoelectrics for Waste Heat Recovery	$0	$70,164	$70,164	2/24/2017	6/30/2018	
8610	Super-resolution reconstruction for Inelastic Neutron Scattering Spectra from Direct Geometry Chopper Spectrometers	$0	$113,095	$113,095	1/27/2017	6/30/2018	
8686	Computational Imaging for Neutron Bragg-Edge Tomography	$0	$174,076	$174,076	2/24/2017	9/30/2019	
8689	Internal Gelation Approach to Hydrothermally Stable Engineered Catalysts	$0	$32,669	$32,669	1/27/2017	6/30/2018	
8707	A Microfluidic Platform for Identifying Radiation/Nuclear Countermeasures for Emergency Situations.	$0	$148,149	$148,149	4/3/2017	7/30/2018	
8708	High resolution validation of next generation turbulent flow models using neutron beams and laser fluorescence in cryogenic Helium	$0	$34,780	$34,780	2/24/2017	7/30/2018	
8710	Investigation of Neptunium Isotope Separation by Liquid-Liquid Extraction	$0	$72,945	$72,945	5/12/2017	8/30/2018	
8711	New Multi-modal Interactive Data Visualization Techniques for Scientific Data Analysis	$0	$84,394	$84,394	5/12/2017	8/30/2018	
8714	Developing Tip Enhanced Raman Spectroscopy Platform for Chemical and Structural Imaging at the Nanoscale	$0	$83,426	$83,426	5/16/2017	8/30/2018	
8716	Self-healing barrier films for vacuum insulation panels	$0	$80,156	$80,156	3/30/2017	7/30/2018	
8727	Additive Manufacturing Of Enhanced Battery Architectures	$0	$103,812	$103,812	5/15/2017	8/30/2018	
8729	Experimental Data Based Combinatorial Kinetic Simulations for Predictions of Enhanced Exhaust Emission Catalysis with Bifunctional Mixed-Bed Systems	$0	$95,377	$95,377	5/12/2017	8/30/2018	
8733	Atomic Force Microscopy Beyond the Standard Quantum Limit	$0	$154,800	$154,800	8/30/2017	1/30/2019	
8734	Novel Carbon Composite Material and Capacitive Deionization Architecture for Desalination of Low Salinity Water Sources	$0	$117,829	$117,829	6/21/2017	9/30/2018	
8735	Biomimetic networks as adaptable neuromorphic circuits	$0	$125,594	$125,594	5/12/2017	8/30/2018	
8743	Novel Materials for Desulfurization of Jet Propellent-8 via Selective Adsorption	$0	$116,414	$116,414	6/21/2017	9/30/2018	
8748	Uncovering Novel States in Quantum Topological Materials by Deep Learning of Electronic Structure Imaging	$0	$146,347	$146,347	6/21/2017	9/30/2018	
8755	Supercomputer-Based Cancer Vaccine Design	$0	$122,682	$122,682	10/3/2017	2/25/2019	
8756	Proof of principle of acoustic-based nondestructive measurement of gas pressure and composition in sealed pressurized containers	$0	$80,908	$80,908	6/21/2017	9/30/2018	
8765	Strategic Hire: Direct simulation of dynamic processes in porous geological systems with explicit pore representation	$0	$160,347	$160,347	6/21/2017	9/30/2019	
8768	An Integrated Systems Biology Approach to Identify Opioid-Induced Shifts in Function of the Gut Microbiome among Lean and Obese Mice Undergoing Systemic Opioid Treatment	$0	$146,495	$146,495	8/30/2017	1/30/2019	
8773	Social and Physical Systems in Urban Environments	$0	$201,387	$201,387	6/23/2017	5/30/2020	
8776	Advanced Numerical Methods for Fracture Modeling	$0	$289,192	$289,192	10/26/2017	9/30/2019	
8777	Cryogenic Component Demonstration for a Neutron Electric Dipole Moment Experiment at the Spallation Neutron Source Based on a Non-magnetic High-Entropy Alloy	$0	$100,757	$100,757	10/3/2017	2/25/2019	
8779	Enabling Advanced In-Pile Instrumentation Using Ultrasonic Additive Manufacturing	$0	$379,238	$379,238	10/26/2017	9/30/2019	
8794	Pre-Exascale Structural Modeling and Drug Discovery Pipeline	$0	$266,095	$266,095	10/26/2017	9/30/2019	
8799	Matrix-Free Algebraic Multigrid Preconditioner	$0	$276,029	$276,029	10/26/2017	9/30/2019	
8811	Smart Grid Transactive Scalable Hybrid Management System	$0	$378,324	$378,324	10/26/2017	9/30/2019	
8817	Fundamental studies of materials degradation in molten chloride salts using targeted corrosion testing, advanced spectroscopy, and thermodynamic modeling	$0	$485,936	$485,936	10/26/2017	9/30/2019	
8819	Accelerating the development of connected and automated vehicles through real-time traffic simulation coupled to an advanced hardware-in-the-loop system	$0	$269,106	$269,106	10/26/2017	9/30/2019	
8824	Portable High-Technetium Wide-angle Spherical Neutron Polarimetry Device - distinguish between nuclear coherent scattering, nuclear spin-incoherent scattering and magnetic scattering in the scattering process.	$0	$418,464	$418,464	10/26/2017	9/30/2019	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
8828	A streamlined strategy for integrated collimator design and sample environment	$0	$262,783	$262,783	10/26/2017	9/30/2019	
8831	A quantitative, systems biology, multi-omic approach to diagnose gynecologic cancers	$0	$444,748	$444,748	10/26/2017	9/30/2019	
8832	Microbial Quantitative Trait Locus Mapping	$0	$321,961	$321,961	10/26/2017	9/30/2019	
8833	Investigating the slow dynamics of materials using neutron spin Larmor labeling techniques	$0	$316,901	$316,901	10/26/2017	9/30/2019	
8843	Hyperspectral Compressive Neutron Lensless Imaging with VISION (Name, not acronym, of a Vibrational Spectrometer at the Spallation Neutron Source) - The beamline at the spallation neutron source uses neutrons to probe molecular vibrations while simultaneously collecting diffraction data. This instrument offers unique advantages over traditional optical vibration spectroscopy, including high isotopic sensitivity and the ability to perform spectroscopy on thick non-transparent samples.	$0	$237,020	$237,020	10/26/2017	9/30/2019	
8858	Obtaining atomistic insights into flexible biomolecular systems by data-driven integration of cryo-electron microscopy, neutron scattering and molecular simulations	$0	$320,549	$320,549	10/26/2017	9/30/2019	
8860	Accelerating end-to-end prediction of physical phenomena by interleaving analytics with multiscale simulations on Exascale architectures	$0	$280,384	$280,384	10/26/2017	9/30/2019	
8866	A platform to identify and model genetic and phenotypic changes in cancer at the single cell level	$0	$319,236	$319,236	10/26/2017	9/30/2019	
8872	Co-evolving plant traits and hydrologic environment within watershed models	$0	$318,955	$318,955	10/26/2017	9/30/2019	
8892	Accelerating Connected and Automated Vehicle Research with Dynamic Wireless Power Transfer	$0	$460,672	$460,672	10/26/2017	9/30/2019	
8896	Deep Modulation: An Expendable Physical Layer for Smart Grid Security	$0	$278,931	$278,931	10/26/2017	9/30/2019	
8898	Operando 4 Dimensional Scanning Transmission Electron Microscopy to Probe Dynamic Chemical Reactivity: Integrated Approach to Understand and Design Functional Interfacial Chemistry	$0	$346,005	$346,005	10/26/2017	9/30/2019	
8910	Detecting Genome Modifications for Plant Biosecurity	$0	$302,551	$302,551	10/26/2017	9/30/2019	
8913	Securing A Time Service For Energy Infrastructure	$0	$297,391	$297,391	10/26/2017	9/30/2018	
8921	Switched Mode Controls for Guaranteeing Resilient Operation of the Smart Grid	$0	$318,410	$318,410	10/26/2017	9/30/2019	
8941	Scalability of Optical Using Machines for Acceleration of Exascale Applications	$0	$294,912	$294,912	10/26/2017	9/30/2019	
8947	An Innovative Integrated Pressure-Temperature-Flow Sensor for Advanced Reactor Applications (Export Controlled Information)	$0	$367,805	$367,805	10/26/2017	9/30/2019	
8949	Leveraging Computational Structure-Function Analyses to Reveal the Hidden Complexity of Biosystems	$0	$364,352	$364,352	10/26/2017	9/30/2019	
8952	Interfacial Thermal Transport: Advanced First Principles Modeling and Ultrafast Thermal Spectroscopy	$0	$348,990	$348,990	10/26/2017	9/30/2019	
8958	A Fully Kinetic Exascale Simulation Capability for Magnetic Fusion Energy	$0	$388,288	$388,288	10/26/2017	9/30/2019	
8980	Lock and Key: Securing genomes against the Clustered Regularly Interspaced Short Palindromic Repeat Associated Protein 9 gene-editing tool	$0	$319,747	$319,747	10/26/2017	9/30/2019	
8981	Scalable Non-linear Unmixing with Physical Constraints for Scientific Data	$0	$355,278	$355,278	10/26/2017	9/30/2019	
8988	Hybrid quantum interfaces for dissipationless charge and spin transport	$0	$455,372	$455,372	10/26/2017	9/30/2019	
9000	Dynamic Chromatic Transforms to Arbitrate Silicon Photonic Networks	$0	$332,739	$332,739	10/26/2017	9/30/2019	
9007	High-throughput functional analysis of microbiomes using aptamer-based biosensors	$0	$346,553	$346,553	10/26/2017	9/30/2019	
9029	Accelerating Stochastic Sampling Methods by On-Line Data Analytics and Machine Learning	$0	$235,948	$235,948	10/26/2017	9/30/2019	
9039	Post-Moore System Simulations for Codesigning Future Programming Models	$0	$249,625	$249,625	10/26/2017	9/30/2019	
9042	Designing entropy-stabilized oxides and other chemically disordered materials: A stochastic, first principles-finite temperature approach	$0	$307,672	$307,672	10/26/2017	9/30/2019	
9058	Active Core Saturation Prevention in Ferromagnetic Core Loop Antennas	$0	$130,344	$130,344	8/30/2017	1/30/2019	
9060	Jesse Ault - Wigner Fellow - High-fidelity cardiovascular simulation for personalized medicine	$0	$189,970	$189,970	7/6/2017	7/30/2020	
9070	Passive Control System for Window Attachments	$0	$22,640	$22,640	8/30/2017	1/30/2019	
9083	Controlling the Growth and Stacking of Two-Dimensional Materials by Pulsed Laser Epitaxy	$0	$49,903	$49,903	3/5/2018	6/30/2019	
9084	Integrating Nuclear Criticality Experiments into Differential Nuclear Data Evaluations	$0	$160,060	$160,060	10/3/2017	2/25/2019	
9085	Cable Driven Big Area Additive Manufacturing System	$0	$99,873	$99,873	11/30/2017	3/30/2019	
9087	Development of Spatially Dependent Embedded Self-Shielding Method	$0	$17,947	$17,947	9/18/2017	1/30/2019	
9090	Using Evolutionary Data to Model Protein-Protein Complexes in P. trichocarpa	$0	$365,554	$365,554	10/3/2017	9/30/2019	
9091	Sculpting Silicon: 3 Dimensional fabrication of semiconductors on atomic level	$0	$62,393	$62,393	12/6/2017	4/30/2019	
9093	Enabling advanced compression ignition engines with polyoxymethylene dimethyl ethers	$0	$29,708	$29,708	10/26/2017	2/25/2019	
9094	Network-based Universal Two-factor Authentication	$0	$127,345	$127,345	11/30/2017	3/30/2019	
9097	Identification and characterization of genes affecting diatom biomineralization	$0	$160,150	$160,150	10/3/2017	2/25/2019	
9098	Development of Transformative Image Reconstruction Capabilities for Radiological Source Characterization	$0	$142,225	$142,225	11/30/2017	3/30/2019	
9099	Self-Regulating Hydrogels for Controlled Amendment Release	$0	$48,170	$48,170	3/12/2018	6/30/2019	
9101	Integrated Fuel, Chemical, and Nutrient Separations for Supporting a Circular Algal Economy	$0	$149,205	$149,205	11/30/2017	3/30/2019	
9109	Multifunctional hybrid organometal halides: Reaching new property space by designing organic-inorganic interfaces	$0	$139,693	$139,693	11/30/2017	3/30/2019	
9115	Message in a bottle -- the role of extracellular vesicles in microbial communities	$0	$138,885	$138,885	12/12/2017	4/30/2019	
9118	Enable the capability for engineering synthetic photosynthesis in microbes	$0	$84,272	$84,272	1/19/2018	5/30/2019	
9178	Enabling of Fast Charge Via Zirconia Modified Cathode Material	$0	$427,361	$427,361	11/30/2017	9/30/2019	
9186	Imaging Thermal Conductivity in Spatially Heterogeneous Materials with High Spatial and Temporal Resolution	$0	$196,478	$196,478	1/22/2018	5/30/2019	
9188	General framework for the development of predictive atomistic force fields and its application to multicomponent alloys	$0	$123,360	$123,360	3/5/2018	6/30/2019	
9191	Future Urban Bus for Autonomous Research	$0	$220,483	$220,483	12/1/2017	9/30/2019	
9204	Combining nonlinear electrochemical and optical spectroscopies to probe interfacial structure and reactivity	$0	$164,106	$164,106	3/12/2018	6/30/2019	
9206	Ceramic Encapsulated Metal Phase Change Material for High Temperature Thermal Energy Storage	$0	$71,506	$71,506	3/12/2018	6/30/2019	
9207	Predicting Allosteric Drugs for Targeted Cancer Therapy through Computational Docking and Molecular Dynamics	$0	$135,729	$135,729	1/30/2018	9/30/2019	
9233	A Graphics Processing Unit-accelerated high dimensional data management for machine learning workloads in large scale Graphics Processing Unit-Central Processing Unit environments.	$0	$102,825	$102,825	3/15/2018	6/30/2019	
9234	Laser Stripping for a Next-Generation Muon Source at the Spallation Neutron Source	$0	$101,555	$101,555	3/26/2018	6/30/2019	
9237	Color-Changing Paint for Natural Gas Leak Detection	$0	$84,964	$84,964	5/9/2018	7/30/2019	
9239	A high-order splitting strategy for solving two-phase flow model with stiff source terms	$0	$46,992	$46,992	6/7/2018	8/30/2019	
9244	Design of Polymers with Intrinsic Microporosity for Clean Water	$0	$47,341	$47,341	6/7/2018	8/30/2019	
9252	Rapid digital-twin development framework for quantitative assessment of grid cyber-resilience	$0	$2,134,802	$2,134,802	3/1/2018	9/30/2018	
9259	Development of Scanning Electrochemical Microscopy-Inductively Coupled Plasma Mass Spectrometry to Resolve Multi-Element Electrochemical Reactions at the Interface In Situ	$0	$829,143	$829,143	7/11/2018	9/30/2019	
9260	Evolving Advanced Neural Networks at exaop scale	$0	$189,359	$189,359	3/15/2018	6/30/2019	
9261	Transformational Porous Liquids for Window Insulation	$0	$44,259	$44,259	6/20/2018	8/30/2019	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
9282	Application of Machine Learning for Performance Prediction of an Advanced Manufactured Nuclear Component	$0	$5,847,988	$5,847,988	8/1/2018	9/30/2019	
9290	Advancing Domain Science with Explainable Deep-Learning: Application to High-Temperature Alloy Design	$0	$296,359	$296,359	4/24/2018	9/30/2018	
9294	Deep learning for solving inverse problems in imaging and multi-spectral data	$0	$252,887	$252,887	4/19/2018	9/30/2018	
9296	High Performance Computing-Enabled Machine Learning for Bio Synapse Neuromorphic Devices	$0	$264,621	$264,621	5/2/2018	9/30/2018	
9297	Artificial intelligence for dynamic scanning transmission electron microscopy data: unraveling mechanisms of solid state chemical reactions, atom by atom	$0	$288,990	$288,990	4/19/2018	9/30/2018	
9325	LungXNet: Scalable Artificial Intelligence for High Throughput Multi-Labeled Medical Image	$0	$170,823	$170,823	4/19/2018	9/30/2018	
9333	3 Dimensional strain visualization and resolution limit of deformation processes in complex metal structures with X-ray Computed Tomography	$0	$56,926	$56,926	9/4/2018	10/30/2019	
9334	Multimodal Imaging of Plants to Predict Complex Bio System Behavior	$0	$363,704	$363,704	5/9/2018	9/30/2018	
9566	Quantum Materials Initiative: Excitations and Transport in Novel Quantum Matter	$0	$8,347,419	$8,347,419	5/11/2018	9/30/2019	
9606	Beyond Batteries Initiative Preliminary Research	$0	$100,957	$100,957	7/17/2018	7/30/2019	
9608	Roll-to-Roll Ready Solid State and Lithium Metal Battery Technologies Preliminary Research	$0	$272,434	$272,434	8/2/2018	9/30/2018	
	Total # of Projects for ORNL: 191	**Total Equipment Cost for ORNL: $0**		**Total Other Cost for ORNL: $53,885,745**		**Total Cost for ORNL: $53,885,745**	

PNNL - Pacific Northwest National Lab							
PN15073/2748	Microbiome-Exposome Interactions- This project is addressing key gaps in our understanding of how the composition and function of mammalian microbial communities (microbiomes) are impacted by exposures to environmental agents and how these changes impact host susceptibility to the agents. This is not a human microbiome.	$0	$60,616	$60,616	3/16/2015	3/15/2018	
PN15077/2752	Statistical Integration of Omics Data from Microbiomes. We will develop an infrastructure and computational tools designed to process, analyze, and visualize microbial community sequence data to address the challenge of computational analysis. This is not a human microbiome.	$0	$87,065	$87,065	3/19/2015	3/18/2018	
PN15085/2760	Fundamental Understanding of Nucleation Processes to Assess Solution Stability and Phase Growth and Genesis	$0	$122,107	$122,107	4/22/2015	4/21/2018	
PN15090/2765	An In-situ Investigation of boehmite (gamma-AlOOH) Dissolution under High pH (potential of hydrogen) Conditions	$0	$5,292	$5,292	5/11/2015	5/10/2018	
