

Appendix E. Project Listing

Department of Energy |

Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
AMES - Ames Laboratory							
FY2019-MKRM	Diffraction Tomography for Crystal Structural Identification	0	\$65,038	\$65,038	5/1/2019	9/30/2019	
FY2019-MBRY	Integrating cloud computing and the internet-of-things into a scientific work flow	0	\$26,078	\$26,078	3/1/2019	2/28/2022	
FY2019-MPER	New organolanthanide molecular quantum materials are within reach. Computationally study a series of new organolanthanide molecular quantum materials to help predict the effect on magnetic properties resulting from modifications to the lanthanide metal center or the ligands	0	\$78,341	\$78,341	1/2/2018	9/30/2020	
FY2019-NNUS	Development of Quantum Sensor based on single spins in diamond for quantum materials research	0	\$170,500	\$170,500	1/1/2019	9/30/2020	
FY2019-TPRO	Development of Novel Correlative Approach to Analysis of Organic-Inorganic Interfaces. The project combines non-destructive high-resolution Analytical Electron Microscopy with (destructive) Atom Probe Tomography to provide a comprehensive understanding of role of organic/inorganic interfaces, including the elusive "buffer layer", thereby addressing a gap in their characterization.	0	\$82,594	\$82,594	10/1/2018	9/30/2020	
FY2019-LZHO	Controlling Magnetic Skyrmion, quasiparticles which have been predicted theoretically and observed experimentally in condensed matter systems, with External Strain	0	\$182,836	\$182,836	10/1/2018	9/30/2020	
FY2019-KKOV	Rational Synthesis of Novel Non-Centrosymmetric Tetrel-Pnictide Intermetallics	0	\$158,703	\$158,703	10/1/2018	9/30/2020	
FY2019-TYOB	Ultra-low Temperature Dynamic Nuclear Polarization Nuclear Magnetic Resonance Spectroscopy	0	\$104,341	\$104,341	10/1/2018	9/30/2020	
FY2018-VBAL-1	New Horizons in the Atomic Scale Design of two dimensional and three dimensional Hetero-Structures	0	\$127,379	\$127,379	10/1/2017	9/30/2019	
FY2016-SBUD-3	Resonance Ultrasound Spectroscopy of Correlated Materials and Materials at the Edge of Stability	0	\$490	\$490	7/25/2016	12/31/2018	
Total # of Projects for AMES: 10		Total Equipment Cost for AMES: \$0	Total Other Cost for AMES: \$996,300	Total Cost for AMES: \$996,300			
ANL - Argonne National Lab							
2019-0510	Study of Potential Applications to Ultrafast Electron Diffraction/Microscopy Using a High Repetition Rate Superconducting Electron Photocathode Gun	0	\$83,523	\$83,523	8/1/2019	9/30/2019	
2019-0509	Artificial Intelligence Robotic Platform for Solution-Processable Materials	0	\$94,842	\$94,842	8/1/2019	9/30/2019	
2019-0508	Artificial Intelligence-Coupled Experiment and Simulation to Create Tailored Three-Dimensional Auxetic Materials	0	\$44,550	\$44,550	9/1/2019	9/30/2019	
2019-0507	Data Enabled Catalyst Discovery. Advancing molecular level understanding of fundamental properties and processes of catalytic systems is essential to accelerate the discovery of new and effective catalysts for atom-efficient chemical transformations that are key to the production of value-added chemicals, pharmaceuticals, and transportation fuels.	0	\$96,004	\$96,004	8/1/2019	9/30/2019	
2019-0506	Computational Fluid Dynamics Modeling of Rotating Detonation Engines. Multidimensional modeling and computational fluid dynamics can complement engine experiments and serve as a valuable tool to provide more insights into the combustion dynamics and enable optimization of critical design parameters that influence rotating detonation operation and performance.	0	\$55,318	\$55,318	8/1/2019	9/30/2019	
2019-0501	Generating Training Datasets for Developing a Deep Learning-Computer Vision Framework to Monitor Avian Interactions with Solar Energy Facility Infrastructure	0	\$13,369	\$13,369	6/1/2019	9/30/2019	
2019-0498	Fabrication of Large Area Dense Separator via Tape Casting and Pressureless Sintering	0	\$49,577	\$49,577	7/1/2019	9/30/2019	
2019-0494	Manufacturing Processes for Lithium Metal Using Advanced Electrodeposition	0	\$49,977	\$49,977	7/1/2019	9/30/2019	
2019-0487	Development of Conductive Solid-State Lithium Lanthanum Zirconium Oxide Electrolyte by Hot-pressing of Electrospun Precursor Lithium Lanthanum Zirconium Oxide Nanofibers	0	\$49,956	\$49,956	8/1/2019	9/30/2019	
2019-0486	Rapid Microwave-Assisted Sintering of Lithium Lanthanum Zirconium Oxide Solid State Electrolyte: An Energy-Efficient Manufacturing Alternative	0	\$48,790	\$48,790	7/1/2019	9/30/2019	
2019-0483	Aerosol Deposition of Dense Ceramic Layers for All-Solid-State Batteries. In this project, we will develop an aerosol deposition thin-film fabrication process to overcome the issues in the traditional ceramic processing for the all-solid-state batteries.	0	\$49,315	\$49,315	7/1/2019	9/30/2019	
2019-0482	Development of Dense Lithium Lanthanum Zirconium Oxide Solid-State Electrolytes from Ultrafine-Grain Nanofibers	0	\$42,717	\$42,717	7/1/2019	9/30/2019	
2019-0481	Cathode Composite Electrode Composed of 1 Micron-size Single Crystal Lithium Lanthanum Zirconium Oxide Filler and a Core-Shell Cathode	0	\$48,431	\$48,431	7/1/2019	9/30/2019	