PN15091/2766	Correlation of Colloidal Interactions and Macroscopic Rheology in Concentrated Electrolyte Solutions	$0	$142,927	$142,927	5/12/2015	5/11/2018	
PN15094/2769	How do Non-linear Microbial Processes Lead to Linear Ecosystem Fluxes?	$0	$140,628	$140,628	5/31/2015	5/30/2018	
PN15095/2770	Monitoring Diffusion of Actinide Daughters and Granddaughters in Metals for Chronometer Applications	$0	$121,536	$121,536	6/3/2015	6/2/2018	
PN15100/2775	Modeling the Interfacial Effects, Partitioning, and Production Routes of Epsilon Particles in Uranium Oxide	$0	$133,479	$133,479	8/6/2015	8/5/2018	
PN16001/2778	Assessing Climate and Human-exposure Impacts of Polycyclic Aromatic Hydrocarbons and Secondary Organic Aerosol Particles	$0	$74,083	$74,083	10/1/2015	9/30/2018	
PN16003/2780	Dynamic Multiscale Modeling of Complex Biosystems: A Framework for Multiscale Metabolic Modeling	$0	$225,971	$225,971	10/1/2015	9/30/2018	
PN16004/2781	Test Bed Federation Tools for Control of Complex Systems Research	$0	$133,488	$133,488	10/1/2015	9/30/2018	
PN16009/2786	Using In situ Liquid Secondary Ion Mass Spectrometry and In situ Transmission Electron Microscopy to Determine the Mechanism and Kinetics of Lithium Ion Mobility in Solid Electrolyte Interface Layers	$0	$75,048	$75,048	10/1/2015	9/30/2018	
PN16013/2790	Bulk Nanostructured Alloy Optimization: Designing for Processing and Thermal Stability	$0	$133,223	$133,223	10/1/2015	9/30/2018	
PN16014/2791	Scalable Processing of Nanostructured Materials	$0	$134,149	$134,149	10/1/2015	9/30/2018	
PN16017/2794	Robust Statistical Data Exploration and Analysis for Microbiome Metabolomics. This project aims to improve analysis methodologies, develop a robust and reproducible biomarker discovery process, and improve the quality and reduce the time to reach meaningful results integrating multiple heterogeneous data types. This is not a human microbiome.	$0	$158,858	$158,858	10/1/2015	9/30/2018	
PN16018/2795	High-throughput Genome-to-Metabolome Computational Methods for Microbiome Metabolomics and Modeling	$0	$93,626	$93,626	10/1/2015	9/30/2018	
PN16019/2796	Deciphering Microbial Communication Through Metabolites	$0	$146,271	$146,271	10/1/2015	9/30/2018	
PN16020/2797	Carbon Rods with Unexpected Humidity-Driven Water Expulsion	$0	$72,011	$72,011	10/1/2015	9/30/2018	
PN16022/2799	Bulk Thermally Stable Nanocomposite Processing	$0	$134,093	$134,093	10/1/2015	9/30/2018	
PN16023/2800	Using Modified Proteins for Forensic Deconvolution of Xenobiotic Dose Quantitation and Timing	$0	$112,274	$112,274	10/1/2015	9/30/2018	
PN16030/2807	Permafrost Microbiome Responses to Hydrologic Perturbation and Subsequent Alteration to Ecosystem Function	$0	$14,479	$14,479	10/6/2015	9/30/2018	
PN16031/2808	Probing Complex Microbiomes Using Mass Spectrometry and Sequencing Capabilities to Understand How Microbiomes are Influenced by their Environment. This is not a human microbiome.	$0	$140,050	$140,050	10/6/2015	9/30/2018	
PN16034/2811	Provenance and Pathways Investigations of Uranium Oxide Particles Using Oxygen Isotope	$0	$63,961	$63,961	10/19/2015	9/30/2018	
PN16036/2813	Mitigating Challenges Toward an Enduring Supply of Low-radioactivity Argon for Ongoing Pacific Northwest National Laboratory National Security and Basic Science Programs	$0	$87,107	$87,107	10/20/2015	9/30/2018	
PN16038/2815	Transpire: Transparent Model-Driven Discovery of Streaming Patterns	$0	$16,952	$16,952	10/27/2015	9/30/2018	
PN16039/2816	Temporal Modeling in Streaming Analytics	$0	$167,424	$167,424	11/3/2015	9/30/2018	
PN16044/2821	Stream Adaptive Foraging for Evidence: Human-Computer Co-assisted Signature Discovery and Evidence Generation for Streaming Data with Deep Learning	$0	$171,078	$171,078	11/9/2015	9/30/2018	
PN16055/2832	Ion Implantation and Characterization of Epsilon Metal Phase Formation in Ceria (Cerium Dioxide) This project integrates synthesis, ion irradiation, microscopy and modeling to develop fundamental understanding of fission products in irradiated nuclear fuel.	$0	$289,453	$289,453	12/11/2015	12/10/2018	
PN16058/2835	Particle-Filter Surface Interactions and Dynamics in the Presence of Cross-Flow	$0	$211,517	$211,517	12/21/2015	12/20/2018	
PN16062/2839	Fundamental Insights into Gamma-Radiation Effects at Complex Oxide-Water Interfaces from First Principles Simulations	$0	$159,927	$159,927	1/22/2016	1/21/2019	
PN16063/2840	Control Framework for Large Scale Complex Systems	$0	$241,299	$241,299	1/22/2016	9/30/2018	
PN16071/2848	Unveiling the Dynamics Microbial Biofilm and Plant Root Interface under Extreme Conditions	$0	$50,868	$50,868	2/4/2016	9/30/2018	
PN16073/2850	Advancing Ecosystem Understanding of Carbon Turnover and Storage through Molecular Characterization	$0	$136,890	$136,890	2/8/2016	9/30/2018	
PN16075/2852	At the Fringe of a Shifting Carbon Paradigm with Climate Change: Unlocking the Organo-mineral Controls on the Bioavailability at the Terrestrial-aquatic Interface	$0	$46,314	$46,314	2/18/2016	9/30/2018	
PN16076/2853	Ecosystem Transitions and Associated Greenhouse Gas Fluxes Following Salt-Water Intrusion from Relative Sea Level Rise	$0	$29,938	$29,938	2/18/2016	9/30/2018	
PN16079/2856	Search for Lepton Number Violation	$0	$623,204	$623,204	3/24/2016	9/30/2018	
PN16086/2863	Low-Mass Dark Matter Backgrounds Research and Development	$0	$405,546	$405,546	4/13/2016	9/30/2018	
PN16090/2867	Interfacial Diffusion and Crud Formation at the Liquid - Liquid Interface of Solvent Extraction Processes	$0	$234,942	$234,942	4/25/2016	9/30/2018	
PN16093/2870	Spectrally Resolved Nanoscale Imaging of Single Molecules, Plasmons, and their Interaction	$0	$111,834	$111,834	5/17/2016	9/30/2018	
PN16096/2873	Modeling Continuous Human Information Processing	$0	$153,255	$153,255	6/7/2016	9/30/2018	
PN16097/2874	Cryogenic Low Energy Astrophysics with Noble liquids Detection of Dark Matter and Low Energy Neutrinos	$0	$279,124	$279,124	6/9/2016	9/30/2018	
PN16102/2879	Low-scaling Electronic Structure Methods for Accurate Modeling Chemical Transformations in Complex Environments	$0	$206,328	$206,328	7/18/2016	7/17/2019	
PN16105/2882	Fundamental Investigations of Photoelectrochemical Water Splitting of Model Oxide Electrode Surfaces	$0	$233,233	$233,233	8/1/2016	9/30/2018	
PN16106/2883	Determining Mechanisms of Microbial Metal Mobilization in Coastal Wetland Environments	$0	$206,811	$206,811	8/2/2016	9/30/2018	
PN16108/2885	Gut-on-a-chip for Multi-Omic Studies of the Gut Microbiome	$0	$97,649	$97,649	8/12/2016	9/30/2018	
PN16110/2887	Spatially Resolved Quantitative Gene Expression Analyses Applied to Transitioning Mouse Gut and Soil Microbiomes	$0	$79,978	$79,978	8/12/2016	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
PN16113/2890	Understanding Polar Climate Sensitivity - This project aims to pinpoint the relative roles of atmosphere and ocean dynamic processes in determining the sensitivity of polar climates to anthropogenic forcings.	$0	$213,473	$213,473	9/6/2016	9/5/2019	
PN17001/2891	Retro-fitting Non-traditional Microbes with State-of-the-art Synthetic Biology Tools: Towards the Next Generation of Engineered Microbial Biosensors	$0	$189,987	$189,987	10/1/2016	9/30/2018	
PN17002/2892	Untethered - Coherent Millimeter-wave Sensing using Drones with Visual Motion Capture	$0	$148,877	$148,877	10/1/2016	9/30/2018	
PN17004/2894	Dynamic, Multimodal, Molecular Imaging of Live Biological Systems	$0	$37,748	$37,748	10/1/2016	9/30/2018	
PN17009/2899	Breaking the Curse of Dimensionality in Atmosphere Modeling: New Methods for Uncertainty Quantification and Parameter Estimation	$0	$129,267	$129,267	10/1/2016	9/30/2018	
PN17011/2901	Development of High-throughput Metabolomics Technologies: Application to Studying the Flowering Time in Arabidopsis thaliana	$0	$117,430	$117,430	10/1/2016	9/30/2018	
PN17013/2903	Predicting the Predictions: A Visual Analytic Workflow for Data-Driven Reasoning about Climate Model Predictions	$0	$117,272	$117,272	10/1/2016	9/30/2018	
PN17014/2904	Towards Polarization-Switched Solid-State Molecular Pumps	$0	$120,875	$120,875	10/1/2016	9/30/2018	
PN17016/2906	Distributed Deep Learning and System Identification for Community Detection and Classification	$0	$192,499	$192,499	10/1/2016	9/30/2018	
PN17017/2907	Embedding a Nervous System in Solid Metal Parts with Ultrasonic Three-Dimensional Printing	$0	$179,813	$179,813	10/1/2016	9/30/2019	
PN17019/2909	Development of Integrated Framework for High-accuracy Excited-state Simulations of Dynamical Processes	$0	$128,045	$128,045	10/1/2016	9/30/2018	
PN17021/2911	Acid-Base Catalysis for Converting Electrocatalytic Hydrogeneation Intermediates	$0	$190,841	$190,841	10/1/2016	9/30/2019	
PN17022/2912	Fundamentals of Electrocatalytic Hydrogen Addition	$0	$425,156	$425,156	10/1/2016	9/30/2018	
PN17023/2913	Reactor and Process Design - This project is focused on developing scalable reactors for catalytic processes that can be deployed where complex feedstocks are already gathered.	$0	$202,882	$202,882	10/1/2016	9/30/2018	
PN17024/2914	Synthesis of Tunable Electro-catalysts for Biomass Conversion	$0	$285,067	$285,067	10/1/2016	9/30/2018	
PN17025/2915	Learning Control for Building Systems	$0	$137,689	$137,689	10/1/2016	9/30/2018	
PN17026/2916	Theoretical Investigation of Low Temperature Electrocatalytic Hydrogen Addition	$0	$274,437	$274,437	10/1/2016	9/30/2019	
PN17028/2918	Probiotics and Secondary Bile Acids as Regulators of the Gut Microbe Interactome - The primary goal of this project is to develop and implement an integrated experimental and computational capability that predicts multi-species chemical synthesis pathways. In addition, this project will establish a new capability for advanced cultivation of human gut microbial consortia that can be used as a reproducible test-bed for multi-omics investigations.	$0	$496,537	$496,537	10/1/2016	9/30/2019	
PN17029/2919	Chemical Bonding in Uranium Oxides Studied by Uranium-233 and Uranium-235 Nuclear Quadrupole Resonance Spectroscopy	$0	$150,805	$150,805	10/1/2016	9/30/2018	
PN17031/2921	Towards a Better Understanding for Mineral Nanoparticle Assembly by Coupling Colloidal and Hydrodynamic Forces and Its Application to Superlattice Formation of Nanocrystals	$0	$178,306	$178,306	10/1/2016	9/30/2018	
PN17032/2922	Peptoid-based Biomimetic Materials with Tunable Structures and Functions	$0	$211,672	$211,672	10/1/2016	9/30/2018	
PN17034/2924	Towards an Understanding of the Role of Hydration and Hydrodynamic Forces in Modeling Synthesis	$0	$93,286	$93,286	10/1/2016	9/30/2018	
PN17035/2925	Electrocatalytic Hydrogenation Process Development	$0	$418,128	$418,128	10/1/2016	9/30/2019	
PN17036/2926	Investigation of the Signatures of Additively Manufactured Objects Using Advanced Chemistry and Materials Science Techniques to Identify Counterfeits	$0	$69,810	$69,810	10/3/2016	9/30/2018	
PN17038/2928	Deception Detection, Tracking and Factuality Assessment in Social and News Media	$0	$202,381	$202,381	10/3/2016	9/30/2019	
PN17039/2929	Radiological Atomic Force Microscopy: Coupled Radiation Source/Liquid-cell Atomic Force Microscopy to Study Radiation-induced Interfacial Processes	$0	$226,094	$226,094	10/3/2016	9/30/2019	
PN17040/2930	Campus as a Laboratory - The major focus of this project is the development of new test bed capabilities and enhancement of existing test bed while being flexible, scalable, and expandable so that advanced/new control technologies (for example, self-healing inside buildings, managing distributed energy resources, and demand response) can be experimentally tested and built.	$0	$110,047	$110,047	10/4/2016	9/30/2018	
PN17043/2933	Phase Field Modeling of Microstructure Development in Plutonium Oxalate Precipitation	$0	$67,007	$67,007	10/12/2016	9/30/2018	
PN17045/2935	Surface Modifications of Laminar Graphene Oxide Water Separation Membranes	$0	$78,306	$78,306	10/24/2016	9/30/2018	
PN17046/2936	Hierarchical Framework Materials by Advanced Materials Design	$0	$133,667	$133,667	10/24/2016	9/30/2018	
PN17047/2937	Utilizing High Resolution Ion Mobility Separations in Multi-Omic Analyses of Biologically Important Isomers	$0	$58,473	$58,473	10/24/2016	9/30/2018	
PN17051/2941	Multimodal Approach for Rapid, Robust, Reliable and Economic Environmental Monitoring	$0	$97,156	$97,156	10/26/2016	9/30/2018	
PN17054/2944	SQUINT: Streaming Query User Interface	$0	$156,066	$156,066	11/9/2016	9/30/2018	
PN17055/2945	A Probe-based Microtiter Plate Assay for Characterization of Protein Binding Partners of Small Molecules	$0	$19,325	$19,325	11/10/2016	9/30/2018	
PN17056/2946	Dynamic Network Analysis via Motifs	$0	$59,077	$59,077	11/28/2016	9/30/2018	
PN17057/2947	Integrated Control Testing under Complexity	$0	$381,090	$381,090	12/1/2016	9/30/2018	
PN17061/2951	Mimicking the Function of the Enzyme Scaffold	$0	$134,158	$134,158	12/12/2016	9/30/2018	
PN17063/2953	Developing In situ Capabilities for Interfacial Characterization using Synchrotron Light Source	$0	$53,020	$53,020	12/16/2016	9/30/2019	
PN17064/2954	Deep Learning applied to Accelerator Neutrino Physics in Liquid Argon Time Proportional Chambers	$0	$20,198	$20,198	12/19/2016	9/30/2018	
PN17065/2955	BIFROST: Bounded Informational Framework to Optimize Streaming sysTems	$0	$131,690	$131,690	12/20/2016	9/30/2018	
PN17067/2957	EvoGraph: Highly Efficient Large-Scale Graph Processing on Accelerator-based Supercomputers	$0	$54,992	$54,992	1/3/2017	9/30/2018	
PN17069/2959	Mastering the Macromolecular-materials Interface for Energy Science	$0	$193,522	$193,522	1/12/2017	9/30/2018	
PN17070/2960	Probing Collective Phenomena at Solid-Liquid Interfaces Under Reaction Conditions	$0	$113,008	$113,008	1/17/2017	9/30/2018	
PN17072/2962	PICO-40L (40 Liter Version of the PICO Physics Collaboration Experiment) Bubble Chamber Research and Development	$0	$429,935	$429,935	1/20/2017	1/19/2020	
PN17073/2963	Small Research and Development efforts that align with Department of Energy/Department of Homeland Security mission space.	$0	$328,771	$328,771	2/13/2017	2/12/2020	
PN17080/2970	Quantum Defects in Synthesized Diamond Aerogel and Diamond Nanoparticles	$0	$72,231	$72,231	3/13/2017	9/30/2018	
PN17082/2972	Fungal Solid State Fermentation for Citric Acid and Enzyme Co-products that Derive Value from Agricultural Waste	$0	$24,874	$24,874	3/24/2017	9/30/2018	
PN17084/2974	Ultrasensitive Nanoscale Chemical Imaging with Controllably Tailored Electromagnetic Waves	$0	$17,807	$17,807	4/13/2017	9/30/2018	
PN17086/2976	Deep Learning for Scientific Discovery - We will leverage deep learning in four mission-relevant areas: a) biomedical sciences, b) cyber systems, c) optimization of exascale resources, and d) neutrino physics. This effort will also invest in theory research. We have identified additional relevant PNNL mission areas in which to test the breadth of the applicability of deep learning, ranging from smart manufacturing to catalysis. We will rapidly mature our understanding of where and when deep learning is applicable.	$0	$1,692,324	$1,692,324	4/14/2017	4/13/2020	
PN17087/2977	Nuclear Trafficking Objective: Materials Processing Characterization	$0	$143,013	$143,013	4/18/2017	4/17/2020	
PN17089/2979	Ion Manipulation at Atmospheric Pressure	$0	$21,071	$21,071	5/5/2017	5/4/2020	
PN17090/2980	Theoretical Studies of Metal Complex Degradation Products and Their Associated Signatures in the Plutonium Separations Process	$0	$68,742	$68,742	5/19/2017	9/30/2018	
PN17094/2984	Molecular Mechanisms of Drought Mortality and Survival	$0	$73,434	$73,434	5/31/2017	9/30/2018	
PN17095/2985	PACiFiC: Proactive Adaptive Cybersecurity Framework for Control	$0	$1,017,066	$1,017,066	6/1/2017	5/31/2020	
PN17098/2988	Development of Physics-compatible Stochastic Models for Multiphysics Systems with Nonlinear Field Variables	$0	$99,585	$99,585	6/20/2017	6/19/2020	
PN17099/2989	Understanding Fundamental Design Principles Underlying How Biological Systems Adapt to Engineered Functions	$0	$1,152,710	$1,152,710	6/22/2017	6/21/2020	