2019-0466	A User-Friendly Artificial Intelligence Software Toolkit for Molecular Modeling and Design of Quantum Materials	0	\$38,807	\$38,807	8/1/2019	9/30/2020	
2019-0465	The Importance of Soil Water Content Heterogeneity for Determining Landscape Level Processes	0	\$145,475	\$145,475	4/1/2019	3/31/2022	
2019-0464	Advanced Computing Expedition 2019. During the research period, investigators will develop a quantum algorithm or a neuromorphic application, explore the use of accelerator technology for deep learning, or collaborate to optimize a code for the Aurora exascale system. Nineteen expeditions will be supported across these four areas. These expeditions will allow for an exploratory look at a number of different areas and how they can be enabled by future computing technologies.	0	\$671,979	\$671,979	5/1/2019	9/30/2019	
2019-0453	Machine learning enabled advanced X-ray spectroscopy in the Advanced Photon Source Upgrade Era	0	\$124,839	\$124,839	4/1/2019	3/31/2021	
2019-0451	Artificial Intelligence guided metastable phase diagram of materials. We will move to synthesis through artificial intelligence and first-principles computations to discover metastable states and the locations of those states in phase space.	0	\$114,763	\$114,763	8/1/2019	3/31/2021	
2019-0442	Finding Critical Processes of Deformation in Structural Materials with Artificial Intelligence	0	\$71,940	\$71,940	5/1/2019	3/31/2021	
2019-0441	Learning and differentiating: using Artificial Intelligence to image beyond the X-ray depth of focus limit	0	\$78,624	\$78,624	4/1/2019	3/31/2021	
2019-0438	Informed Images: X-ray Diffraction Vision for Fast Charging of Lithium Batteries	0	\$109,237	\$109,237	5/1/2019	3/31/2021	
2019-0437	An Internet Islanding Approach to Deterrence of Nation-State Adversaries. With this information and analysis, we will determine the feasibility and potential impact of such a disconnection and use established concepts of deterrence theory to consider whether such a threat is likely to have meaningful impact on adversarial behavior.	0	\$49,147	\$49,147	5/1/2019	9/30/2019	
2019-0433	Coupling Data Science and in situ Multi-Modal Probes for Materials Synthesis. We choose the materials system to study here only to demonstrate the coupling of experimental, computational, and data science in order to develop a science of synthesis widely applicable to a universe of materials and their underlying formation and growth processes.	0	\$180,207	\$180,207	6/1/2019	9/30/2021	
2019-0412	State Preservation for Deep Learning Applications. In support of Department of Energy missions, the proposed project aims to explore how to design and develop efficient state preservation techniques in the context of deep learning applications running at large scale.	0	\$49,368	\$49,368	5/1/2019	9/30/2019	

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2019-0410	A Novel Security Analysis Toolbox for National Grid Resilience Modeling. In this project, we will (1) develop power system security analysis methodologies and algorithms to enable resilience study at a national level and (2) develop a resilience study modeling framework and computational architecture to disseminate the research results to industry and research communities.	0	\$49,123	\$49,123	5/1/2019	9/30/2019	
2019-0409	Open Source Atmospheric Data Community Toolkit. The framework will provide the environment to enable collaboration in the research community. This environment will allow the development of tools for funded programs, as well as provide researchers in the scientific community with code for advancing their work. Research programs will also be able to adopt code provided by the scientific community without having to develop it from scratch.	0	\$23,817	\$23,817	4/1/2019	9/30/2019	
2019-0408	Advanced Moderation Module Development for Micro-Very-High-Temperature Reactors	0	\$51,812	\$51,812	4/1/2019	9/30/2019	
2019-0404	Design of a Modular Ocean Mining System for Seawater Rare Element Extraction and Desalination	0	\$30,261	\$30,261	5/1/2019	9/30/2019	
2019-0398	Laser Joining of Dissimilar Metals	0	\$37,963	\$37,963	4/1/2019	9/30/2019	
2019-0397	Combining High-Performance Computing, Artificial Intelligence, and Agent-Based Models to Combat Misinformation Campaigns	0	\$48,368	\$48,368	5/1/2019	9/30/2019	
2019-0395	Generation of a Next Level Dataset for Regional Scale Climate Modeling: Convective Resolving Spatial Scales	0	\$72,278	\$72,278	4/1/2019	9/30/2019	
2019-0392	Enhancing Simulation Tools for Hypersonic Flight Through Improved Fuel Injection Modeling in Air-Breathing Jet Engines	0	\$48,479	\$48,479	4/1/2019	9/30/2019	
2019-0386	Mineralogy Inspires Physics. Mineralogical databases will be used to identify candidates for new quantum materials that display either quantum spin liquid behavior or unconventional superconductivity. By performing electronic structure calculations, which of these materials have the most potential to exhibit novel quantum behaviors for future studies will be identified.	0	\$370,082	\$370,082	1/1/2019	9/30/2020	