PN17100/2990	Elemental Analysis of Rare Earths in Microfluidic Devices Capable of Employing Electrophoresis Based Separations	$0	$149,380	$149,380	6/27/2017	6/26/2020	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
PN17101/2991	Determining Radiolytic Transient Intermediates and Interfacial Species and Their Roles in Aluminum Oxyhydroxide Reactivity	$0	$427,639	$427,639	7/17/2017	7/16/2020	
PN17102/2992	Dissolution of Spent Nuclear Fuel: An In situ and Atomic Resolution Transmission Electron Microscopy Study	$0	$248,509	$248,509	10/1/2017	9/30/2020	
PN17103/2993	Signatures of Warfighter Response to Pathogen-, Toxin- and Activity-Induced Stress	$0	$109,989	$109,989	8/4/2017	8/3/2020	
PN17104/2994	Monitoring of Terrestrial Aquatic Ecosystems with Hyperspectral Imagery	$0	$203,717	$203,717	8/8/2017	8/7/2020	
PN17105/2995	Patterns and Mechanisms of Coastal Forest Loss in Relation to Sea-level Variability, Drought, and Heat-waves	$0	$154,966	$154,966	8/8/2017	8/7/2020	
PN17106/2996	Process-based Understanding of Perturbation Impacts in Tidally-influenced Nearshore Terrestrial-aquatic Interfaces	$0	$242,623	$242,623	8/8/2017	8/7/2020	
PN17107/2997	Understanding How Saltwater Intrusion Interacts with Plant Communities to Affect Soil Greenhouse Gas Fluxes in Coastal Forests	$0	$268,763	$268,763	8/8/2017	8/7/2020	
PN17108/2998	Developing Isotachophoresis for Nuclear Safeguards	$0	$222,562	$222,562	8/9/2017	8/8/2020	
PN17109/2999	Characterization of Radiation Induced Defects Across Scales	$0	$224,929	$224,929	8/18/2017	8/17/2020	
PN18001/3000	From Crystalline Nanorods to Hierarchical Structures	$0	$238,395	$238,395	10/1/2017	9/30/2020	
PN18002/3001	Topographic, Chemical, and Structural Nanoscopy of Biomineral Nucleation and Phase Transformation	$0	$108,787	$108,787	10/1/2017	9/30/2020	
PN18003/3002	Actinide Fluorination Science	$0	$300,957	$300,957	10/1/2017	9/30/2020	
PN18004/3003	Visible and Ultraviolet -Light Mediated Photochemistry of the Actinides: Photocatalysis and Luminescence Detection	$0	$503,313	$503,313	10/1/2017	9/30/2020	
PN18005/3004	Exploring Genotypic Diversity for Functional Trait Variance	$0	$191,816	$191,816	10/1/2017	9/30/2020	
PN18006/3005	Molecular Phenotyping of Plants and Microbes	$0	$204,212	$204,212	10/1/2017	9/30/2020	
PN18007/3006	DROWHUNT - Classified Project	$0	$189,069	$189,069	10/1/2017	9/30/2020	
PN18008/3007	Neural Interactive Machine Learning	$0	$240,612	$240,612	10/1/2017	9/30/2020	
PN18009/3008	Focal Point Analysis for Trusting Machine Learning	$0	$289,996	$289,996	10/1/2017	9/30/2020	
PN18010/3009	Radon Photoionization	$0	$64,212	$64,212	10/1/2017	9/30/2020	
PN18011/3010	The Physics of Ultralight Particles	$0	$413,145	$413,145	10/2/2017	9/30/2020	
PN18012/3011	PlantDevo: Effects of Environmental Perturbations on Plant Development	$0	$172,022	$172,022	10/3/2017	9/30/2020	
PN18013/3012	Building a Virtual Plant Ecosystem	$0	$185,831	$185,831	10/3/2017	9/30/2020	
PN18014/3013	Developing a Predictive Understanding of Thermodynamics and Kinetics of Phase Transformation and Defect Evolution During Concurrent Ion Irradiation and Transient Heating	$0	$78,603	$78,603	10/4/2017	9/30/2020	
PN18015/3014	Microbial Ecology of the Plant Rhizosphere	$0	$136,936	$136,936	10/5/2017	9/30/2020	
PN18016/3015	Enabling Prescriptive 'Treatments' for Precision Soil Microbiomes by Activity-based Profiling	$0	$78,118	$78,118	10/5/2017	9/30/2018	
PN18017/3016	Hybrid Multiscale Finite Volume Algorithm for Massively Parallel Simulation of Reactive Phenomena	$0	$71,989	$71,989	10/10/2017	9/30/2020	
PN18018/3017	Development of Metabolite Sensors for Directed Strain Evolution	$0	$92,877	$92,877	10/10/2017	9/30/2018	
PN18019/3018	Heterogeneous Catalyst Development for Crotonaldehyde from Acetaldehyde	$0	$80,486	$80,486	10/11/2017	9/30/2018	
PN18020/3019	Fabrication of Magnesium Sheet from Shear Assisted Processing and Extrusion Extruded Tubing and Formability Testing Thereof	$0	$82,888	$82,888	10/11/2017	9/30/2020	
PN18021/3020	Metabolic Responses of Eelgrass to Environmental Stressors	$0	$75,983	$75,983	10/13/2017	9/30/2018	
PN18022/3021	Time-Lapse Multiphysics Simulation and Joint Inversion Toolset for Large-Scale Subsurface Imaging	$0	$116,398	$116,398	10/13/2017	9/30/2020	
PN18023/3022	An Autonomous Acoustic Receiver for Monitoring Real-time Fish Survival	$0	$117,346	$117,346	10/16/2017	9/30/2018	
PN18024/3023	Statistical Microscopy Conjoined with Deep Learning - Revolutionary Insights Across Length Scales	$0	$138,061	$138,061	10/16/2017	9/30/2018	
PN18025/3024	B'omarr Monk - Classified Project	$0	$348,788	$348,788	10/17/2017	9/30/2020	
PN18026/3025	Damage Mechanisms and Defect Formation in Irradiated Model Systems	$0	$178,019	$178,019	10/25/2017	9/30/2020	
PN18027/3026	Silicon Detectors for National Security Applications	$0	$192,746	$192,746	11/1/2017	9/30/2020	
PN18028/3027	Seawater Electrochemical Element Extraction Technology	$0	$79,057	$79,057	11/6/2017	9/30/2018	
PN18029/3028	Multiscale Plant Modeling	$0	$178,858	$178,858	11/7/2017	9/30/2018	
PN18030/3029	In-situ Battery Degradation Mechanism Study using Solid-State Nuclear Magnetic Resonance Characterization	$0	$119,116	$119,116	11/7/2017	9/30/2018	
PN18031/3030	Hydrologic Imprinting Across Terrestrial-aquatic Gradients: Unraveling the Spectrum of Ecosystem Responses to Freshwater Limitation	$0	$215,280	$215,280	11/13/2017	9/30/2020	
PN18032/3031	Development of an In Vitro Platform for Inhalation Toxicology	$0	$71,478	$71,478	11/13/2017	9/30/2018	
PN18033/3032	Grid Architecture Analysis	$0	$78,711	$78,711	11/17/2017	9/30/2018	
PN18034/3033	Explanatory Question-Answering on Knowledge Graphs	$0	$60,827	$60,827	11/20/2017	9/30/2018	
PN18035/3034	Geochemical Controls on Fracture Growth	$0	$118,344	$118,344	11/21/2017	9/30/2018	
PN18036/3035	Integrated Models for Energy Resiliency Planning	$0	$97,650	$97,650	11/22/2017	9/30/2018	
PN18037/3036	Ion Transport Process Across Reactive Solid-liquid Interfaces	$0	$110,383	$110,383	11/27/2017	9/30/2020	
PN18038/3037	Affordable and Rapid Radionuclide Production	$0	$83,626	$83,626	11/27/2017	9/30/2018	
PN18039/3038	Blockchain Transactive Energy Application: Increasing Speed, Scale and Security at the Grid's Edge	$0	$96,880	$96,880	11/28/2017	9/30/2018	
PN18040/3039	In Situ Characterization of Corrosion in Magnesium Alloys	$0	$85,507	$85,507	12/6/2017	9/30/2018	
PN18041/3040	Accelerating Lithium Ion Transport for Extreme Fast Charging Batteries	$0	$82,316	$82,316	12/11/2017	9/30/2018	
PN18042/3041	Non-Signalized Intersection Control – a Collaborative Control for Traffic Flow Systems Composed of Connected Autonomous Vehicles	$0	$274,559	$274,559	12/18/2017	9/30/2018	
PN18043/3042	Programming Metabolite Exchange to Understand and Control Plant-Microbe Interactions	$0	$97,378	$97,378	12/19/2017	9/30/2020	
PN18044/3043	Development of High Energy Lithium Ion Sulfur Batteries	$0	$65,563	$65,563	12/27/2017	9/30/2018	
PN18045/3044	Gaining New Insights into the Drought Impacts at Finer Scales by Developing a High-spatiotemporal-resolution Solar Induced Chlorophyll Fluorescence Dataset	$0	$149,865	$149,865	1/3/2018	1/2/2021	
PN18046/3045	Blockchain for Building Identification and Data Exchange	$0	$76,853	$76,853	1/4/2018	9/30/2018	
PN18047/3046	Redesigning a Small Laccase into a Robust Catalyst for Oxygen Reduction Reaction on Electrode Surface	$0	$222,844	$222,844	1/5/2018	1/4/2021	
PN18048/3047	Data Assessment and Assimilation for Atmospheric Radiation Measurement Data Using Dynamic Bayesian Networks	$0	$120,085	$120,085	1/9/2018	1/8/2021	
PN18049/3048	Assessing the Feasibility of Modelling Soil Organic Carbon Contributions to Atmospheric Ice Nuclei	$0	$93,273	$93,273	1/9/2018	9/30/2018	
PN18050/3049	Developing a Model-Experiment Integration Platform for Complex Systems in Subsurface and Terrestrial Ecosystem Sciences	$0	$110,425	$110,425	1/9/2018	1/8/2021	
PN18051/3050	Low-Temperature Electroplating of Zirconium: Ionic Mixture Methods	$0	$46,234	$46,234	1/25/2018	1/24/2021	
PN18052/3051	Influence of Vegetation Canopy Architecture on Dynamics of Spatiotemporal Light Distribution	$0	$63,501	$63,501	1/25/2018	1/24/2021	
PN18053/3052	Chemical Modeling of the Fate of Radioiodine	$0	$91,206	$91,206	2/6/2018	2/5/2021	
PN18054/3053	Interpretation of Trained Recurrent Neural Nets by State-Space Reconstruction	$0	$87,707	$87,707	2/6/2018	2/5/2021	
PN18055/3054	Performance Prediction and Process Attribution for Additive Manufacturing	$0	$210,905	$210,905	2/6/2018	2/5/2021	
PN18056/3055	Interdisciplinary Efforts Relevant to Department of Energy Biological Missions	$0	$120,760	$120,760	2/6/2018	2/5/2021	
PN18057/3056	Material Modeling for Additively Manufactured Device Forensics	$0	$77,701	$77,701	2/12/2018	2/11/2021	
PN18058/3057	Integration Infrastructure and Toolsets	$0	$78,602	$78,602	2/12/2018	2/11/2021	
PN18059/3058	Radiotracer Atmospheric Dynamics Chamber Feasibility and Design	$0	$111,605	$111,605	2/15/2018	9/30/2018	
PN18060/3059	Controlled Mineral Growth for Improving Technecium-99 and Iodine-129 Retention in Cementitious Waste Forms	$0	$127,711	$127,711	2/16/2018	2/15/2021	
PN18061/3060	Vehicle Emission Monitoring Applications using Internet of Things Ecosystem	$0	$45,737	$45,737	3/6/2018	3/5/2021	
PN18062/3061	Towards Automated Vulnerability and Mitigation of Critical Infrastructure	$0	$85,862	$85,862	3/8/2018	9/30/2018	
PN18063/3062	Mesofluidic Separation of Large Particles in Waste Slurries	$0	$50,065	$50,065	3/14/2018	3/13/2021	
PN18064/3063	DeepCare: Improving Patient Care using Deep Learning on Electronic Health Records	$0	$104,951	$104,951	3/14/2018	3/13/2021	
PN18065/3064	Microchannel Reactive Distillation: Alcohol-to-Jet Application	$0	$110,900	$110,900	3/19/2018	9/30/2018	
PN18066/3065	Atomic and Sub-nanoscale Engineered Multifunctional Electrocatalysts	$0	$105,034	$105,034	3/27/2018	3/26/2021	
PN18067/3066	Three-dimensional Millimeter-wave Motion Tracking	$0	$115,216	$115,216	3/27/2018	9/30/2018	
PN18068/3067	Nonflammable Electrolytes for Lithium-Ion Batteries	$0	$80,027	$80,027	3/30/2018	9/30/2018	
PN18070/3069	Collective Atomic Phenomena for Separations Science	$0	$40,217	$40,217	4/2/2018	4/1/2021	
PN18071/3070	Fabrication of Fused Deposition Mixing Extruder for Polymer Blending	$0	$72,256	$72,256	4/9/2018	4/8/2021	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
PN18072/3071	Flow-Through Pressurized Magic Angle Spinning Nuclear Magnetic Resonance Rotors for Multimodal Analysis	$0	$68,582	$68,582	4/16/2018	9/30/2018	
PN18073/3072	Reducing Cold-start Emissions	$0	$88,016	$88,016	4/23/2018	9/30/2018	
PN18074/3073	Investigation of Quantum Information System Algorithms and Software Framework for Electronic Structure Calculations	$0	$286,458	$286,458	5/3/2018	5/2/2021	
PN18075/3074	Pure Materials - Classified Project	$0	$92,261	$92,261	5/11/2018	5/10/2021	
PN18076/3075	Taxonomy and Health Assessment for Project Oryx- The focus of this project is to understand the data gathered at a research reactor from a cyber security perspective.	$0	$32,565	$32,565	5/14/2018	5/13/2021	
PN18077/3076	Development of Translational Assays Prognostic of Poor Disease Outcomes in Deadly Infections	$0	$137,088	$137,088	5/16/2018	9/30/2018	
PN18078/3077	Metabolomics of Programmed Cell Death	$0	$47,125	$47,125	5/17/2018	9/30/2018	
PN18079/3078	Enhanced Value of Renewable Energy via High Temperature Electrolysis	$0	$93,731	$93,731	5/24/2018	9/30/2018	
PN18080/3079	On-line Optical Spectroscopy to Characterize Chemistry of the Transuranic Elements in Molten Salts	$0	$39,199	$39,199	5/24/2018	5/23/2021	
PN18081/3080	Engineering Sequence-defined Polymers for Controlled Formation of Hybrid Materials	$0	$74,215	$74,215	5/29/2018	5/28/2021	
PN18082/3081	New Quantum Phenomena by Combining Two-dimensional Materials with Complex Oxides	$0	$43,476	$43,476	5/31/2018	5/30/2021	
PN18083/3082	Capability to Process and Characterize Uranium-Zirconium and Uranium-Zirconium-Plutonium Alloys	$0	$77,123	$77,123	6/22/2018	6/21/2021	
PN18084/3083	Single-cell Proteomic Analysis of Developing Chick Vestibular Hair Cells	$0	$34,576	$34,576	7/13/2018	9/30/2018	
PN18086/3085	Electrochemical Reactor and Process: Oxidation Electrocatalysis for Increasing the Value of Renewable Carbon	$0	$271,607	$271,607	7/25/2018	9/30/2018	
PN18087/3086	Imaging Intact Filamentous Fungi from Spore to Hyphal Tip on the Nanoscale	$0	$247,131	$247,131	7/31/2018	7/30/2021	
PN18090/3089	Protecting Research - Classified Project	$0	$19,808	$19,808	8/29/2018	8/28/2021	
	Total # of Projects for PNNL: 198	**Total Equipment Cost for PNNL: $0**		**Total Other Cost for PNNL: $32,219,366**		**Total Cost for PNNL: $32,219,366**	
PRINCE - Princeton Plasma Physics Lab							
PPPL-045	Predicting and Mitigating Runaway Electrons in Tokamaks	$0	$44,891	$44,891	2/2/2015	1/31/2018	
PPPL-046	Simulations of Plasma Turbulence With Lithium or Other Walls	$0	$53,630	$53,630	2/2/2015	1/31/2018	
PPPL-048	The Efficacy of Lithium Conditioning and Liquid Lithium Surfaces in Devices with Metallic Plasma Facing Components	$0	$43,408	$43,408	2/2/2015	9/30/2017	
PPPL-051	Low Temperature Plasma for Synthesis and Functionalization of Graphene	$0	$85,087	$85,087	2/2/2015	1/31/2018	
PPPL-055	Investigation of a Plasma Mass Filter	$0	$61,936	$61,936	4/13/2015	4/12/2018	
PPPL-056	Large-data statistical approach for predicting disruptions in tokamaks using a Joint European Torus disruption-relevant database	$0	$96,545	$96,545	4/13/2015	4/12/2018	
PPPL-058	Superconducting Magnet Studies	$0	$168,737	$168,737	8/12/2015	8/11/2018	
PPPL-059	Advanced Centrifuge Development for Industrial Applications	$0	$141,722	$141,722	11/1/2015	9/30/2018	
PPPL-060	Establishing the Feasibility of the Lithium Vapor Box Divertor	$0	$246,584	$246,584	11/1/2015	9/30/2018	
PPPL-061	Development of Plasma-Surface Interaction Science for Direct Power Extraction Applications	$0	$184,070	$184,070	11/1/2015	9/30/2018	
PPPL-063	Full Wave Calculations in the Scrape-off Layer of Tokamak	$0	$111,744	$111,744	11/1/2015	9/30/2018	
PPPL-065	Development of New Initiatives for Space Instrumentation and Space Plasma Physics Research at Princeton Plasma Physics Lab	$0	$111,644	$111,644	8/15/2016	8/14/2019	
PPPL-066	Permeation barriers in high atomic number materials used for fusion-reactor plasma-facing components	$0	$57,196	$57,196	2/1/2017	1/31/2020	
PPPL-067	Proton Beam X-ray Diagnostics	$0	$131,168	$131,168	2/1/2017	1/31/2020	
PPPL-068	Gyrokinetic total-f simulation of edge and divertor transport in stellarators with the X-point included gyrokinetic codes	$0	$189,455	$189,455	2/1/2017	1/31/2020	
PPPL-069	Global numerical studies of magnetic reconnection in rotating plasmas with magnetic and flow shear	$0	$88,564	$88,564	2/1/2017	1/31/2020	
PPPL-070	Definition of a next-step liquid-metal-wall toroidal confinement facility	$0	$194,787	$194,787	2/1/2017	1/31/2020	
PPPL-071	Future Stellarator Configuration Investigation	$0	$347,536	$347,536	2/1/2017	1/31/2020	
PPPL-072	A Flowing Liquid Metal Torus - This is a proposal for fabrication of equipment and initial operation of a toroidal test system to study the technology of fast flowing liquid metal plasma-facing surfaces. The project will focus in the near term on developing a liquid metal diverter suitable for implementation and testing in present-day fusion systems.	$0	$216,285	$216,285	3/8/2017	3/7/2020	
PPPL-074	Secondary electron emission from dielectrics and liquids	$0	$49,614	$49,614	10/1/2017	9/30/2018	
PPPL-076	Development of Magnetic Enhancement Coils for a Fast Time Response Electromagnetic Disruption Mitigation System	$0	$73,495	$73,495	10/1/2017	9/30/2019	
PPPL-077	Investigation of Commercial Cloud Services for Research Computing	$0	$15,562	$15,562	7/11/2018	3/31/2019	
	Total # of Projects for PRINCE: 22	**Total Equipment Cost for PRINCE: $0**		**Total Other Cost for PRINCE: $2,713,660**		**Total Cost for PRINCE: $2,713,660**	
PTX - Pantex Plant							
PX130160	Precision Computer Numerical Control Mill/Lathe Machining	$0	$673,665	$673,665	10/1/2012	2/28/2018	Special exemption provided by Federal Program Manager.
PX163601	Less Than Lethal Technologies	$0	$366,907	$366,907	10/1/2015	9/30/2018	
PX163612	Investigations into High Explosive Machining Parameters	$0	$97,209	$97,209	10/1/2015	9/30/2018	
PX163615	Additive Manufacturing for Energetic and Mock Materials	$0	$537,041	$537,041	10/1/2015	9/30/2018	
PX163619	Autonomous Mobile Bay Equipment Retriever	$0	$748,637	$748,637	10/1/2015	9/30/2018	
PX163625	Microreactor Technology Development	$0	$976,751	$976,751	10/1/2015	9/30/2018	
PX163641	Establishment of Dust Ignition Testing Capability	$0	$83,781	$83,781	10/1/2015	9/30/2018	
PX163647	Insensitive, High Temperature, High Performance Explosive	$0	$115,776	$115,776	10/1/2015	9/30/2018	
PX164213	Pantex Plant Electrical System Study (Wind Farm Optimization)	$0	$67,024	$67,024	10/1/2015	9/30/2018	
PX170112	Rapid Response Additive Manufacturing Machine Accuracy Study with Y-12	$0	$47,301	$47,301	10/1/2016	9/30/2018	
PX174502	Light Enhancement Coating Automation	$0	$52,457	$52,457	10/1/2016	9/30/2018	
PX174504	Air Driven Wet Sieving of Explosives	$0	$129,036	$129,036	10/1/2016	9/30/2019	
PX174507	Fourier Transform Near-Infrared Analysis	$0	$45,561	$45,561	10/1/2016	9/30/2018	
PX174508	Matrix-Assisted Laser Desorption Ionization Mass Spectrometry for High Molecular Weight Polymers	$0	$51,158	$51,158	10/1/2016	9/30/2018	
PX174510	Port Glass Replacement Suitability Study	$0	$35,844	$35,844	10/1/2016	9/30/2019	
PX174516	Nascent Firing Set Technologies	$0	$236,868	$236,868	10/1/2016	9/30/2018	
PX174519	Projectile Impact System Upgrade	$0	$167,669	$167,669	10/1/2016	9/30/2019	
PX174521	Electric Gun Assembly and Characterization	$0	$90,896	$90,896	10/1/2016	9/30/2018	
PX174537	Online Gas Analysis	$0	$64,115	$64,115	10/1/2016	9/30/2018	
PX185200	Improved Characterization of Critical Electrical Props and Hazards for Lightning	$0	$530,055	$530,055	10/1/2017	9/30/2020	
PX185201	Comprehensive Polymer Analyses for Explosives Use	$0	$135,241	$135,241	10/1/2017	9/30/2020	
PX185202	Evaluating Sensitivity of Detonators to Insults	$0	$32,872	$32,872	10/1/2017	9/30/2020	
PX185205	Ignition Mechanisms of Explosives during Drilling and Skidding	$0	$353,419	$353,419	10/1/2017	9/30/2020	
PX185206	Photon Doppler Velocimetry System Upgrades and Improvements	$0	$629,524	$629,524	10/1/2017	9/30/2020	
PX185209	Online Monitoring and Remote Sensing During High Explosive Aging	$0	$153,899	$153,899	10/1/2017	9/30/2020	
PX185210	Evaluation of Particle Characterization Techniques for Consistency	$0	$246,225	$246,225	10/1/2017	9/30/2020	
PX185211	Use of Pycnometry for Density of Explosives and Polymers and Powders	$0	$190,262	$190,262	10/1/2017	9/30/2020	
PX185213	Foreign Material Source Identification in Polymer-bonded Explosive Booster Material	$0	$65,010	$65,010	10/1/2017	9/30/2018	
PX185214	Inspection of Machined High Explosive Profiles	$0	$39,086	$39,086	10/1/2017	9/30/2018	
PX185217	Feasibility Study for Use of RoboCrib - Like Technology at Pantex	$0	$24,098	$24,098	10/1/2017	9/30/2018	
PX185228	Evaluation of Polymer Crystallinity in High Explosives	$0	$48,110	$48,110	10/1/2017	9/30/2020	
PX185873	Rapid Response Data Centered Configuration Management for High Explosives Pressing Facility Feasibility Study	$0	$80,844	$80,844	10/1/2017	9/30/2018	
PX186267	Rapid Response Electronic Hold Point Q Forms	$0	$15,049	$15,049	10/1/2017	9/30/2020	
PX186430	Develop a post processor that will be used with the recently purchased Mazak Hybrid Additive Manufacturing machine	$0	$45,933	$45,933	10/1/2017	9/30/2020	
	Total # of Projects for PTX: 34	**Total Equipment Cost for PTX: $0**		**Total Other Cost for PTX: $7,177,323**		**Total Cost for PTX: $7,177,323**	
SLAC - SLAC National Accelerator Laboratory							
16-014	Ultrafast 11 electron volts Source for Time-Resolved Photoemission	$0	$329	$329	10/1/2014	9/30/2017	FY17 cost vouchered in FY18
16-030	Ultrafast Electron Diffraction Experiments	$0	$1,674	$1,674	4/1/2015	3/31/2018	FY17 cost vouchered in FY18
17-003	Molecular Basis of Ecosystems Nitrogen Cycling: A Strategic SLAC Biosciences Program	$0	($423)	($423)	10/1/2015	9/30/2018	September FY17 adjustment that posted in October FY18
17-004	Real Time Control of Subsurface Fractures and Fluid Flow	$0	$847	$847	10/1/2014	9/30/2017	Straggling cost from FY17

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
17-007	Electrochemical Heat Harvesting & Cooling	$0	$1,629	$1,629	10/1/2015	9/30/2018	FY17 cost vouchered in FY18
17-008	Modeling Acceleration in Laser-Driven Shocks	$0	($2,041)	($2,041)	10/1/2014	9/30/2017	FY17 cost vouchered in FY18 and FY18 OH true-up cost
17-009	Structural Characterization of Electrolyte and Polymer Gated Electronics to Better Control Device Properties	$0	($7,346)	($7,346)	4/1/2015	3/31/2018	Variance between accrual and actual cost
17-016	Scattering Studies and Crystal Growth of Quantum Materials	$0	$4,441	$4,441	10/1/2015	9/30/2018	FY17 cost vouchered in FY18
17-017	Megawatt Terahertz Optical Parametric Amplifier	$0	($7)	($7)	10/1/2015	9/30/2018	Variance between accrual and actual cost
17-020	Integrated Electrochemical-Biological System for the Production of Fuels and Chemicals from carbon dioxide	$0	$2,681	$2,681	10/1/2015	9/30/2018	FY17 cost vouchered in FY18
17-022	Quantum Optics and Biological Probes with Silicon Vacancies in Chemical Vapor Deposition Grown Diamond	$0	($10,605)	($10,605)	10/1/2015	9/30/2018	Variance between accrual and actual cost
18-001	Development of Combined X-ray absorption fine structure spectroscopy/Fourier transform infra-red In Situ Cell For Insight Into Catalyst Function	$0	$230,288	$230,288	2/1/2017	1/31/2020	
18-002	Stimulated X-Ray Emission Spectroscopy – A Powerful New Tool to Study Transition Metal Centers at X-Ray Free Electron Lasers	$0	$168,082	$168,082	5/1/2017	4/30/2020	
18-003	Charged Particle Beam Manipulation Using Carrier-Envelope Phase-Stable Coherently Combined Discretely Polarized Laser Pulses	$0	$275,364	$275,364	1/1/2017	12/31/2019	
18-004	Next Generation Power System Operator Training for Smart Grids	$0	$166,931	$166,931	10/1/2017	9/30/2020	
18-005	Machine Learning for Data Reduction at Linear Accelerator Coherent Light Source II: A Path Toward TeraHertz Detection	$0	$248,081	$248,081	10/1/2017	9/30/2020	
18-006	Gaussian Process Opt imization : Machine Learning for Linear Accelerator Coherent Light Source, Linear Accelerator Coherent Light Source II, and the Free Electron Laser Farm of the Future	$0	$193,051	$193,051	10/1/2017	9/30/2020	
18-007	Modeling Strong-Field Quantum Electrodynamics at SLAC	$0	$56,814	$56,814	5/1/2018	4/30/2021	
18-008	Emergent Spintronics In Complex Oxide Heterostructures	$0	$177,328	$177,328	5/1/2017	4/30/2020	
18-009	A Radio For Hidden Photon Dark Matter	$0	$31,592	$31,592	10/1/2015	9/30/2018	
18-010	Lead-Free Perovskites As Solar-Cell Absorbers	$0	$214,706	$214,706	11/1/2016	10/31/2019	
18-011	Multi-dimensional Interconnects	$0	$49,263	$49,263	10/1/2015	9/30/2018	
18-012	Fresh-Slice Beams at the Linear Accelerator Coherent Light Source II	$0	$263,571	$263,571	10/1/2017	9/30/2020	
18-013	Studying Bacterial Dehalogenation in Action	$0	$127,910	$127,910	2/1/2018	1/31/2021	
18-015	Accelerating Nanocrystal Synthetic Development	$0	$12,197	$12,197	10/1/2015	9/30/2018	
18-016	Developing Impulsive Nuclear and X-Ray Scattering to Study the Structural	$0	$41,310	$41,310	1/1/2018	12/31/2020	
18-017	Optimization and Demonstration of a Parallel-Feed Accelerator Structure for Superconducting Radio-Frequency Applications	$0	$172,669	$172,669	10/1/2017	9/30/2020	
18-018	Development of a High Repetition Rate Soft X-Ray Source in Preparation of Linear Accelerator Coherent Light Source II Experiments	$0	$343,333	$343,333	12/1/2017	11/30/2020	
18-019	Using Plasma and Coherent Radiation Wakefields for Manipulation of Phase Space of Relativistic Electron Beams	$0	$115,080	$115,080	5/1/2018	4/30/2021	
18-020	Novel Photoemissive Materials for Improving the Experimental Reach of Future Hard X-ray Free Electron Lasers	$0	$70,032	$70,032	5/1/2018	4/30/2021	
18-021	FY16 Panofsky - Cosmic Microwave Background Research	$0	$266,987	$266,987	10/1/2015	9/30/2018	
18-022	FY16 Panofsky - Advance Free Electron Laser Research	$0	$255,811	$255,811	10/1/2015	9/30/2018	
18-023	FY17 Panofsky-Development and Application of Ultrafast X-ray Imaging Techniques	$0	$218,896	$218,896	4/1/2017	3/31/2020	
18-024	FY17 Panofsky - ATLAS Research	$0	$216,467	$216,467	10/1/2016	9/30/2019	
18-025	FY18 Panofsky - Development of Multidimensional X-ray Spectroscopy with Stochastic Signal Recovery at SFEL	$0	$248,181	$248,181	9/1/2017	8/31/2020	
18-026	FY18 Panofsky - Novel Methods for Single-Particle Bio-imaging Using X-ray and Electron Sources	$0	$305,154	$305,154	11/1/2017	10/31/2020	
	Total # of Projects for SLAC : 36	**Total Equipment Cost for SLAC : $0**		**Total Other Cost for SLAC : $4,460,277**		**Total Cost for SLAC : $4,460,277**	
SNL - Sandia National Lab							
188288	Vertically-Injected Ultraviolet Laser Diodes	$0	$60,652	$60,652	6/10/2015	6/9/2018	Project was for 36 months over 4 fiscal years.