2019-0383	Sustainability of Brackish Groundwater in the Mid-Continental Region. Our ultimate goal is to determine the sustainable yields of brackish groundwater in fine geographic detail from the Northern Great Plains aquifer system and the Midwest states of the Ohio River Valley.	0	\$17,794	\$17,794	3/1/2019	9/30/2019	
2019-0381	A Novel Readout for Large Arrays of Superconducting Nanowire Single Photon Detectors. We are developing a novel resonator-based readout for superconducting nanowire single photon detectors which are widely implemented as photodetectors for quantum information and sensing because of their low timing jitter, high quantum efficiency, and low dark count rate.	0	\$235,179	\$235,179	11/1/2018	9/30/2020	
2019-0377	Long-Lived Erbium Qubits in Silicon-Based Semiconductor Materials. This erbium-on-silicon architecture enables scalable platforms for quantum information processing and storage.	0	\$241,631	\$241,631	2/1/2019	9/30/2020	
2019-0375	Hybrid Quantum-Classical Computing Architectures. we are developing a hybrid quantum-classical computing program that leverages our classical supercomputing expertise. Many of the algorithms we are studying have applications relevant to Department of Energy missions.	0	\$167,521	\$167,521	1/1/2019	12/31/2020	
2019-0360	Quantum State Engineering in Strong-Coupling Circuits using Floquet Theory	0	\$264,107	\$264,107	12/1/2018	9/30/2020	
2019-0358	A Scalable Toolkit for Noisy-Qubit Simulation	0	\$98,668	\$98,668	11/1/2018	9/30/2020	
2019-0352	Macroscopic Quantum Entanglement Between Magnetization and Mechanical Motion	0	\$178,632	\$178,632	1/1/2019	12/31/2020	
2019-0349	Coherent Quantum Information Processing With Magnons Coupled Via Photons	0	\$126,863	\$126,863	4/1/2019	9/30/2021	
2019-0340	Design and Test Synthetic Pathways to Optimize their Effectiveness and Produce New Chemical Diversity	0	\$618,371	\$618,371	11/1/2018	9/30/2020	
2019-0338	Advancing Pump-Probe X-ray Capabilities Toward the Advanced Photon Source Upgrade	0	\$137,979	\$137,979	12/1/2018	9/30/2021	
2019-0330	Integrated Sensor Array and Modeling for Rapid Process Development in Chemical Vapor Deposition	0	\$194,720	\$194,720	11/1/2018	9/30/2020	
2019-0328	Active Plasmonics using Epitaxial Thin Films of Dirac Semimetals. Our team will synthesize, pattern, and characterize plasmonic structures by using this novel class of materials, with the goal of enabling frequency-agile waveguides, sources, and high-sensitivity spectroscopic tools in the terahertz regime.	0	\$223,183	\$223,183	12/1/2018	9/30/2020	
2019-0316	Magnetically-Enforced Microbial Scavengers	0	\$15,456	\$15,456	12/1/2018	2/28/2019	
2019-0315	Developing Multiphoton-Lithography-based Three-Dimensional Nano-Printing: X-ray Corrective Lenses for the Advanced Photon Source Upgrade and Beyond	0	\$136,403	\$136,403	12/1/2018	9/30/2021	
2019-0313	Neuromorphic Learning for Neuroimaging	0	\$133,058	\$133,058	10/1/2018	9/30/2020	
2019-0300	Enabling Automatic Learning of Atmospheric Particles through the Advanced Photon Source Upgrade	0	\$207,047	\$207,047	10/1/2018	9/30/2020	
2019-0296	Fighting Cancer with Accelerators. The superconducting Argonne Tandem Linac Accelerator System is one of only 2 or 3 accelerators in the United States with the required lithium beam to support this development.	0	\$290,867	\$290,867	11/1/2018	9/30/2019	
2019-0295	Universe as the Laboratory Mission-Critical Thin Film Materials. Our project will explore the applicability of novel thin-film synthesis techniques, such as ion-beam-assisted sputtering and impulse reactive magnetron sputtering, to improve our fundamental understanding and control of thin-film detector materials critical to the mission of Argonne's initiative called "The Universe is Our Laboratory."	0	\$349,946	\$349,946	11/1/2018	9/30/2021	
2019-0292	Computational Design of Li-ion Cathodes Based on Transition Metal Oxyulfide	0	\$25,394	\$25,394	11/1/2018	9/30/2019	
2019-0279	Develop Spectroscopy and Imaging Capabilities for Microfluidic Channels	0	\$445,636	\$445,636	10/1/2018	9/30/2020	
2019-0259	MaterialsEyes: A Reverse Image Search Tool for Materials Images	0	\$157,969	\$157,969	10/1/2018	12/30/2020	
2019-0258	Low-velocity High-gradient Accelerating Structures for Compact Carbon Therapy Linac	0	\$202,994	\$202,994	11/1/2018	9/30/2020	
2019-0256	Advanced Characterization of Polypytic Silicon Carbide for Quantum Technologies	0	\$251,058	\$251,058	10/1/2018	9/30/2021	
2019-0254	Near Real-Time Optimization of Manufacturing Processes via Machine Learning	0	\$274,021	\$274,021	10/1/2018	9/30/2020	
2019-0250	The Development of a High-throughput Mass Spec-based Method for Biocatalyst Engineering	0	\$182,912	\$182,912	10/1/2018	12/30/2020	
2019-0246	Developing Capability to Generate High Resolution Agronomic and Economic Decision Variables for Creating Win-Win for Bioenergy Crops and Water Quality	0	\$166,848	\$166,848	3/1/2019	9/30/2019	
2019-0217	Establishing a Usable, Scalable, and Reproducible Computational Ecosystem for Dark Energy Science	0	\$98,378	\$98,378	1/1/2019	9/30/2021	