189614	Smart Sensor Technologies	$0	$4,558,598	$4,558,598	10/1/2015	9/21/2018	
190245	NanoCRISPR: A Revolutionary Therapeutic Platform for Rapidly Countering Emerging and Genetically-Enhanced Biological Threats (CRISPR = Clustered Regularly Interspaced Short Palindromic Repeats)	$0	$5,195,849	$5,195,849	10/1/2015	9/21/2018	
190958	Analyzing and Understanding of Transporters to Control Lignin Transformation into Fuel	$0	$542,821	$542,821	10/1/2015	9/21/2018	
190959	Unmasking Hidden Compounds within Hyperspectral Images	$0	$153,393	$153,393	10/1/2015	9/21/2018	
190960	Modular Abiotic/Biotic Systems for Understanding and Directing Biological Function	$0	$593,116	$593,116	10/1/2015	9/21/2018	
190961	Exploiting the Microbial Achilles Heel for New Broad Spectrum Anti-Microbials	$0	$559,432	$559,432	10/1/2015	9/21/2018	
190962	Engineering 'Green' Algae: Reducing Metabolic Waste for High Biomass Productivity	$0	$503,693	$503,693	10/1/2015	9/21/2018	
190963	Quantum Optimization and Approximation Algorithms	$0	$332,944	$332,944	10/1/2015	9/21/2018	
190965	Adverse Event Prediction Using Graph-Augmented Temporal Analysis	$0	$600,674	$600,674	10/1/2015	9/21/2018	
190966	Counter Adversarial Graph Analytics	$0	$793,285	$793,285	10/1/2015	9/21/2018	
190968	Subsystem Reduced-Order Modeling and Network Uncertainty Quantification for Rapid, Agile, Extreme-Scale Simulation	$0	$580,362	$580,362	10/1/2015	9/21/2018	
190970	Optimal Control and Design of Qubits	$0	$161,368	$161,368	10/1/2015	9/21/2018	
190971	Green Monopropellant System Design and Characterization for Threat Signature Analyses	$0	$427,059	$427,059	10/1/2015	9/21/2018	
190974	Optical Technology	$0	$472,005	$472,005	10/1/2015	9/21/2018	
190989	Creating Data for Validating Machine Learning Methods	$0	$337,487	$337,487	10/1/2015	9/21/2018	
190991	Multimodal Data Integration Under Uncertainty	$0	$458,146	$458,146	10/1/2015	9/21/2018	
190993	Implementing Neural Adaptive Filtering in Detection Systems	$0	$355,598	$355,598	10/1/2015	9/21/2018	
190997	Assessment of Non-Traditional Phenomenologies for Proliferation Detection	$0	$347,983	$347,983	10/1/2015	9/21/2018	
191005	Development and Demonstration of Alternative Precision Navigation Capabilities in Global Positioning System-Denied Environments	$0	$511,754	$511,754	10/1/2015	9/21/2018	
191017	A Fundamental Study on the Physicochemical Process of Soot Particle Inception	$0	$827,212	$827,212	10/1/2015	9/21/2018	
191051	Water Treatment System for Resilient Energy Production	$0	$452,227	$452,227	10/1/2015	9/21/2018	
191053	Investigating the Chemistry, Physics, Wear and Aging in Rolling Electrical Contact	$0	$509,037	$509,037	10/1/2015	9/21/2018	
191055	High-Resolution Modeling and Measurements in the Arctic	$0	$422,430	$422,430	10/1/2015	9/21/2018	
191056	Fundamentals of Pellet-Clad Debonding	$0	$528,786	$528,786	10/1/2015	9/21/2018	
191057	Co-optimization to Integrate Power System Reliability Decisions with Resiliency Decisions	$0	$189,849	$189,849	10/1/2015	9/21/2018	
191060	Understanding Soot Development and Thermal Stratification in Combustion Engines through Hyperspectral Non-linear Optical Diagnostics	$0	$661,739	$661,739	10/1/2015	9/21/2018	
191068	High-Throughput Material Characterization via 6-Degrees of Freedom Loading and Material Parameter Feedback	$0	$571,645	$571,645	10/1/2015	9/21/2018	
191069	Big-Data Multi-Energy Iterative Volumetric Reconstruction Methods for As-Built Validation & Verification Applications	$0	$472,471	$472,471	10/1/2015	9/21/2018	
191074	Reduced Order Models of Structures Incorporating Complex Materials	$0	$122,493	$122,493	10/1/2015	9/21/2018	
191076	Turbulent Flow Uncertainty Quantification using Machine Learning Techniques	$0	$696,009	$696,009	10/1/2015	9/21/2018	
191087	High Fidelity Hybrid Method for In Situ Borehole Stress Determination	$0	$492,205	$492,205	10/1/2015	9/21/2018	
191133	Chemical-Mechanical Modeling of Subcritical-to-Critical Fracture in Geomaterials	$0	$496,489	$496,489	10/1/2015	9/21/2018	
191144	Changing the Engineering Design and Qualification Paradigm in Component Design and Manufacturing (Born Qualified)	$0	$4,183,715	$4,183,715	10/1/2015	9/21/2018	
191150	Arming and Firing System Charge State Determination using Unintended Radiated Electromagnetic Emissions	$0	$437,909	$437,909	10/1/2015	9/21/2018	
191151	Improving Render Safe Capabilities for National Security from Chemical and Biological Dissemination Devices	$0	$520,507	$520,507	10/1/2015	9/21/2018	
191161	Eyes on the Ground: Visual Verification for On-Site Inspection	$0	$508,787	$508,787	10/1/2015	9/21/2018	
191175	Rapid Automated Pathogen Identification by Enhanced Ribotyping	$0	$614,499	$614,499	10/1/2016	9/21/2018	
191183	Applying Biological Immune-System Concepts to Improve Electronic Biosurveillance System Performance	$0	$359,307	$359,307	10/1/2015	9/21/2018	
191184	Polarimetry for Extended Persistence and Range in Fog for Infrastructure Protection	$0	$485,034	$485,034	10/1/2016	9/21/2018	
191186	Understanding Transport and Aging Mechanisms to Optimize Sandia's Ion-Conducting Electrolytes for Energy Applications	$0	$658,535	$658,535	10/1/2015	9/21/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
191187	Electrochemical Model of Humidity-Driven Corrosion	$0	$76,049	$76,049	10/1/2015	9/21/2018	
191188	Interfacial Effects on the Microstructure and Morphology of Energetic Materials	$0	$213,739	$213,739	10/1/2015	9/21/2018	
191191	High Power Solid-State Lithium-ion Batteries Through Interface Engineering	$0	$598,055	$598,055	10/1/2015	9/21/2018	
191194	Cooperative Self-Assembly for Structure and Morphology Control of Energetic Materials	$0	$544,477	$544,477	10/1/2015	9/21/2018	
191196	Quantum Nanofabrication: Mechanisms and Fundamental Limits	$0	$603,747	$603,747	10/1/2015	9/21/2018	
191198	Scandium Aluminum Nitride for Advanced Piezoelectric Sensors, Actuators, and Filters	$0	$454,355	$454,355	10/1/2015	9/21/2018	
191199	Highly Efficient Solar-Blind Single Photon Detectors	$0	$514,640	$514,640	10/1/2015	9/21/2018	
191203	A New Paradigm in Chem/Bio Threat Detection: Evaluating Threats Based on Biological Function Rather than Chemical Form	$0	$431,468	$431,468	10/1/2015	9/21/2018	
191204	Optimization of Sputtered Aluminum Nitride for the Seeding of Metal Organic Chemical Vapor Deposition Gallium Nitride Films	$0	$46,952	$46,952	10/1/2015	9/21/2018	
191210	Developing a Solid State Technology for Electron Spin Qubits on Liquid Helium	$0	$473,614	$473,614	10/1/2015	9/21/2018	
191211	A Platform for Quantum Information and Large-Scale Entanglement with Rydberg Atoms in Programmable Optical Potentials	$0	$260,527	$260,527	10/1/2015	9/21/2018	
191221	Topological Photonics: The Quest for Ultimate Photon Control	$0	$297,639	$297,639	10/1/2015	9/21/2018	
191223	A New All-Dielectric Nanolaser	$0	$220,457	$220,457	10/1/2015	9/21/2018	
191227	Bridging the Gap: Evaluating Compatibility and Reliability of Interfaces between Additively Manufactured and Conventional Gas Transfer System Components	$0	$167,806	$167,806	10/1/2015	9/21/2018	
191229	Advanced Neutron Generator	$0	$709,814	$709,814	10/1/2015	9/21/2018	
191232	Multi-Material Additive Manufacturing for Trusted Ceramic Packages with Embedded Capacitors	$0	$810,546	$810,546	10/1/2015	9/21/2018	
191234	Creating Robust and Secure Free-Space Optical Systems for Information and Power Transmission in Confined Environments	$0	$49,495	$49,495	10/1/2015	9/21/2018	
191235	Time-Resolved X-Ray Diffraction Measurements on Laser-Compressed Polycrystalline Samples Using a Multi-Pulse, Short-Pulse Laser Generated X-Ray Source	$0	$718,789	$718,789	10/1/2015	9/21/2018	
191237	Current Loss in 0.1 - 100 Terawatt Vacuum Transmission Lines: Next-Generation Experiments and Physics-Based Simulations	$0	$859,836	$859,836	10/1/2015	9/21/2018	
191239	Adjoint-Based Methods for Optimization and Uncertainty Quantification in Particle Transport	$0	$469,995	$469,995	10/1/2015	9/21/2018	
191240	Correlating the Structural and Electrical Performance of Microelectronics during a Radiation Event	$0	$604,276	$604,276	10/1/2015	9/21/2018	
192762	Novel Microelectromechanical-System-Enabled Nanofracking of Subsurface Minerals	$0	$541,548	$541,548	11/2/2015	9/21/2018	
192786	A Compact, Spectrally-Tunable Source of Entangled Photon-Pairs for Quantum Sensing	$0	$501,679	$501,679	11/3/2015	9/21/2018	
193231	Developing Fugitive Emissions Sensor Networks: New Optimization Algorithms for Monitoring, Measurement and Verification	$0	$295,576	$295,576	11/19/2015	9/21/2018	
193407	Additively Manufactured Shock Absorbing Engineered Materials	$0	$133,815	$133,815	1/11/2016	9/21/2018	
193419	Development of Detection and Mitigation Algorithms for False Data Injection Cyberattacks against Nuclear Facilities	$0	$80,480	$80,480	12/2/2015	9/21/2018	
193422	Understanding the Physics of Silicon-Germanium Heterojunction Bipolar Transistors for Cutting-edge Electronics at Deep Cryogenic Temperatures	$0	$102,348	$102,348	12/2/2015	9/21/2018	
193424	Motion and Trajectory Algorithms for Visual Information Foraging in Intelligence Analysis Workflows	$0	$298,235	$298,235	12/7/2015	9/21/2018	
195868	Electromagnetic (Optical/Radio Frequency) Signatures Associated with Atmospheric Discharges and Plasma Generation in Explosive Events	$0	$121,143	$121,143	4/1/2016	9/21/2018	
195880	Coupled Electron-Photon Monte Carlo Radiation Transport for Next-Generation Computing Systems	$0	$217,395	$217,395	3/23/2016	9/21/2018	
195881	Sequential Design of Experiments for Accelerated Life Testing	$0	$37,369	$37,369	3/23/2016	9/21/2018	
196390	Event Correlation using Spatio-Temporal Point Processes	$0	$352,640	$352,640	4/11/2016	9/21/2018	
199972	Three-Dimensional Multicolor Superresolution Microscopy for Imaging the Machinery of Cells and Capturing Biochemical Interfaces	$0	$259,804	$259,804	10/1/2016	9/20/2019	
199973	Selection of Ribosomes from Infected Mammalian Cells to Identify Viral Pathogens	$0	$438,375	$438,375	10/1/2016	9/20/2019	
199974	Diagnostic Tool for Measuring Early Chemical Signatures of Pond Crash	$0	$547,589	$547,589	10/1/2016	9/20/2019	
199975	Big Data, Machine Learning and Dynamic Complex System Modeling to Improve Algae Cultivation	$0	$602,425	$602,425	10/1/2016	9/20/2019	
199977	A Disaggregated Memory Architecture for Future High-Performance Computing	$0	$329,540	$329,540	10/1/2016	9/20/2019	
199981	Compatible Particle Methods: a New Paradigm for Structure-Preserving Discretization Without a Mesh	$0	$622,359	$622,359	10/1/2016	9/20/2019	
199982	Multi-Level Memory Algorithmics for Large, Sparse Problems	$0	$613,039	$613,039	10/1/2016	9/20/2019	
199983	Fast and Robust Linear Solvers Based on Hierarchical Matrices	$0	$469,369	$469,369	10/1/2016	9/20/2019	
199984	Diffusion Maps: A Unified Framework for Reasoning About Imperfect Data	$0	$436,820	$436,820	10/1/2016	9/20/2019	
199986	Parallel Tensor Decompositions for Massive, Heterogeneous, Incomplete Data	$0	$656,178	$656,178	10/1/2016	9/20/2019	
199988	Stochastic Optimization to Enhance Resiliency and Response Strategies in Critical Infrastructure	$0	$479,174	$479,174	10/1/2016	9/20/2019	
199992	Latent, Passive, Low-Energy X-ray Exposure Indicator	$0	$281,515	$281,515	10/1/2016	9/21/2018	
200013	Exploring Active Metal Spectroscopic Emissions in Explosive Detonations for Improved Weapon Discrimination	$0	$315,947	$315,947	10/1/2016	9/21/2018	
200014	Enhanced Single-Frame Closely-Spaced Object Processing	$0	$245,891	$245,891	10/1/2016	9/21/2018	
200015	The Chemical Composition of Vaporized Ground Materials	$0	$176,655	$176,655	10/1/2016	9/21/2018	
200016	Exploring the Effects of Silicon Ultra-thinning on Integrated Circuit Behavior	$0	$274,150	$274,150	10/1/2016	9/21/2018	
200018	Assessment of Post-Quantum Cryptographic Algorithms - Classified Project	$0	$296,719	$296,719	10/1/2016	9/21/2018	
200019	Featureless Radio-Frequency/Microwave Structures	$0	$208,758	$208,758	10/1/2016	9/21/2018	
200020	Improved Mobile Device Positioning via Contextual Awareness	$0	$238,376	$238,376	10/1/2016	9/20/2019	
200022	Advanced Synthetic Aperture Radar Exploitation	$0	$159,238	$159,238	10/1/2016	9/20/2019	
200058	Landscape Monitoring using High-Resolution Remotely Sensed Imagery	$0	$418,969	$418,969	10/1/2016	9/21/2018	
200059	Scalable, Targeted Code Analysis using Application Programming Interface Abstraction	$0	$325,266	$325,266	10/1/2016	9/21/2018	
200060	Enabling Novel, Game-Changing Radar Sensing via Ultra-Wideband Polarimetry	$0	$193,627	$193,627	10/1/2016	9/20/2019	
200061	Ionospheric Impacts on Space-Based Radars: Characterization and Mitigation	$0	$289,796	$289,796	10/1/2016	9/20/2019	
200063	Additively Manufactured, Athermal, Broadband, and Light-Weight Optical Telescope	$0	$209,925	$209,925	10/1/2016	9/20/2019	
200065	Persistent Tracking of Dismounts by Multichannel Radar	$0	$212,818	$212,818	10/1/2016	9/20/2019	
200066	Novel Approach for Uniform, Localized Die Thinning	$0	$172,436	$172,436	10/1/2016	9/21/2018	
200067	Broadband Extremely Low-Profile Antennas	$0	$146,915	$146,915	10/1/2016	9/20/2019	
200068	Understanding the Scientific Basis Behind Assumptions in Aerothermal Modeling	$0	$274,289	$274,289	10/1/2016	9/21/2018	
200069	Ultra Low Level Security Introspection of Computer Operating Systems	$0	$294,449	$294,449	10/1/2016	9/20/2019	
200070	Rapid Abstraction in Confined Environments	$0	$435,526	$435,526	10/1/2016	9/20/2019	
200071	Creating an Interprocedural Analyst-Oriented Data Flow Representation for Binary Program Analysis	$0	$385,790	$385,790	10/1/2016	9/21/2018	
200098	A Novel Joint Hierarchical Model For Hyper-Spectral Target Prediction	$0	$314,254	$314,254	10/1/2016	9/21/2018	
200105	Entity Resolution at Large Scale: Benchmarking and Algorithmics	$0	$265,430	$265,430	10/1/2016	9/21/2018	
200106	Neural Inspired Computation Remote Sensing Platform	$0	$298,005	$298,005	10/1/2016	9/20/2019	
200113	Mitigation of Cyber Proliferation	$0	$420,458	$420,458	10/1/2016	9/21/2018	
200114	Compact Low-Power Chemical Detector	$0	$261,796	$261,796	10/1/2016	9/20/2019	
200115	Low-Cost, Large Area Neutron Sensor	$0	$317,617	$317,617	10/1/2016	9/21/2018	
200133	Waveform-Agile Multi-Channel Cognitive Digital Radar for Multi-Mission Intelligence Surveillance and Reconnaissance and Radio-Frequency-Enabled Cyber	$0	$510,731	$510,731	10/1/2016	9/20/2019	
200134	A 1 volt, 1 watt, 100 gigahertz Electro-optic Modulator on Silicon for Space Applications	$0	$287,880	$287,880	10/1/2016	9/20/2019	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
200135	Spiking/Processing Array (SPARR) for Wide Dynamic Range and High Resolution Photonic Sensing	$0	$411,083	$411,083	10/1/2016	9/20/2019	
200136	Multilayered Solid State Neutron Detector for Nonproliferation Applications	$0	$378,949	$378,949	10/1/2016	9/21/2018	
200137	Avalanche Photodiode Arrays for High Dynamic Range Infrared Detection	$0	$329,259	$329,259	10/1/2016	9/20/2019	
200138	Extreme Power Radio-Frequency Amplifiers	$0	$341,755	$341,755	10/1/2016	9/20/2019	
200140	Geospatially Aware System of Systems Decision Capability	$0	$337,074	$337,074	10/1/2016	9/20/2019	
200143	Donor Quantum-Dot Four-Qubit Assessment Platform	$0	$253,217	$253,217	10/1/2016	9/21/2018	
200145	Cryogenic Ingress and Egress of Optical Signals for Cyber	$0	$282,195	$282,195	10/1/2016	9/21/2018	
200147	Diversity for Microelectronics Lifecycle Security	$0	$317,757	$317,757	10/1/2016	9/21/2018	
200149	Deciphering Atmospheric Ice Nucleation using Molecular-Scale Microscopy	$0	$634,131	$634,131	10/1/2016	9/20/2019	
200150	Developing Process-Microstructure-Property Correlation of Radiation-Tolerant Nanoporous and Nanostructured Materials for High Irradiation Environments	$0	$601,788	$601,788	10/1/2016	9/20/2019	
200151	Novel Zoned Wasteforms for High-Priority Radionuclide Waste Streams	$0	$493,027	$493,027	10/1/2016	9/20/2019	
200152	Enhancing Power Plant Safety through Coupling Plant Simulators to Cyber Digital Architecture Model	$0	$515,963	$515,963	10/1/2016	9/21/2018	
200165	A New Method to Contain Molten Corium in Catastrophic Nuclear Reactor Accidents	$0	$463,431	$463,431	10/1/2016	9/20/2019	
200166	In-Cylinder Diagnostics to Overcome Efficiency Barriers in Natural Gas Engines	$0	$434,259	$434,259	10/1/2016	9/21/2018	
200167	Bio-Inspired Ion-Selective Electrodialysis Membranes	$0	$732,166	$732,166	10/1/2016	9/20/2019	
200168	Exploring Fundamental Limitations of Manganese Oxide Cathodes for Reversible Zinc/Manganese Dioxide Batteries	$0	$444,015	$444,015	10/1/2016	9/20/2019	
200169	Passive Magnetoelastic Smart Sensors for a Resilient Energy Infrastructure	$0	$311,011	$311,011	10/1/2016	9/20/2019	
200170	Discovering the Physics of Blast and Fluid Structure Interactions: A Novel Experimental-Computational Approach	$0	$856,995	$856,995	10/1/2016	9/20/2019	
200171	Design of Acoustic Metamaterials for Shock and Vibration Control in Weapon Systems	$0	$771,708	$771,708	10/1/2016	9/20/2019	
200172	Physics of Discharge Initiation from Complex Surfaces	$0	$512,295	$512,295	10/1/2016	9/20/2019	
200174	Illumination of Damage with High-Strength Alloys in Abnormal Mechanical Environments	$0	$324,004	$324,004	10/1/2016	9/20/2019	
200175	Residual Stress Inversion using Ultrasonic Surface Waves, X-Ray Diffraction, and Sacrificial Material	$0	$508,474	$508,474	10/1/2016	9/20/2019	
200176	Uncertainty Quantification of Microstructural Material Variability Effects	$0	$724,400	$724,400	10/1/2016	9/20/2019	
200177	Pushing Continuum Reactive Capabilities through Novel Sub-Grid and Statistical Methods	$0	$622,576	$622,576	10/1/2016	9/20/2019	
200180	Integrated Geomechanics and Geophysics in Induced Seismicity: Mechanisms and Monitoring	$0	$496,671	$496,671	10/1/2016	9/20/2019	
200181	Monitoring and Repair of Damaged Cement-Geomaterial Interfaces in High Pressure High Temperature Repository and Borehole Scenarios	$0	$668,335	$668,335	10/1/2016	9/20/2019	
200182	Attribution of Methane Emissions in the Arctic and Continental United States	$0	$373,949	$373,949	10/1/2016	9/20/2019	
200183	Prediction and Inference of Multi-scale Electrical Properties of Geomaterials	$0	$573,433	$573,433	10/1/2016	9/20/2019	
200184	Enabling Modular Architectures with Radiation-Hard Bus-Based Power Delivery	$0	$4,469,807	$4,469,807	10/1/2016	9/20/2019	
200185	Inferring Proliferation from Supply Chain Signals	$0	$487,901	$487,901	10/1/2016	9/20/2019	
200186	Controlling the Activity of Gene Editing Tools	$0	$638,308	$638,308	10/1/2016	9/20/2019	
200188	Cognitive Information Environments for International Safeguards Inspections	$0	$462,744	$462,744	10/1/2016	9/20/2019	
200189	Efficient and Scalable Modeling of Non-Traditional Devices for Emulytics	$0	$559,859	$559,859	10/1/2016	9/20/2019	
200190	Polarized Radar for Detection and Automatic Non-Visual Assessment of Unmanned Aerial Systems	$0	$369,092	$369,092	10/1/2016	9/20/2019	
200191	Quantifying Uncertainty in Emulations	$0	$348,185	$348,185	10/1/2016	9/20/2019	
200193	A Novel Approach to Foot and Mouth Disease Early Detection, Epizootic Surveillance, and Differentiating Infection from Vaccination Status	$0	$548,972	$548,972	10/1/2016	9/20/2019	
200194	Highly Sensitive Atomic Electrometry for Non-Invasively Detecting and Diagnosing Electronics	$0	$401,940	$401,940	10/1/2016	9/20/2019	
200195	Xenon Atom Trap Trace Analysis Enabled by Optical Isotopic Enrichment	$0	$382,043	$382,043	10/1/2016	9/20/2019	
200196	Engineered Materials for Deactivation of Chemical Agents in Non-Aqueous, Non-Corrosive Environments	$0	$421,657	$421,657	10/1/2016	9/20/2019	
200197	Enabling Hydrogen Infrastructure through Surface Passivation of Structural Materials	$0	$705,910	$705,910	10/1/2016	9/20/2019	
200199	Engineering Next-Generation Zero Thermal Expansion Composite Materials for Additive Manufacturing Technologies	$0	$310,039	$310,039	10/1/2016	9/20/2019	
200200	Predicting the Friction Behavior of Body-Centered Cubic Metal and Alloys	$0	$505,229	$505,229	10/1/2016	9/20/2019	
200201	Mechanistic Origins of Stochastic Rupture in Metals	$0	$650,400	$650,400	10/1/2016	9/20/2019	
200202	Making Density Functional Theory Work for all Materials	$0	$200,953	$200,953	10/1/2016	9/20/2019	
200203	Magnetic Nanocomposites for High Performance Inductor Materials	$0	$712,740	$712,740	10/1/2016	9/20/2019	
200204	Investigating Phase Evolution in Chemical Wavefronts Subject to High Heating Rates	$0	$541,927	$541,927	10/1/2016	9/20/2019	
200226	Rad Hard Devices Science Using Quasi-Electric Fields	$0	$591,355	$591,355	10/1/2016	9/20/2019	
200227	Additional Processing of Commercial Fin Field Effect Transistor Devices and Their Radiation Properties	$0	$423,865	$423,865	10/1/2016	9/21/2018	
200228	Near Infrared Nanophotonics through Dynamic Control of Carrier Density in Conducting Ceramics	$0	$534,996	$534,996	10/1/2016	9/20/2019	
200229	Active and Nonreciprocal Radio-Frequency Acoustic Microsystems	$0	$617,612	$617,612	10/1/2016	9/20/2019	
200230	What is Happening in Narrow-Band-Gap Devices? - Radiation Induced Defects and Recombination	$0	$418,949	$418,949	10/1/2016	9/21/2018	
200231	A Truly Micro-scale Low Cost, Size, Weight, and Power Gyroscope based on Optomechanical Oscillation	$0	$500,286	$500,286	10/1/2016	9/20/2019	
200232	Digital Electronics at the Atomic Limit	$0	$684,909	$684,909	10/1/2016	9/20/2019	
200233	MilliKelvin High-Electron-Mobility Transistor Amplifiers for Low Noise, High Bandwidth Measurement of Quantum Devices	$0	$409,274	$409,274	10/1/2016	9/21/2018	
200236	Developing Thermally Activated Acid Release Agents	$0	$161,352	$161,352	10/1/2016	9/21/2018	
200237	Understanding Silicon-Decorated Nanoporous-Carbon Anodes for High-Performance Lithium-Ion Energy Storage	$0	$270,182	$270,182	10/1/2016	9/20/2019	
200238	Engineering Spin-Orbit Interaction in Silicon	$0	$244,466	$244,466	10/1/2016	9/21/2018	
200240	Electro-optical Control over Silicon Vacancy Center Emission in Diamond	$0	$207,927	$207,927	10/1/2016	9/21/2018	
200241	Nanocomposite Films with Tunable Physical Properties as Robust Corrosion Barriers	$0	$501,402	$501,402	10/1/2016	9/20/2019	
200242	Targeting a 100X Reduction from Design to Analysis: An Agile Workflow for Stronglink Design	$0	$502,159	$502,159	10/1/2016	9/21/2018	
200243	Agile Component Design Through Integrated Diagnostics and Computational Optimization	$0	$637,677	$637,677	10/1/2016	9/20/2019	
200245	Rectenna Thermal Power Supply	$0	$451,008	$451,008	10/1/2016	9/20/2019	
200248	Dynamic Strain Aging in Additive Manufactured Alloys and Components	$0	$1,022,960	$1,022,960	10/1/2016	9/20/2019	
200253	Novel Materials to Enable Future Weapon Architectures	$0	$567,749	$567,749	10/1/2016	9/20/2019	
200254	Non-Destructive Evaluation for Encapsulated Component Qualification	$0	$753,781	$753,781	10/1/2016	9/20/2019	
200256	Advanced Positional Awareness Employing Extremely Cold Atoms	$0	$570,009	$570,009	10/1/2016	9/20/2019	
200257	A Silicon/compound semiconductor Photonics Platform for Optical Data Communications and High Functionality Photonics	$0	$663,381	$663,381	10/1/2016	9/20/2019	
200260	Investigation of 10-28 nanometers Commercial Integrated Circuits for use in Nuclear Weapon Radiation Environments	$0	$393,215	$393,215	10/1/2016	9/20/2019	
200264	Single Event Effects in Sandia's Semiconductor Devices and Acceptance Testing in Integrated Circuits	$0	$498,374	$498,374	10/1/2016	9/20/2019	
200265	Polynomial Chaos methods in Xyce for Embedded Uncertainty Quantification Circuit Analysis	$0	$507,508	$507,508	10/1/2016	9/20/2019	
200267	Development of Fast Pulse Intense Neutron Generation Capability by Beam-Target Interaction on Hermes-III for Radiation Effects Testing	$0	$323,335	$323,335	10/1/2016	9/20/2019	
200268	Stochastic Shock in Advanced Materials	$0	$851,578	$851,578	10/1/2016	9/20/2019	

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200269	Benchmarking three-dimensional Magnetohydrodynamic Simulations of Electrothermal Instability Growth	$0	$423,166	$423,166	10/1/2016	9/20/2019	
200271	High-Energy X-Ray Detectors using Fast, High-atomic number Semiconductors	$0	$368,687	$368,687	10/1/2016	9/20/2019	
200275	Prediction and Design of Nonlinear Systems and their Emergent Behavior	$0	$225,150	$225,150	10/1/2016	9/20/2019	
200276	Towards Multi-Fluid Multi-Physics Continuum Plasma Simulation for Modeling Magnetically-Driven Experiments on Z Machine	$0	$568,146	$568,146	10/1/2016	9/20/2019	
201545	Mechanical Communication using Piezoelectric-Magnetoelastic Transducers	$0	$700,987	$700,987	10/27/2016	9/20/2019	
201876	Engineering Microbial Assassins to Target Bacterial Pathogens	$0	$25,421	$25,421	11/10/2016	9/21/2018	
201939	Tools and Techniques for PRESTIGE (PRactical Evaluation and Synthesis of Trust In Government systEms)	$0	$1,982,630	$1,982,630	11/14/2016	9/20/2019	
203202	Nano-Engineering of Detector Surfaces to Offer Unprecedented Imager Sensitivity to Soft X-rays and Low Energy Electrons	$0	$242,836	$242,836	1/19/2017	9/20/2019	
203429	Topological Quantum Material for Quantum Computation	$0	$1,299,968	$1,299,968	1/26/2017	9/20/2019	
203433	A Domain-Specific Language for High-Consequence Control Software	$0	$315,109	$315,109	1/26/2017	9/20/2019	
203537	An Exascale Computational Simulation Capability for Pervasive Fracture & Failure of Structures	$0	$233,173	$233,173	1/30/2017	9/20/2019	
203539	Mitigating Charge Carrier Generation in Silicon to Enhance Backside Laser Failure Analysis	$0	$311,881	$311,881	1/30/2017	9/21/2018	
204724	Renewable Hydrogen Production via Thermochemical/Electrochemical Coupling	$0	$9,847	$9,847	3/14/2017	9/21/2018	
204725	Inkjet Printing Metal Organic Frameworks for Next Generation Electronics and Optoelectronics	$0	$240,868	$240,868	3/14/2017	9/21/2018	
204977	Signatures of Genome Editing	$0	$1,008,497	$1,008,497	3/21/2017	9/20/2019	
206536	Testing the Possibility of Magnetic Contrast Imaging Based on Circular and Linear Dichroism using Photoemission Electron Microscopy	$0	$61,918	$61,918	5/24/2017	9/21/2018	
206861	Improved Industrial Control Systems Resilience Through Automated Detection and Response	$0	$395,353	$395,353	6/7/2017	9/20/2019	
209189	Rapid Antimicrobial Susceptibility Determination using Acoustic Resonance	$0	$155,058	$155,058	10/1/2017	9/21/2018	
209190	Engineering Cells for Personalized Antimicrobial Therapy	$0	$699,021	$699,021	10/1/2017	9/18/2020	
209191	Diversified Therapeutic Phage Cocktails from Close Relatives of the Target Bacterium	$0	$678,962	$678,962	10/1/2017	9/18/2020	
209192	Neural Algorithms for Low Power Implementation of Partial Differential Equations	$0	$475,653	$475,653	10/1/2017	9/21/2018	
209193	Statistical Uncertainty Quantification for Multivariate Physical Parameter Estimation with Multivariate Outputs	$0	$277,552	$277,552	10/1/2017	9/20/2019	
209194	Linear Programming in Strongly Polynomial Time	$0	$389,213	$389,213	10/1/2017	9/18/2020	
209195	Distributed-In-Time Techniques for Optimization at Extreme Scales	$0	$577,350	$577,350	10/1/2017	9/18/2020	
209196	Mixed-Integer Partial-Differential-Equation-Constrained Optimization	$0	$450,731	$450,731	10/1/2017	9/18/2020	
209197	Efficient, Scalable Tomography of Many-Qubit Quantum Processors	$0	$293,046	$293,046	10/1/2017	9/18/2020	
209198	Information-Theoretic Algorithms to Quantify Genomic Information for Genomic Security	$0	$390,875	$390,875	10/1/2017	9/20/2019	
209199	A Parallel Optics Approach to Snapshot Hyperspectral Imaging	$0	$328,467	$328,467	10/1/2017	9/20/2019	
209200	Building the World's First Laser Refrigerated Sensor	$0	$391,568	$391,568	10/1/2017	9/18/2020	
209201	Shock Tube Measurements of Hot Dense Gas Luminosity and Opacity for Constructing Opacity Tables	$0	$348,009	$348,009	10/1/2017	9/18/2020	
209202	Ultra-Efficient Sensing System through Holistic Design	$0	$399,983	$399,983	10/1/2017	9/18/2020	
209203	Finite Set Statistics Based Distributed Optimal Control for Space Surveillance	$0	$316,541	$316,541	10/1/2017	9/20/2019	
209204	Miniaturized Explosive Test for Optical Emission Diagnostics	$0	$364,657	$364,657	10/1/2017	9/18/2020	
209205	Chip-Scale Nano-Optomechanical Platform for High-Bandwidth, High-Efficiency Radio Frequency Signal Processing	$0	$221,778	$221,778	10/1/2017	9/18/2020	
209206	Three-Dimensional Printed Waveguide Optics for Transformative Sensors	$0	$343,059	$343,059	10/1/2017	9/18/2020	
209207	Quantum-Enhanced Imaging System with Unprecedented Resolution	$0	$244,272	$244,272	10/1/2017	9/20/2019	
209208	Efficient Real-Time Cognition at the Point of Sensing	$0	$341,614	$341,614	10/1/2017	9/18/2020	
209209	Intelligent Customized Spot Shielding for Microelectronics in Space Applications	$0	$219,291	$219,291	10/1/2017	9/18/2020	
209210	Autonomous Detection and Assessment with Moving Sensors: A Foundation for Future Physical Security Systems	$0	$640,737	$640,737	10/1/2017	9/18/2020	
209211	Emulating Genome Security Risks in Realistic Genomics Data Ecosystems	$0	$518,787	$518,787	10/1/2017	9/21/2018	
209212	Data Enrichment for Improved Intelligence Value and Situational Awareness	$0	$370,022	$370,022	10/1/2017	9/18/2020	
209215	Rapid Assessment of Autoignition Propensity in Novel Fuels and Blends	$0	$400,361	$400,361	10/1/2017	9/18/2020	
209216	Innovative Technologies for Optical Detection of Stress Corrosion Cracks	$0	$378,844	$378,844	10/1/2017	9/21/2018	
209217	A Predictive Model for Arctic Coastal Erosion	$0	$713,322	$713,322	10/1/2017	9/18/2020	
209218	Probiotic, Optimized Strains of Specifically Engineered Bacteria	$0	$417,500	$417,500	10/1/2017	9/18/2020	
209219	Coupling of Laminar-Turbulent Transition Modeling with Reynolds-averaged Navier-Stokes Computational Fluid Dynamics	$0	$257,854	$257,854	10/1/2017	9/18/2020	
209220	A Unified Framework for Quantification of Margin and Uncertainty	$0	$329,712	$329,712	10/1/2017	9/20/2019	
209222	Explosive Challenge: Revolutionizing Spatial and Temporal Blast Characterization	$0	$618,425	$618,425	10/1/2017	9/18/2020	
209223	Connecting Polymer Physics and Microstructure With Large-Deformation Polymer Foam Mechanics	$0	$498,230	$498,230	10/1/2017	9/18/2020	
209224	Role of Phonon-to-Vibration Energy Transfer in Initiation of Energetic Materials	$0	$386,057	$386,057	10/1/2017	9/18/2020	
209225	An Agile Design-to-Simulation Workflow Using a New Conforming Moving Least Squares Method	$0	$406,654	$406,654	10/1/2017	9/20/2019	
209226	Development of an Electromagnetic Resonance Dampener to Improve Shielding Effectiveness	$0	$97,929	$97,929	10/1/2017	9/21/2018	
209227	Visualizing Clustering and Uncertainty Analysis with Multivariate Longitudinal Data	$0	$101,160	$101,160	10/1/2017	9/21/2018	
209228	Characterizing the Spatiotemporal Evolution of Xenobiotic Degrading Microbes	$0	$79,286	$79,286	10/1/2017	9/21/2018	
209229	Lattice-Matched, Low-Dislocation Density Epitaxy Using Non-Traditional Alloys	$0	$102,513	$102,513	10/1/2017	9/21/2018	
209230	Arctic Tipping Points Triggering Global Change	$0	$193,738	$193,738	10/1/2017	9/18/2020	
209231	Unlocking Real Time Infrasound Event Classification Abilities using Machine Learning	$0	$102,617	$102,617	10/1/2017	9/20/2019	
209233	Developing the Color Key for "Hyperspectral Google Earth"	$0	$97,986	$97,986	10/1/2017	9/21/2018	
209234	Characterization and Sampling of Ultralow Permeability Geomaterials using Electrokinetics	$0	$192,720	$192,720	10/1/2017	9/18/2020	
209235	Optimizing Electromagnetic Signal Transmission for Distributed Embedded Wireless Sensors for Geoscience Applications	$0	$129,956	$129,956	10/1/2017	9/21/2018	
209236	Active Tracers for In Situ Computing in Porous and Fractured Media	$0	$157,982	$157,982	10/1/2017	9/21/2018	
209237	Real-Time Subsurface Event Assessment and Detection	$0	$203,027	$203,027	10/1/2017	9/18/2020	
209238	Strategic Inertial Guidance with Matter Waves	$0	$4,956,910	$4,956,910	10/1/2017	9/18/2020	
209239	Electro Magnetic Pulse-Resilient Electric Grid for National Security	$0	$2,069,527	$2,069,527	10/1/2017	9/18/2020	