2019-0205	Ion Transport in Heterogeneous Materials	0	\$844,322	\$844,322	11/1/2018	9/30/2021	
2019-0202	Development and Application of Advanced Computing Technologies and Models for Hypersonic Combustion Applications	0	\$291,936	\$291,936	10/1/2018	9/30/2020	
2019-0157	Ultrafast Time-resolved Quantum Ghost Imaging	0	\$478,664	\$478,664	10/1/2018	9/30/2021	
2019-0153	Fabrication of Single Crystal and High Aspect Ratio Piezoelectric Nanofibers for Nanogenerator Applications	0	\$24,076	\$24,076	10/1/2018	9/30/2019	
2019-0145	Sensor-based Mixed Reality for Rapid Digital Prototyping	0	\$174,074	\$174,074	1/1/2019	9/30/2019	
2019-0142	Statistical Multi-Scale Methods for Parameterization of Complex Physics-Based Models	0	\$24,429	\$24,429	10/1/2018	9/30/2019	
2019-0135	Atomic Synthesis of Artificial Lattices for Quantum Simulation	0	\$271,031	\$271,031	1/1/2019	9/30/2021	
2019-0112	Goal-Oriented Optimal Experimental Design Framework for Sensor Placement and Acquisition of Highly-Correlated Data	0	\$24,503	\$24,503	10/1/2018	9/30/2019	
2019-0109	Uncovering Dark Energy Physics through Forward-Modeling Galaxies into the Nonlinear Regime	0	\$203,102	\$203,102	11/1/2018	9/30/2021	

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2019-0108	High-Pressure Diamond Anvil Cell with Nitrogen-Vacancy Center Based Magnetometry. We propose to develop a novel instrument that will enable highly sensitive magnetization measurements in a diamond anvil cell by incorporating nitrogen vacancy centers into the diamond anvil cell and using microwaves to excite the nitrogen vacancy centers so that resonances can be optically detected.	0	\$189,305	\$189,305	1/1/2019	12/30/2020	
2019-0104	Computational Framework to Characterize Extreme Events for Complex Physical Phenomena	0	\$24,413	\$24,413	10/1/2018	9/30/2019	
2019-0103	High-Resolution Cosmology: Extending the Reach of Clustering Measurements	0	\$74,295	\$74,295	11/1/2018	9/30/2021	
2019-0100	The Feature Tracking Kit. The goal of the project is to develop the Feature Tracking Kit, a generalized in situ feature tracking framework for high-performance computers that eliminates the need for redundant efforts to formulate domain-specific feature tracking algorithms.	0	\$54,021	\$54,021	10/1/2018	9/30/2019	
2019-0098	The Cosmic Lab of the Future. We propose to develop a pilot project that will provide innovative services for data access, interactions, and analysis at different levels. We will focus on cosmological simulation data generated with our high-performance Hardware/Hybrid Accelerated Cosmology Code.	0	\$121,535	\$121,535	12/1/2018	9/30/2021	
2019-0083	Production of Chemically and Mineralogically Accurate Far-Field Fall Out Particles Using an Electric Arc Furnace	0	\$164,928	\$164,928	10/1/2018	9/30/2019	
2019-0062	Maximizing Cluster Cosmology with Next Generation Cosmic Microwave Background Surveys	0	\$187,577	\$187,577	11/1/2018	9/30/2021	
2019-0057	Development of an Integrated, Mechanistic Framework for Lead-Cooled Fast Reactor Source Term Assessments	0	\$226,227	\$226,227	10/1/2018	9/30/2019	
2019-0050	Horn-Coupled Detectors for Future Cosmic Microwave Background Experiments	0	\$162,161	\$162,161	11/1/2018	9/30/2020	
2019-0048	A New View on Charge and Spin in Functional Metal Oxides	0	\$22,423	\$22,423	10/1/2018	11/30/2018	
2019-0034	Cooling the Cooler: Using Optical Stochastic Cooling to Prepare Cold Electrons for Cooling Hadrons in the Electron-Ion Collider	0	\$60,598	\$60,598	11/1/2018	9/30/2020	
2019-0030	Probabilistic Forecasting of Extreme Weather Using Deep Learning	0	\$297,878	\$297,878	10/1/2018	9/30/2020	
2019-0028	Fast Current Modulation in Superconducting Arbitrarily Polarizing Emitter Undulator for Fast Polarization Switching	0	\$226,907	\$226,907	11/1/2018	9/30/2020	
2019-0026	Establishment of an Electrospinning-based Nanofiber Manufacturing Platform using in situ Small Angle X-ray Scattering and Wide Angle X-ray Scattering Measurements	0	\$299,158	\$299,158	11/1/2018	9/30/2020	
2019-0024	Krypton-85 Analysis in Uranium Hexafluoride via Atom Trap Trace Analysis	0	\$196,728	\$196,728	11/1/2018	9/30/2019	
2019-0023	Novel Production of Theranostic Precious Metal Radionuclides at the Argonne Tandem Linear Accelerator System	0	\$136,726	\$136,726	10/1/2018	9/30/2020	
2019-0010	Large-Scale Uncertainty Quantification for Power System Resilience. This research seeks to improve the resilience of the electrical grid by reducing reliance on heuristics for reliability assessment.	0	\$11,862	\$11,862	10/1/2018	9/30/2019	
2019-0006	Deep Learning for Posterior Density Emulation and Sampling. The potential outcome of this research will be a new family of sampling tools for Bayesian inference having distinct advantages over Markov chain Monte Carlo techniques. Such a major new inference method would constitute an important addition to the current arsenal of uncertainty quantification tools, with impacts on applications throughout physical science, including high energy physics, nuclear physics, chemistry, and materials.	0	\$189,852	\$189,852	10/1/2018	9/30/2019	