209240	Towards Predictive Plasma Science and Engineering through Revolutionary Multi-Scale Algorithms and Models	$0	$4,676,043	$4,676,043	10/1/2017	9/18/2020	
209241	AMPPED Components: Advanced Models of the Physics and Phenomena of Electrical Discharge	$0	$1,477,350	$1,477,350	10/1/2017	9/18/2020	
209242	Designer Quantum Materials	$0	$302,893	$302,893	10/1/2017	9/20/2019	
209243	Describing the Chemical Steps of Hydrogen Incorporation in Metal Hydrides using Time-Resolved Environmental X-ray Photoelectron Spectroscopy	$0	$598,509	$598,509	10/1/2017	9/18/2020	
209244	Identifying Rare, Disqualifying Flaws in Additively Manufactured Components	$0	$511,700	$511,700	10/1/2017	9/18/2020	
209245	Nanomaterial Ink Development for Smart Manufacturing	$0	$259,899	$259,899	10/1/2017	9/18/2020	
209246	High Entropy Alloys: A Materials Solution to Metals Additive Manufacturing	$0	$604,292	$604,292	10/1/2017	9/18/2020	
209247	Characterizing Ferromagnetic/Antiferromagnetic Interfaces for Ultrafast Spintronics	$0	$208,485	$208,485	10/1/2017	9/21/2018	
209248	Mitigation of Point Defects in Wide-Bandgap Semiconductors by Photo-Modification of Fermi Level during Growth	$0	$519,933	$519,933	10/1/2017	9/18/2020	
209249	An Interfacial Synaptic Transistor for Fast Neuromorphic Computing	$0	$249,633	$249,633	10/5/2017	9/18/2020	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
209250	Asynchronous Ballistic Reversible Computation with Superconducting Josephson Junctions	$0	$497,442	$497,442	10/1/2017	9/18/2020	
209251	Low-Power High-Speed Transistors Enabled by Ferroelectric Hafnium Oxide	$0	$468,691	$468,691	10/1/2017	9/18/2020	
209252	Graphene-Enabled On-Chip Spectroscopy	$0	$191,127	$191,127	10/1/2017	9/21/2018	
209253	High-Voltage Power-Transistors Enabled by Selective Area Regrowth of Positive/Negative Junctions Using Ultra-wide Bandgap Nitride Semiconductors	$0	$692,471	$692,471	10/1/2017	9/18/2020	
209254	Demonstrating Robustness of Analogue Quantum Simulators	$0	$413,496	$413,496	10/1/2017	9/18/2020	
209255	Wide-Range Solid-State Tuning for Acoustoelectronics	$0	$531,720	$531,720	10/1/2017	9/18/2020	
209256	Convolutional Scattering Networks for Autonomy	$0	$263,922	$263,922	10/1/2017	9/18/2020	
209257	Networked-based Cyber Analysis using Deep Packet Inspection for High-Speed Networks	$0	$294,883	$294,883	10/1/2017	9/20/2019	
209258	Micro-Detonic Effects on Single Crystalline Materials	$0	$329,516	$329,516	10/1/2017	9/20/2019	
209259	Suitability of Advanced Antenna Window Materials for Extreme Re-entry Environments	$0	$217,787	$217,787	10/1/2017	9/18/2020	
209260	Modeling Complex Relationships in Large-Scale Data using Hypergraphs	$0	$211,588	$211,588	10/1/2017	9/20/2019	
209261	Activity Waveforms: Measuring and Comparing the Rhythms of Complex Behaviors	$0	$310,650	$310,650	10/1/2017	9/18/2020	
209262	Semi-Autonomous Methods for Rapid Prototyping of Software Defined Radiofrequency Counter-Unmanned Aerial System Techniques	$0	$391,506	$391,506	10/1/2017	9/18/2020	
209263	Microelectronics-Based Neutron and Spectroscopic Gamma Detectors Using Compound Semiconductors	$0	$467,997	$467,997	10/1/2017	9/18/2020	
209264	Single Chip Micro Electro Mechanical Systems Ultrasonic Imaging System	$0	$446,068	$446,068	10/1/2017	9/18/2020	
209265	Unpowered, Stackable, Large Area Semiconductor Neutron Detector	$0	$422,550	$422,550	10/1/2017	9/20/2019	
209266	Diagnosing and Destroying Non-Markovian Noise in Qubits	$0	$191,692	$191,692	10/1/2017	9/18/2020	
209267	Synthetic Aperture Radar Image Formation and Feedback to Navigation Subsystem in Global Position System Denied and Degraded Environments	$0	$413,336	$413,336	10/1/2017	9/18/2020	
209268	Novel Applications of Near-Field Scanning Optical Microscopy	$0	$312,390	$312,390	10/1/2017	9/21/2018	
209269	Language-Independent Software Analysis	$0	$242,981	$242,981	10/1/2017	9/18/2020	
209270	Predictable Lifetime Devices	$0	$240,763	$240,763	10/1/2017	9/18/2020	
209271	Enabling Atomic Layer Precision during Circuit Edit and Global Back-Side Ultra-Thinning: A Path to Improved Failure Analysis of State-of-the-Art Microelectronic Devices	$0	$203,905	$203,905	10/1/2017	9/18/2020	
209272	Blockchain Derived Secure Computing	$0	$119,092	$119,092	10/1/2017	9/18/2020	
209273	Automated Threat Modeling for Cyber Security Analytics and Emulation	$0	$528,478	$528,478	10/1/2017	9/18/2020	
209274	Autonomous Sensor Tasking and Scheduling Across Multiple Platforms	$0	$410,975	$410,975	10/1/2017	9/18/2020	
209275	Enhance Substrate Binding of Organophosphorus Hydrolase via Unnatural Amino Acids Utilizing Advanced Transition State and Allosteric Modeling	$0	$198,127	$198,127	10/1/2017	9/20/2019	
209277	Phonon Blockade of the Superconducting Transition	$0	$102,924	$102,924	10/1/2017	9/20/2019	
209278	2-Dimensional and 3-Dimensional Real-Time Visualization of Magnetic Fields using Quantum Optics	$0	$241,586	$241,586	10/1/2017	9/20/2019	
209279	Microwave Doppler Charge Velocimetry for Narrow and Wide Bandgap Semiconductors	$0	$151,115	$151,115	10/1/2017	9/20/2019	
209280	Miniature Accelerometers with Sub-Microsecond Timescales for Characterization of Structural Dynamics	$0	$384,669	$384,669	10/1/2017	9/18/2020	
209281	Intrinsically Radiation-Hard, High-Voltage, Solid-State Switch	$0	$456,661	$456,661	10/1/2017	9/18/2020	
209282	Modular Optical Bus Fabrication by Additive Manufacturing and Heterogeneous Integration	$0	$440,968	$440,968	10/1/2017	9/18/2020	
209283	Fabricating Bilayer Resistive Random-Access Memory for a Radiation-Hard Non-Volatile Memory	$0	$335,228	$335,228	10/1/2017	9/20/2019	
209284	Fuze Positional Awareness and Jammer Resistance from Radar-Based Terrain Aiding	$0	$537,286	$537,286	10/1/2017	9/18/2020	
209285	Slurry-Processing Enabled Development of Thin, Large Surface Area, Non-Cylindrical Thermal Batteries for High Power Applications	$0	$505,316	$505,316	10/1/2017	9/18/2020	
209286	Sandia Heterogeneous Architecture of Disaggregated Electronics: Advanced Packaging to Increase Radiation-Hardened Capabilities and Trust	$0	$400,965	$400,965	10/1/2017	9/20/2019	
209287	Modeling Low Density Plasma in Electrode/Target Systems for High Current Pulsed Power	$0	$707,740	$707,740	10/1/2017	9/18/2020	
209289	Advancing the Understanding of Laser-Plasma Interactions in High-Energy Density Plasma	$0	$188,494	$188,494	10/1/2017	9/18/2020	
209290	Testing Effects of 14 Mega Electron Volt Neutrons on Materials and Devices at the Sandia Ion Beam Laboratory	$0	$460,706	$460,706	10/1/2017	9/20/2019	
209298	Creating Automatic Information Theoretic Analysis to Assist in Reverse Engineering Binary Image Formats	$0	$302,686	$302,686	10/1/2017	9/20/2019	
209505	Self-Assembly Assisted Additive Manufacturing of Thermoset Materials	$0	$160,824	$160,824	10/10/2017	9/20/2019	
209652	Modeling Energy Transfer and Melting Efficiencies in Fusion Metal Additive	$0	$192,646	$192,646	10/19/2017	9/20/2019	
209678	Nanomagnet-Based Physically Unclonable Functions	$0	$102,139	$102,139	10/23/2017	9/21/2018	
209679	Total Ionizing Dose Response of Dielectrically-Isolated 3-Dimensional Transistors for Future Strategic Electronics Capability	$0	$105,464	$105,464	10/23/2017	9/21/2018	
209680	Hole Spin Qubits in Germanium	$0	$100,340	$100,340	10/23/2017	9/21/2018	
209693	Novel Analysis Techniques for Field Programmable Gate Array Battery-Backed Random Access Memory	$0	$177,854	$177,854	10/23/2017	9/21/2018	
209695	Conversion of Plastic Work into Heat: A full-field study of thermomechanical coupling	$0	$96,059	$96,059	10/23/2017	9/21/2018	
209697	Chemomechanical Controls on Induced Seismicity	$0	$93,355	$93,355	10/23/2017	9/21/2018	
209699	Feasibility of Single-Sided 3-Dimensional Elemental Imaging	$0	$46,880	$46,880	10/23/2017	9/21/2018	
209700	Determining Saturation Velocity for Aluminum Gallium Nitride Alloys	$0	$99,205	$99,205	10/23/2017	9/21/2018	
209745	Seismic Phase Identification with Speech Recognition Algorithms	$0	$79,192	$79,192	10/26/2017	9/21/2018	
209899	Switchable Energetic Materials for Enhanced Safety and Security	$0	$105,624	$105,624	11/9/2017	9/21/2018	
209911	Additively Manufactured Transparent Optical Glass	$0	$99,951	$99,951	11/9/2017	9/21/2018	
210202	Understanding Pulsed Laser Surface Annealing for Advanced Semiconductor Materials	$0	$170,007	$170,007	11/30/2017	9/21/2018	
210212	Random Laser Physical Unclonable Function	$0	$73,809	$73,809	11/30/2017	9/21/2018	
210403	Cost-Competitive, Scalable and Safe Grid Storage: Sandia's Radical Ion Flow Battery Technology	$0	$571,029	$571,029	12/12/2017	9/18/2020	
210566	Non-Contact Measurements of Density and Thermal Conductivity for Organic Thin Films such as Thin Film Explosives	$0	$102,437	$102,437	1/9/2018	9/21/2018	
210567	Fabrication of Position Controlled Silicon/Silicon Germanium Quantum Dots for Integrated Optical Sources and Beyond	$0	$100,039	$100,039	1/9/2018	9/21/2018	
210568	Mechanical Interfacial Control of Lithium-Metal Anodes	$0	$101,085	$101,085	1/9/2018	9/21/2018	
210569	Zeptocalorimetry	$0	$102,517	$102,517	1/9/2018	9/21/2018	
210570	Generative Models for Synthetic Aperture Radar Target Synthesis	$0	$78,110	$78,110	1/9/2018	9/21/2018	
210579	Dissipative Non-linear Topology Characterization	$0	$105,238	$105,238	1/9/2018	9/21/2018	
210588	Low Probability Events and High False Alarms: How Low do False Alarm Rates Need to Be?	$0	$76,563	$76,563	1/9/2018	9/21/2018	
210592	Computational and Experimental Characterization of Intermediate Amorphous Phases in Geological Materials	$0	$95,177	$95,177	1/9/2018	9/21/2018	
210594	Rechargeable Thermal Batteries With Novel Lithium-Boron Anodes	$0	$69,943	$69,943	1/9/2018	9/21/2018	
210602	Chance-Constrained Optimization for Critical Infrastructure Protection	$0	$79,466	$79,466	1/9/2018	9/21/2018	
210648	Improved Wave Energy Production Forecasts for Smart Grid Integration	$0	$94,211	$94,211	1/11/2018	9/21/2018	
210649	Using Analog Silicon-Oxide-Nitride-Oxide-Silicon for Energy Efficient Computing	$0	$100,916	$100,916	1/11/2018	9/21/2018	
210650	Configurable Additive Packaging Solutions	$0	$58,301	$58,301	1/11/2018	9/21/2018	
210908	Tunneling Injection Into Electron Beam Photoresist	$0	$53,310	$53,310	2/2/2018	9/21/2018	
211067	An Advanced Persistent Homology Toolbox for Real-time, Automatic Classification of Seismic Signals	$0	$184,669	$184,669	2/15/2018	9/21/2018	
211148	Autonomy-Enabled, Real-Time, Rapid Trajectory Generation for Highly Dynamic Hypersonic Missions	$0	$251,084	$251,084	2/22/2018	9/20/2019	
211149	Molecular Modeling of Pressure Directed Assembly	$0	$62,557	$62,557	2/22/2018	9/21/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
211434	Assessment of an Energy-Release Process for Point-Defect Migration in Group-III Nitride Semiconductors	$0	$195,833	$195,833	3/15/2018	9/21/2018	
211655	Low Temperature Hermetic Valves for Swallowable Sample Collection Capsules	$0	$58,357	$58,357	3/28/2018	9/21/2018	
211656	Infrared Characterization of Anisotropic Materials Through Plasmonic Coupling	$0	$67,443	$67,443	3/28/2018	9/21/2018	
211658	High-Resolution Raman Measurements of Gradients at Interfaces	$0	$98,076	$98,076	3/28/2018	9/21/2018	
211659	Three-Dimensional Imaging through Shock-Waves at Ultra-High Speed	$0	$95,530	$95,530	3/28/2018	9/21/2018	
211660	Development of Metal Hydride Nano-Inks for Multi-Materials Production	$0	$115,943	$115,943	3/28/2018	9/21/2018	
211663	Digitally Designed Porous Media to Control Capillary Imbibition and Release under Mechanical Deformation	$0	$89,631	$89,631	3/28/2018	9/21/2018	
211664	Deformation and Fracture in Complex-Shaped Energetic Particles	$0	$85,547	$85,547	3/28/2018	9/21/2018	
211665	Leveraging Intrinsic Principal Directions for Multifidelity Uncertainty Quantification	$0	$58,111	$58,111	3/28/2018	9/21/2018	
211666	Coupled Magnetic Spin Dynamics and Molecular Dynamics in a Massively Parallel Framework	$0	$103,726	$103,726	3/28/2018	9/21/2018	
211668	Topological Spin Transistor	$0	$101,861	$101,861	3/28/2018	9/21/2018	
211669	Developing an Inductively Driven Transmission Line to Power X-Pinch Radiation Sources on Z Machine	$0	$88,235	$88,235	3/28/2018	9/21/2018	
211670	Discovering a New Aging Mechanism in Lamellar Solid Lubricants	$0	$201,502	$201,502	3/28/2018	9/21/2018	
211671	Machine Learning of Signal Patterns for Protocol Informatics	$0	$94,921	$94,921	3/28/2018	9/21/2018	
211826	Robust, Rapid, Autonomous Mission Planning for Hypersonic Flight Vehicles	$0	$256,561	$256,561	4/12/2018	9/20/2019	
211884	Rapid Estimation for Hypersonic Engagements	$0	$139,861	$139,861	4/18/2018	9/20/2019	
211913	Patterns of Analyst Attention	$0	$148,180	$148,180	4/19/2018	9/21/2018	
212018	Using Generative Models to Generate Hypersonic Boost-Glide Vehicle Trajectories	$0	$215,688	$215,688	4/25/2018	9/20/2019	
212040	Synthetic High Forward Squint Synthetic Aperture Radar Images Using Generative Adversarial Networks	$0	$174,104	$174,104	4/26/2018	9/20/2019	
212041	New High-Resolution Electron Scattering Capability	$0	$213,450	$213,450	4/26/2018	9/21/2018	
212042	Convex Optimization using Geometric Programming on Field-Programmable Gate Arrays	$0	$155,037	$155,037	4/26/2018	9/20/2019	
212080	Optimal Elevon Control Allocation and Fault Detection/Recovery for Hypersonic Flight Vehicles	$0	$151,481	$151,481	4/30/2018	9/20/2019	
212081	Synthetic Aperture Radar for Autonomous Hypersonics Mission Terminal Guidance	$0	$201,643	$201,643	4/30/2018	9/20/2019	
212091	Multi-Fidelity Toolkit	$0	$122,874	$122,874	5/1/2018	9/20/2019	
212093	Perception-Based Navigation Algorithms for Hypersonic Vehicles	$0	$174,725	$174,725	5/1/2018	9/21/2018	
212224	Data Analytics in Commercial National Security Applications	$0	$41,138	$41,138	5/9/2018	9/21/2018	
212226	Development and Characterization of a Novel Supervisory Control and Data Acquisition/Industrial Control Systems Threat Model	$0	$99,967	$99,967	5/9/2018	9/21/2018	
212229	Proof of Principle Demonstration of Particle Beams to Disable Triggering Circuits	$0	$202,299	$202,299	5/9/2018	9/21/2018	
212413	Development of Alternative Lattice-Matched Buffer Layers and Optimization of Metalorganic Chemical Vapor Deposition Growth for III-Nitride Power Electronics	$0	$99,238	$99,238	5/22/2018	9/18/2020	
212430	Distributed Computational Algorithms Focusing on Modeling and Demonstration of Transformer Cyber Resilience	$0	$228,403	$228,403	5/23/2018	9/20/2019	
212581	Efficient Generalizable Deep Learning	$0	$53,856	$53,856	6/6/2018	9/21/2018	
212582	Adjoint-based Calibration of Plasticity Model Parameters from Digital Image Correlation Data	$0	$88,422	$88,422	6/6/2018	9/21/2018	
212585	Bioenergy Fuels Biodefense Research: Discovering New Antibiotics from Algal-Bacterial Production Ponds	$0	$113,243	$113,243	6/6/2018	9/21/2018	
212586	Solution of the Generalized Linear Boltzmann Equation for Transport in Stochastic Media	$0	$45,861	$45,861	6/6/2018	9/21/2018	
212587	Modeling Charged Defects in Non-Cubic Semiconductors for Radiation Effects Studies in Next Generation Electronic Materials	$0	$60,056	$60,056	6/6/2018	9/21/2018	
212649	Palletized Simulation Data for Traceability and Reproducibility	$0	$85,828	$85,828	6/12/2018	9/21/2018	
212660	Topology Optimization for Nonlinear Transient Applications using a Minimally Invasive Approach	$0	$93,779	$93,779	6/13/2018	9/21/2018	
212725	Neural Networks as Surrogates of Nonlinear High-Dimensional Parameter-to-Prediction Maps	$0	$93,481	$93,481	6/19/2018	9/21/2018	
212770	Integrated Cyber/Physical Resiliency Analysis	$0	$170,912	$170,912	6/25/2018	9/21/2018	
	Total # of Projects for SNL: 371	**Total Equipment Cost for SNL: $0**		**Total Other Cost for SNL: $160,249,672**		**Total Cost for SNL: $160,249,672**	
SRNL - Savannah River National Lab							
LDRD-2015-00002	Development of Liquid Phase Water Detritiation Technology	$0	$12,493	$12,493	10/1/2014	9/30/2017	Project ended 9/30/2017.
LDRD-2016-00015	Advanced Ultrafast Spectroscopy for Chemical Detection of Nuclear Fuel Cycle Materials	$0	$69	$69	10/23/2015	9/30/2017	Project ended 9/30/2017.