P/ANL2017-158	Real-time Control of Urban Drainage Systems. This research will advance real time control of hydraulic systems by integrating hydraulic modeling with complex adaptive agent systems approaches, allowing for municipalities to diversify flow control capabilities and minimize the impact of combined sewer overflow events.	0	\$224,399	\$224,399	5/1/2017	4/30/2020	
P/ANL2017-157	Transport and Photophysical Processes in Hybrid Perovskites for Energy Applications. The focus of this project is to gain a fundamental understanding of the charge transport and photophysical characteristics in this emerging class of material, enabling further improvement of these materials for a variety of applications, such as in energy conversion and harvesting.	0	\$272,640	\$272,640	7/1/2017	6/30/2020	
P/ANL2017-156	Scalable Data Movement for Data-centric Supercomputing. Our proposed project will help accelerate the transformation of raw data into insights and discoveries and improve our understanding of the data-centric infrastructures needed at exascale and future facilities.	0	\$2,760	\$2,760	7/1/2017	9/30/2019	
P/ANL2017-153	Soft Matter Visualization and Characterization by Electron Optical Beam Lines	0	\$177,505	\$177,505	3/1/2017	9/30/2019	
P/ANL2017-097	A Universal Data Analytics Platform for Science. It will enable usage and dissemination of a broad set of analysis tools, democratizing access to cutting-edge and best-practices approaches. Additionally, it will enable broad and efficient usage of investments in large-scale cyber infrastructure. Most importantly, this approach will accelerate the scientific life cycle, and ultimately the time to discovery, by removing the barriers to performing cutting-edge analyses on large and distributed data using both leadership and on-demand computing infrastructures.	0	\$42,987	\$42,987	11/1/2016	9/30/2019	
P/ANL2017-094	Microstructural Simulations of Stable Conjugated Polymer Glasses. We will (1) develop and distribute scalable simulation and visualization techniques for conjugated polymer physical vapor deposition on an experimentally relevant scale, (2) apply these techniques to explore polymer morphologies obtainable by systematic variations in polymer structure and physical vapor deposition conditions, and (3) characterize the influence of these variables on a film's optoelectronic functionality and susceptibility to thermal and photo-induced degradation.	0	\$147,941	\$147,941	10/1/2016	9/30/2019	
P/ANL2017-093	Beehive: A Dynamic Execution Environment for Performance, Power, and Resilience on Extreme-Scale Computing Systems. We will develop a dynamic execution model, called "Beehive," that can balance performance, resilience, and power-awareness. The central idea of Beehive is based on over-decomposition. Beehive will utilize a combination of operating system and runtime techniques to expose such over-decomposition as distinct operating system processes. Thus, it will map almost directly to existing programming models and allow existing applications to benefit with minimal changes.	0	\$38,421	\$38,421	10/1/2016	3/31/2020	This is an LDRD project supporting a Named Fellow. The extension past three years is in support of maternity leave. The extension was approved by the Argonne DOE Site Office and DOE Headquarters on 2/14/19.
P/ANL2017-092	Quantum Optics with Phonons. We will develop some basic tools for manipulating phonons at much higher frequencies, for use in hard materials where acoustic losses are significantly less severe. This phonon frequency band should also enable exploring interactions with atomic-like structures, such as defect spins, as well as fundamental quantum optics effects. Specifically, we propose to develop a class of "optics" structures for phonons that are similar to those used to guide and trap photons: waveguides, resonators, and beam splitters, combined into interferometers, having overall dimensions of a few to a few hundreds of micrometers. We will explore the potential for integrating these structures with quantum-limited microwave-frequency superconducting devices and with superconducting qubits.	0	\$310,144	\$310,144	11/1/2016	9/30/2019	
P/ANL2017-091	Development of a Compact Accelerator for A High Repetition Rate Free-Electron Laser	0	\$312,228	\$312,228	10/1/2016	9/30/2019	
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	\$47,732	\$47,732	10/1/2016	9/30/2019	
P/ANL2017-080	Coherence for High-Energy Diffraction. We will design new experimental strategies and reconstruction algorithms that bridge the gap between current methods and the constraints presented by coherent diffraction at high x-ray energies.	0	\$219,814	\$219,814	11/1/2016	9/30/2019	

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P/ANL2017-076	Miniaturized High-Efficiency Radio Frequency Energy Harvesting. The proposed project is on radio frequency energy harvesting for defense applications, such as unattended sensors.	0	\$293,413	\$293,413	11/1/2016	9/30/2019	
P/ANL2017-073	Developing Advanced Coherent Surface Scattering Reconstruction Method Incorporating Dynamical Scattering Theory	0	\$137,808	\$137,808	1/1/2017	9/30/2019	
P/ANL2017-058	A Strategic Scientific Program to Establish Argonne Leadership in the Development of the Future Electron-Ion Collider	0	\$863,876	\$863,876	10/1/2016	9/30/2019	
P/ANL2017-031	Ecological Organic Photovoltaics using Water-borne Semiconductor Nanoparticles	0	\$127,822	\$127,822	10/1/2016	9/30/2019	
P/ANL2017-026	Realizing a Gate-Tunable Kinetic Inductance for a Transmon Qubit using Strontium Titanate	0	\$51,000	\$51,000	12/1/2016	1/9/2019	
P/ANL2017-019	Bonding Dissimilar Materials using Nanoparticles/Nanofilm as Eutectic Compounds	0	\$47,733	\$47,733	10/1/2016	3/31/2019	
P/ANL2016-183	Understanding and Controlling Charge, Spin, Pseudospins and Lattice Degrees of Freedom in Layered Transition Metal Dichalcogenides	0	\$13,559	\$13,559	11/1/2015	10/31/2018	
2018-118	Efficient Quantum Computing with Unreliable Quantum Hardware Facilitated by Lightweight Error Correction and Use of Multiple Quantum Processors	0	\$462,189	\$462,189	8/15/2018	7/31/2021	
2018-117	Dynamic Cross-linked Polymers for Silicon-based Electrodes in Lithium-Ion Batteries	0	\$33,123	\$33,123	7/1/2018	9/30/2019	
2018-116	Long-Lived Rare-Earth Qubits on Silicon. This project aims to develop a solid-state qubit platform based on high-quality epitaxial yttrium oxide thin films doped with erbium ions on silicon wafers. This scalable quantum technology combines long coherence with a powerful silicon nanophotonic architecture to enable high-performance qubits and quantum computing devices.	0	\$24,666	\$24,666	7/1/2018	9/30/2019	
2018-115	Health and Environmental Effects of Unconventional Natural Gas Development	0	\$5,101	\$5,101	7/1/2018	6/30/2020	
2018-113	Precise Tailoring of an Electron Beam's Temporal Distribution	0	\$277,371	\$277,371	7/8/2018	7/7/2021	
2018-112	Engineered Materials for Additive Manufacturing. This proposal addresses the overarching challenge of engineering new materials for additive manufacturing by combining computational efforts with in-situ X-ray imaging and diffraction studies to understand and control the underlying physical phenomena driving such rapid and directional solidifications, investigating the physics underlying directed energy deposition, a powder-blown additive manufacturing process.	0	\$265,894	\$265,894	9/4/2018	9/30/2019	
2018-111	Bio-inspired Smart Soft-Robots. The goal is to build an untethered reconfigurable soft robot that can navigate in unknown terrain, perform real-time spatial pressure mapping, and wirelessly communicate with an external agent to recover mapping images.	0	\$258,075	\$258,075	6/1/2018	9/30/2019	
2018-110	Negative Capacitance in Ferroelectric Nanostructures	0	\$18,022	\$18,022	9/1/2018	5/31/2020	
2018-109	High Precision Synthesis for Energy Conversion and Storage	0	\$276,045	\$276,045	5/1/2018	4/30/2021	
2018-107	Creating Next-Generation Quantum Electronics with Topological Insulator/Ferromagnetic Insulator Heterostructures	0	\$71,364	\$71,364	5/1/2018	9/30/2019	
2018-106	Synergistic Multi-Site Catalysts For Dry Reforming Processes	0	\$65,597	\$65,597	5/1/2018	9/30/2019	
2018-105	Electrode Contamination Investigation to Advance Direct Recycling	0	\$133,771	\$133,771	7/1/2018	9/30/2020	
2018-104	Complex Fluids from Chemical Separations: A New Entry to Battery Electrolytes	0	\$257,923	\$257,923	6/1/2018	9/30/2020	
2018-100	High-Density Energy Storage in Solvent-Free Redox Flow Batteries for Flexible Electric Grid	0	\$263,736	\$263,736	6/1/2018	9/30/2020	
2018-099	Syntheses and Evaluation of New Single Ion Electrolytes	0	\$168,568	\$168,568	6/1/2018	12/31/2020	
2018-097	Mission-Driven Unmanned Aerial System and Design Center. This project will establish a Mission-Driven Unmanned Aerial Systems Design Center bringing together critical resources and experience to address the interconnected technical challenges of energy consumption, noise, flight time, and payload by developing a tool to evaluate potential design options and optimizing the trade-offs through targeted aerodynamics design verification.	0	\$294,124	\$294,124	5/1/2018	9/30/2020	
2018-095	Towards the Creation of an Advanced Mobility Cybersecurity Testbed. As deep learning based techniques become more widespread across a wide variety of industries and mobility applications (self-driving cars, smart traffic signals, dynamically assigned freeway traffic), emerging research has begun to focus on investigating these powerful techniques in terms of their response to unintended or malicious inputs. This is especially important in the realm of vehicle technologies, given that machine learning has become an integral component of a vehicle's ability to detect and classify objects (signs, vehicles, pedestrians), ultimately becoming the "driver" in the case of a fully-automated vehicle	0	\$353,501	\$353,501	5/1/2018	9/30/2019	
2018-093	Real-Time Characterization of Versatile Test Reactor Coolant Variables by High Resolution Distributed Sensing	0	\$399,180	\$399,180	5/1/2018	9/30/2019	
2018-090	Strategic Assessment of Future Energy Needs and Emerging Technologies	0	\$309,494	\$309,494	5/1/2018	9/30/2019	