LDRD-2016-00023	Hyperspectral Analysis	$0	$1,704	$1,704	10/23/2015	9/30/2017	
LDRD-2016-00025	Non-Platinum Group Metal Fuel Cell Catalysts	$0	$1,880	$1,880	10/23/2015	9/30/2017	
LDRD-2016-00026	Plutonium Anion Exchange Process Intensification	$0	$5,772	$5,772	10/23/2015	9/30/2017	
LDRD-2016-00031	Characterization of the Environmentally Induced Chemical Transformation of Uranium Tetrafluoride	$0	($4,167)	($4,167)	10/23/2015	9/30/2017	
LDRD-2016-00035	Metal Hydride Thermal Energy Storage Material Development for Dish-Stirling Systems	$0	$1,043	$1,043	10/23/2015	9/30/2017	
LDRD-2016-00037	Problematic Contaminants (Technetium-99, Mercury) for Tank Waste Treatment and Disposal	$0	$21,811	$21,811	10/23/2015	9/30/2017	
LDRD-2016-00038	Selective Adsorption /Purification of Natural Gas Using Tunable Adsorbents	$0	($7,286)	($7,286)	10/23/2015	9/30/2017	
LDRD-2016-00048	Use of Diffusive Gradients in Thin Films as an alternative monitoring tool for inorganic environmental contaminants	$0	$14,993	$14,993	10/23/2015	9/30/2017	
LDRD-2016-00052	Microencapsulation of Plutonium Oxide in a low-water cement-based waste form	$0	($4,355)	($4,355)	10/23/2015	9/30/2017	
LDRD-2016-00053	Explore Innovative Chemistry of Natural Gas Conversion to Dimethyl Ether	$0	$20,672	$20,672	10/23/2015	9/30/2017	
LDRD-2016-00062	Synthesis of Zeolite Materials for Noble Gas Separation	$0	$9,491	$9,491	10/23/2015	9/30/2017	
LDRD-2016-00066	Mercury Removal and Stabilization in the Subsurface using Vapor Phase Sulfur	$0	$25,676	$25,676	10/23/2015	9/30/2017	
LDRD-2016-00071	Advanced Atmospheric Modeling Techniques for Non-Proliferation Applications	$0	$7,102	$7,102	10/23/2015	9/30/2017	
LDRD-2016-00081	Effects of power line noise on Supervisory Control And Data Acquisition system stability	$0	$16,527	$16,527	10/23/2015	9/30/2017	
LDRD-2017-00005	Silver-iodine Secondary Waste Stabilization: Multiscale Evaluation	$0	$343,098	$343,098	10/3/2016	9/30/2018	
LDRD-2017-00012	Power Hardware-in-the-Loop Testing of Distribution Solid State Transformer Controlling a Battery Energy Storage System at the Electrical Grid Research Innovation and Development Facility	$0	$361,022	$361,022	10/3/2016	9/30/2018	
LDRD-2017-00014	Functionalized Porous Zero-Valent Iron for Remediation/Removal of Technetium from Aqueous Systems	$0	$1,327	$1,327	10/3/2017	9/30/2017	
LDRD-2017-00015	Understanding of local structure-function relationships of zeolites used in industry through polarized Raman Spectroscopy	$0	$5,490	$5,490	10/3/2016	9/30/2017	
LDRD-2017-00017	Dissolution of Used Nuclear Fuel using a tributyl phosphate/n-paraffin Solvent	$0	$87,515	$87,515	10/3/2016	9/30/2018	
LDRD-2017-00025	Reduced Graphene Oxide as Filament Material for Thermal Ionization Mass Spectrometry with a Focus on Plutonium and Uranium Analysis	$0	$226,333	$226,333	10/3/2016	9/30/2018	
LDRD-2017-00028	Room Temperature Sieving of Hydrogen Isotopes Using two-dimensional Materials	$0	$370,979	$370,979	10/3/2016	9/30/2018	
LDRD-2017-00030	Evaluation and Uncertainty of a New Method to Detect Suspected Nuclear and Weapons of Mass Destruction Activity	$0	$1,884	$1,884	10/3/2016	9/30/2017	
LDRD-2017-00032	Virtual/Augmented Reality Robotic Interface	$0	$5,139	$5,139	10/3/2016	9/30/2017	
LDRD-2017-00035	Organically Bound Tritium Behavior in Trees and Plants	$0	$4,210	$4,210	10/3/2016	9/30/2017	
LDRD-2017-00037	Wire Arc Additive Manufacturing	$0	$357,056	$357,056	10/3/2016	9/30/2018	
LDRD-2017-00050	Designing a Slag Composition to Optimize Technecium-99 Retention in Oxidized Grouts	$0	$10,202	$10,202	10/3/2016	9/30/2017	
LDRD-2017-00058	Advanced Cloud Forecasting for Solar Energy's Impact on Grid Modernization	$0	$1,830	$1,830	10/3/2016	9/30/2017	
LDRD-2017-00068	Self-Propagating Solution Synthesis of gadolinium zirconate Pyrochlores for Plutonium Disposition	$0	$20,490	$20,490	10/3/2016	9/30/2017	
LDRD-2017-00070	Optimization of Handheld Gas Samplers	$0	$247,021	$247,021	10/3/2016	9/30/2018	
LDRD-2017-00076	Synchrotron-Based Microstructural Characterization Method Development for Plutonium Oxides	$0	$307,488	$307,488	10/3/2016	9/30/2019	
LDRD-2017-00088	Cross-cutting High Surface Area Graphene-Based Frameworks with Controlled Pore Structure and Dopants	$0	$500,664	$500,664	10/3/2016	9/30/2018	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
LDRD-2017-00099	Dynamic Precision Timing Using Iridium Satellite Constellation	$0	$104,303	$104,303	3/14/2017	3/14/2018	
LDRD-2017-00101	Toward Next Generation Monitoring and Prediction of Corrosion/Radiation Damage	$0	$8,172	$8,172	8/1/2017	9/30/2017	
LDRD-2017-00102	Use of Process Imaging to Improve the Performance of Centrifugal Contactors	$0	$83,616	$83,616	8/1/2017	9/30/2018	
LDRD-2017-00103	Process Imaging Techniques for Improving Coalescer Performance	$0	$67,786	$67,786	8/1/2017	9/30/2018	
LDRD-2018-00004	Development of Direct Injection/Ionization Mass Spectrometry Methods for Whole Molecule Characterization	$0	$441,248	$441,248	10/1/2017	9/30/2019	
LDRD-2018-00012	Smart Particle Collector with Real Time Spectroscopic Analysis	$0	$366,911	$366,911	10/1/2017	9/30/2018	
LDRD-2018-00021	Hybrid Thermochemical Hydrogen Production	$0	$327,206	$327,206	10/1/2017	9/30/2019	
LDRD-2018-00024	Develop Savannah River National Lab's code for use as national response asset	$0	$268,432	$268,432	10/1/2017	9/30/2019	
LDRD-2018-00032	Oxyhydroxides on Aluminum Spent Nuclear Fuel: Formation Studies and Removal Practices to Prevent Radiolytic Gas Production	$0	$452,325	$452,325	10/1/2017	9/30/2019	
LDRD-2018-00034	Thermomechanical Modeling of Hydride Materials for Tritium Storage Beds	$0	$209,862	$209,862	10/1/2017	9/30/2018	
LDRD-2018-00044	Gamma Imaging and Mapping Advancements	$0	$196,207	$196,207	10/1/2017	9/30/2018	
LDRD-2018-00045	Development of Novel Foaming Solutions for High Level Waste Processing	$0	$223,132	$223,132	10/1/2017	9/30/2018	
LDRD-2018-00049	Demonstration of Chemical Decladding and Disposition Options for Non-Aluminum Clad Fuels in H-Canyon	$0	$276,867	$276,867	10/1/2017	9/30/2018	
LDRD-2018-00055	Metal-Organics-Framework Glasses as Rad Contaminant Sequesters and Nuclear Waste Forms	$0	$299,496	$299,496	10/1/2017	9/30/2019	
LDRD-2018-00057	Surface Plasmon Assisted Catalysis for Methane Conversion and Hydrogen Production	$0	$320,622	$320,622	10/1/2017	9/30/2018	
LDRD-2018-00060	Big Data, Machine Learning, and Computer Vision for Analysis of Large Data Sets	$0	$127,686	$127,686	11/20/2017	9/30/2018	
LDRD-2018-00077	Synthesis and Characterization of Environmentally Relevant Actinide Compounds to Aid in the Development of Novel Remediation Tactics	$0	$122,067	$122,067	10/1/2017	9/30/2019	
LDRD-2018-00082	Gamma-Ray Raster Imaging with Robotic Data Collection	$0	$57,280	$57,280	10/1/2017	9/30/2019	
LDRD-2018-00087	Innovative Plutonium Waste Forms: Acceptability to Ship to Waste Isolation Pilot Plant	$0	$69,703	$69,703	10/1/2017	9/30/2018	
LDRD-2018-00095	Semi-automated change detection workflow for overhead imagery	$0	$291,812	$291,812	10/1/2018	9/30/2019	
LDRD-2018-00098	Hyperspectral Raman Imaging using a Spatial Heterodyne Spectrometer	$0	$310,047	$310,047	10/1/2017	9/30/2019	
LDRD-2018-00103	Kelvin Probe Force Microscopy for High-Resolution Imaging of Hydrogen in Steel Alloys	$0	$209,990	$209,990	10/1/2017	9/30/2019	
LDRD-2018-00105	Atmospheric Tritium Signature Collection and Concentration by Catalytic Exchange Column	$0	$392,601	$392,601	10/1/2017	9/30/2018	
LDRD-2018-00110	Quaternary Amine-Based Sodalite Sorbent for Selective Removal of technetium-99 and iodine-129	$0	$316,312	$316,312	10/1/2017	9/30/2018	
LDRD-2018-00125	Controllable Electromagnetic Pulse Test Bed for Extra High Voltage Transformers	$0	$210,351	$210,351	10/1/2017	9/30/2018	
LDRD-2018-00126	Embedded Hardware Solution to Ensure Cyber Security of Industrial Control Systems	$0	$242,629	$242,629	10/1/2017	9/30/2019	
LDRD-2018-00129	Investigations into Environmental Radiation Protection & Radioactive Waste Transport	$0	$27,785	$27,785	11/20/2017	9/30/2018	
LDRD-2018-00130	Limited-view 3-dimensional Imaging Technology	$0	$32,741	$32,741	11/20/2017	9/30/2018	
LDRD-2018-00131	Augmented Reality Rendering of Computed Tomography 3-dimensional Density Data	$0	$88,041	$88,041	11/20/2017	9/30/2018	
LDRD-2018-00134	Use of Process Imaging to Improve the Performance of a Filter	$0	$31,447	$31,447	1/17/2018	9/30/2018	
LDRD-2018-00136	Small Unmanned Aircraft System Alane Powered Fuel Cell	$0	$70,383	$70,383	1/17/2018	9/30/2018	
LDRD-2018-00138	Radio Frequency Emulator	$0	$98,971	$98,971	3/1/2018	9/30/2018	
LDRD-2018-00139	Robotic Arm Development Platform	$0	$55,353	$55,353	8/21/2018	9/30/2018	
LDRD-2018-00140	Robot Deployable Air Sampling Development Suite	$0	$27,443	$27,443	8/21/2018	9/30/2018	
	Total # of Projects for SRNL: 67	**Total Equipment Cost for SRNL: $0**		**Total Other Cost for SRNL: $9,404,000**		**Total Cost for SRNL: $9,404,000**	
SRP - Savannah River Plant							
SR16009	Durable Water Splitting Using Thermochemical Cycles of Nanostructured Metal Oxides	$0	$149,413	$149,413	10/1/2015	9/30/2018	
SR16017	Lanthanum Nickel Aluminum .75 Bed Life Extension	$0	$113,341	$113,341	10/1/2015	9/30/2018	
SR16022	Passivation of Stainless Steel Components by Electropolishing and Vacuum Heat Treatment	$0	$234,953	$234,953	10/1/2015	9/30/2018	
SR16026	Two-Dimensional Materials for the Passivation of Stainless Steel Surfaces	$0	$177,257	$177,257	10/1/2015	9/30/2018	
SR16031	Development of Future Thermal Cycling Absorption Process Replacement Capabilities	$0	$386,702	$386,702	10/1/2015	9/30/2018	
SR16032	Enhanced Pinch Weld Electrode	$0	$39,014	$39,014	10/1/2015	9/30/2018	
SR17007	Comprehensive Automated Pinch Weld System	$0	$156,934	$156,934	10/1/2016	9/30/2019	
SR17011	Puncture-cut Resistant Glovebox Gloves with Low Tritium and Oxygen Permeation	$0	$89,952	$89,952	10/1/2016	9/30/2019	
SR17024	Characterization and Tritium Aging of Lanthanum Nickel Aluminum .85 for Regenerative Testing	$0	$98,883	$98,883	10/1/2016	9/30/2019	
SR18001	Induction Heating of Metals for Storage Beds	$0	$102,543	$102,543	10/1/2017	9/30/2020	
SR18010	Photo-cleaned Backgroundless Ion Chambers	$0	$121,164	$121,164	10/1/2017	9/30/2020	
SR18024	Molecular Sieves for Humidity Probe Protection	$0	$135,199	$135,199	10/1/2017	9/30/2020	
	Total # of Projects for SRP: 12	**Total Equipment Cost for SRP: $0**		**Total Other Cost for SRP: $1,805,355**		**Total Cost for SRP: $1,805,355**	
TJNAF - Thomas Jefferson National Accelerator Facility							
2016-LDRD-2a	Generation and Characterization of Magnetized Bunched Electron Beam from Direct Current Photogun for Jefferson Lab Electron-Ion Collider Cooler	$0	$207,757	$207,757	10/1/2015	9/30/2018	
2016-LDRD-4a	Nuclear Gluons with Charm at the Electron-Ion Collider	$0	($299)	($299)	10/1/2015	9/30/2018	
2017-LDRD-04	Geometry Tagging for Heavy Ions at the Jefferson Lab Electron-Ion Collider	$0	$124,052	$124,052	10/1/2016	9/30/2018	
2017-LDRD-11	Phenomenological Study of Hadronization in Nuclear and High-Energy Physics Experiments	$0	$78,383	$78,383	10/1/2016	9/30/2018	
2018-LDRD-09	Development of Next Generation Parallel Event Processing Framework	$0	$48,304	$48,304	10/1/2017	9/30/2018	
	Total # of Projects for TJNAF : 5	**Total Equipment Cost for TJNAF : $0**		**Total Other Cost for TJNAF : $458,197**		**Total Cost for TJNAF : $458,197**	
Y-12NSC - Y-12 National Security Complex							
PD16N080	Manufacturing Innovation Network	$0	$633,343	$633,343	10/1/2015	9/30/2018	
PD16Q890	Computed Tomography Testing and development	$0	$500,338	$500,338	10/1/2015	9/30/2018	
PD16S000	Automated field calibration moisture standard	$0	$479,239	$479,239	10/1/2015	9/30/2018	
PD16S500	Zone Refining - Remove Oxygen contamination from Lithium Hydride using a zone melting technique.	$0	$143,221	$143,221	10/1/2015	9/30/2018	
PD16S640	Near Net Shape Lithium Hydroxide	$0	$213,876	$213,876	10/1/2015	9/30/2018	
PD16U600	Calciner Demonstration	$0	$1,129,660	$1,129,660	10/1/2015	9/30/2018	
PD17A020	Dual Use Electron Beam Welder	$0	$2,346,291	$2,346,291	10/1/2016	9/30/2019	
PD17F270	Machining Upgrades - Continue activities initiated under the Interim Machining Capabilities project and demonstrate upgraded machining capabilities that can be used to support Y-12 production needs in the interim period before the new machining facilities become available.	$0	$1,143,550	$1,143,550	10/1/2016	9/30/2019	
PD17S940	Oxygen Analysis in Salt through Karl Fischer Titration	$0	$76,045	$76,045	10/1/2016	9/30/2018	
PD17S990	Pressure Generators - To continue to develop and demonstrate methods for production of different pressure generating materials for Defense Programs for application to the next generation weapon systems.	$0	$185,342	$185,342	10/1/2016	9/30/2019	
PD17U240	Direct Electrolytic Reduction and Electrorefining	$0	$3,747,422	$3,747,422	10/1/2016	9/30/2019	
PD17U250	Lab-scale Vacuum Arc Remelt for Uranium Alloy Development	$0	$1,933,400	$1,933,400	10/1/2016	9/30/2019	
PD17W150	Maintenance Advanced Technology Initiative	$0	$763,857	$763,857	10/1/2016	9/30/2019	
PD17W160	Predictive Analytics and Interactive Dashboard	$0	$522,457	$522,457	10/1/2016	9/30/2019	
PD17W170	Security Operations Center - This project will apply recent advances in machine learning within the Splunk big data framework to create algorithms that improve anomaly detection for insider threat identification and early warning of cyber attacks, which will provide a prioritized event dashboard for analysts.	$0	$562,759	$562,759	10/1/2016	9/30/2019	
PD18A590	AM Process Control and Repeatability, Defect Detection, and Material Behavior	$0	$1,095,980	$1,095,980	10/1/2017	9/30/2020	
PD18C590	Systems Based Deoxyribonucleic Acid Risk Mitigation Model	$0	$114,795	$114,795	10/1/2017	9/30/2020	
PD18F140	Metal-Seal Flange Containers	$0	$196,174	$196,174	10/1/2017	9/30/2018	
PD18N180	Development of New Concentration Counter for B-1 Lab	$0	$201,653	$201,653	10/1/2017	9/30/2018	
PD18N630	Nuclear Fuel Development	$0	$674,497	$674,497	10/1/2017	9/30/2020	

Project ID	Project Name	Equipment	Other	FY Total	Start Date	End Date	Justification for over 36 months
PD18N710	Uranium Coating and Plating Process Development	$0	$458,847	$458,847	10/1/2017	9/30/2020	
PD18Q080	Rapid Analysis of Tc-99	$0	$173,155	$173,155	10/1/2017	9/30/2018	
PD18Q760	Programmable Logic Controller for Mass Spectrometers	$0	$340,231	$340,231	10/1/2017	9/30/2020	
PD18RR00	Plant Directed Research and Development Rapid Response	$0	$306,592	$306,592	10/1/2017	9/30/2018	
PD18S150	Pilot Scale Lithium Purification	$0	$385,543	$385,543	10/1/2017	9/30/2020	
PD18S310	Modernization of the Insider Quantification and Ranking Process	$0	$53,508	$53,508	10/1/2017	9/30/2020	
PD18S440	Machine Dust Oxygen Reduction	$0	$303,091	$303,091	10/1/2017	9/30/2020	
PD18S620	Modern Lithium Crusher	$0	$78,319	$78,319	10/1/2017	9/30/2020	
PD18U110	Optimized Oxide Blending	$0	$66,378	$66,378	10/1/2017	9/30/2018	
PD18U410	Recycle of Binary Machine Turnings	$0	$20,363	$20,363	10/1/2017	9/30/2020	
PD18U650	Microwave Casting Process Margin Study	$0	$485,293	$485,293	10/1/2017	9/30/2020	
PD18W010	BearCat Situational Awareness Camera System	$0	$201,568	$201,568	10/1/2017	9/30/2018	
PD18W030	Vehicle Checkpoint Automation-Facial and License Plate Recognition	$0	$250,411	$250,411	10/1/2017	9/30/2018	
PD18W060	Mesh Radio Replacement Demonstration	$0	$224,741	$224,741	10/1/2017	9/30/2020	
PD18W500	Standoff gamma imaging evaluation and applications	$0	$316,061	$316,061	10/1/2017	9/30/2020	
PD18W870	Explosive Barrier Testing and Data Collection	$0	$55,758	$55,758	10/1/2017	9/30/2020	
Total # of Projects for Y-12NSC: 36		**Total Equipment Cost for Y-12NSC: $0**		**Total Other Cost for Y-12NSC: $20,383,758**		**Total Cost for Y-12NSC: $20,383,758**	