2018-089	Optimizing Urban Transportation Systems Energy Using Large-Scale Simulation and Machine Learning	0	\$342,804	\$342,804	5/1/2018	9/30/2020	
2018-088	Integrated Simulation Capabilities for Versatile Test Reactor Design and Analysis	0	\$310,872	\$310,872	5/1/2018	9/30/2019	
2018-088	Modeling and Quantifying Tradeoffs among Execution Time, Power, and Resilience of Parallel Application to Efficiently Exploit System Heterogeneity	0	\$384,687	\$384,687	1/1/2018	9/30/2020	
2018-055	Variability and Trends in Land Surface Properties: Effects on boundary layer physics and Extremes Onset	0	\$145,268	\$145,268	12/1/2017	9/30/2020	
2018-054	Development of a Compact 352-Megahertz High Efficiency Solid State Radio-Frequency Amplifier System Utilizing Enhanced Digital Control	0	\$350,293	\$350,293	4/1/2018	9/30/2020	
2018-053	A High Pressure Xenon Gas Time Projection Chamber for Next Generation Neutrinoless Double Beta Decay Search Experiments	0	\$243,838	\$243,838	10/1/2017	9/30/2020	
2018-052	Exploring Lossy Quantum Computation	0	\$250,730	\$250,730	1/1/2018	12/30/2020	
2018-051	High-Efficiency, Low-cost Oxygen Reduction Reaction and Oxygen Evolution Reaction Catalysts Derived from Metal-Organic Frameworks Building an Open Platform to Advance and Simplify Deep Learning Adoption	0	\$284,064	\$284,064	10/1/2017	9/30/2020	
2018-031	Novel Capabilities for Ultra-fast and Ultra-low-dose Three-dimensional Scanning Hard X-ray Microscopy	0	\$404,648	\$404,648	10/1/2017	9/30/2019	
2018-030	Integrated Approach to Unravel Four Dimensional Spatiotemporal Correlation in Highly Transient Phenomena: Ultrafast X-ray Imaging and High-Performance Computing	0	\$289,530	\$289,530	10/1/2017	9/30/2020	
2018-028	Dark-Field Imaging of Multiscale Structures and Their Role at Phase Transition, Hysteresis, and Relaxation, Tuned by Magnetic Field and Temperature	0	\$292,900	\$292,900	10/1/2017	9/30/2020	
2018-027	Continuous Flow Synthesis: A Platform to Accelerate the Transition of Nanomaterials to Manufacturing	0	\$199,250	\$199,250	3/1/2018	9/30/2020	
2018-022	Atomistically Informed Coherent Diffraction Imaging	0	\$406,353	\$406,353	11/1/2017	9/30/2019	
2018-019	Development of Zoom Optics Using Deformable Mirrors with in situ Wavefront Sensing and a Closed-loop Control System	0	\$192,996	\$192,996	10/1/2017	9/30/2020	
2018-016	A High Precision Superconducting Detector for Next Generation Neutrinoless Double Beta Decay Search Experiments	0	\$387,312	\$387,312	1/1/2018	9/30/2020	
2018-012	Enabling Flame Spray Pyrolysis as a Transformational Manufacturing Technology	0	\$142,734	\$142,734	11/1/2017	9/30/2019	
2018-011	Development of a Hard X-ray Spectrometer Based on Transition Edge Sensors for Advanced Spectroscopy	0	\$437,125	\$437,125	11/1/2017	9/30/2019	
2018-002	Novel Methods for Three-Dimensional Integration of Superconducting Detectors and Readout	0	\$293,450	\$293,450	4/1/2018	9/30/2020	
2019-0004	Development of a Hard X-ray Spectrometer Based on Transition Edge Sensors for Advanced Spectroscopy	0	\$202,249	\$202,249	2/1/2019	9/30/2021	
Total # of Projects for ANL: 143		Total Equipment Cost for ANL: \$0	Total Other Cost for ANL: \$26,348,933	Total Cost for ANL: \$26,348,933			
BNL - Brookhaven National Lab							
BNL19-035	Novel Approaches for Self-Assembly of Bio - Nanomaterials and Enabling their New Functions	0	\$91,912	\$91,912	2/1/2019	1/31/2022	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
BNL19-030	Towards Stony Brook University – Brookhaven National Laboratory Scalable Quantum Processing and Network Enabled by Fast Imaging of Single Photons	0	\$479,998	\$479,998	10/1/2018	9/30/2021	
BNL19-029	Single Atom Barium -Identification for next Enriched Xenon Observatory using Electron Microscopy	0	\$169,152	\$169,152	4/1/2019	3/31/2022	
BNL19-028	High-Throughput Advanced Data Acquisition for Electron-Ion Collider, Particle Physics and Cosmology Experiments	0	\$306,093	\$306,093	7/1/2019	6/30/2022	
BNL19-027	Real-time Particle Tracking with Deep Learning on Field Programmable Gate Arrays	0	\$164,988	\$164,988	8/1/2019	7/31/2022	
BNL19-026	Cathode Development and Deployment for Electron-Ion Collider	0	\$316,874	\$316,874	11/1/2018	10/31/2021	
BNL19-024	Quantum Ultra-violet (UV) Sensors based on Superconducting Nanowire Single Photon Detector	0	\$97,450	\$97,450	4/1/2019	3/30/2022	
BNL19-023	Development of Low Background Interconnections	0	\$172,681	\$172,681	2/1/2019	1/31/2022	
BNL19-022	Sensors and Electronics for Next-Generation Dark Energy Surveys	0	\$266,024	\$266,024	11/1/2018	10/31/2021	
BNL19-021	Silicon Drift Detector with Internal Gain and Ultra-low Noise Charge Pre-amplifier for Single Photon Detection	0	\$98,668	\$98,668	4/1/2019	3/31/2022	
BNL19-020	Cryo-Complementary Metal-Oxide-Semiconductor (CMOS): Enabling Technology for Scalable Quantum Processors	0	\$272,621	\$272,621	11/1/2018	10/31/2021	
BNL19-019	Varying Cross-Section Direct Wind Double Helix Coils	0	\$167,635	\$167,635	1/1/2019	12/31/2021	
BNL19-017	Beam Pipe Higher Order Mode (HOM) Absorber	0	\$185,563	\$185,563	5/1/2019	4/30/2022	
BNL19-016	Demonstration of Feasibility of Sub-nanometer, Picosecond Electron Microscope for the Life Sciences	0	\$378,085	\$378,085	12/1/2018	11/30/2021	
BNL19-015	Triplet-Driven Solar Energy Capture	0	\$76,832	\$76,832	2/1/2019	1/31/2022	
BNL19-014	Linking Experiments to Algorithms for Solving Single-Particle Cryo-Electron Microscopy (Cryo-EM) Challenges	0	\$57,912	\$57,912	8/1/2019	7/31/2022	
BNL19-013	In operando Imaging and Dynamics of Two-Dimensional High Temperature Superconductor Based, Dense Q-bit Arrays	0	\$104,043	\$104,043	9/1/2019	8/31/2022	
BNL19-010	X-Ray Vision of Topological Bosons in Condensed Matter	0	\$78,788	\$78,788	12/1/2018	11/30/2021	
BNL19-008	Integrating Multimodal Experiments using Advanced Data Analytics Developed with Microscopic Theories for Quantum Materials	0	\$69,400	\$69,400	7/1/2019	6/30/2022	
BNL19-003	Building an Integrative Forecast System to Address Challenges Facing Renewable Energy Forecast	0	\$110,495	\$110,495	6/1/2019	5/31/2022	
BNL19-002	Physics-Guided Optimization of Quantum Gate Operations. We propose to study the optimization schemes that can reduce the number of gate operations while preserving the circuit outcome. This would in turn reduce the time required to perform certain critical algorithmic steps, analogous to a reduced number of Central Processing Unit instructions on a classical computer. We expect the optimization schemes to be explored, adjusted, and validated based on the underlying physics critical to quantum circuits.	0	\$177,106	\$177,106	2/1/2019	1/31/2022	
BNL19-001	Physics-Informed Autonomous Synthesis of Self-Assembling Materials. We propose to develop physics-informed autonomous synthesis for self-assembling materials. We will advance beyond existing work (by ourselves and other groups) by coupling the known physics of the material under study deeply into the autonomous experimental loop; in particular by using analytic field equations to capture equilibrium behavior, machine-learning approximations to estimate the role of non-equilibrium effects, and High Performance Computing modeling to capture the pathway-dependence of assembly.	0	\$162,989	\$162,989	5/1/2019	4/30/2022	
BNL18-051	Spatial Imaging of Quantum Entanglement. We aim to prototype a long distance quantum network using a modular approach based on the development of the following technological building blocks: a) quantum memories with high efficiency and low noise; b) entangled photon sources with high brightness and wavelength compatible with atom-based memories; and c) characterization devices for imaging and time-stamping of entangled photons, with nanosecond time resolution, capable of evaluating the quantum network performance in real time. We will also investigate how the quantum systems entangled at long distances can be applied to sensing of particles and fields by observing changes in the wave function for the entangled system.	0	\$24,268	\$24,268	6/1/2018	5/31/2021	
BNL18-047	Functional Descriptors of Single Atom Catalysts. We aim to prototype a long distance quantum network using a modular approach based on the development of the following technological building blocks: a) quantum memories with high efficiency and low noise; b) entangled photon sources with high brightness and wavelength compatible with atom-based memories; and c) characterization devices for imaging and time-stamping of entangled photons, with nanosecond time resolution, capable of evaluating the quantum network performance in real time.	0	\$375,256	\$375,256	10/1/2017	9/30/2020	
BNL18-045	Jets at the Electron-Ion Collider. Collimated beams of sub-atomic hadrons called jets are a powerful diagnostic of the properties of matter produced at high energy colliders. This project explores the potential of jet measurements for a wide energy range at a future Electron-Ion Collider.	0	\$375,498	\$375,498	2/1/2018	1/31/2021	
BNL18-044	Interplay of the Many Body Dynamics of Parton Spins with Gluon Saturation at Electron-Ion Collider (EIC)	0	\$362,453	\$362,453	3/1/2018	2/28/2021	
BNL18-039	Studying Confinement and Nuclear Structure through Correlations and Quantum Entanglement at an Electron-Ion Collider (EIC)	0	\$177,675	\$177,675	7/1/2018	6/30/2021	
BNL18-037	Forward and Backward Tracking at the Electron-Ion Collider (EIC) Using Small Strip Thin Gas Chamber Detector	0	\$179,955	\$179,955	8/1/2018	7/31/2021	
BNL18-033	Micro-pattern Gas Detectors. We intend to explore new technologies in all of these areas to develop a family of high-performance detectors with optimized spatial resolution, linearity of response and low channel count, as well as new software simulation tools, in order to improve the performance	0	\$369,128	\$369,128	2/1/2018	1/31/2021	
BNL18-046	Enabling Sustainable Ammonia Synthesis through Ambient and High Pressure Synchrotron Techniques	0	\$159,215	\$159,215	10/1/2017	9/30/2020	
BNL18-038	Ultra-fast High-Granularity Silicon Sensor Technology for Photon Science	0	\$294,595	\$294,595	3/1/2018	2/28/2021	
BNL18-036	Finding a Lifshitz Point with the Beam Energy Scan II	0	\$141,252	\$141,252	7/1/2018	6/30/2021	
BNL18-030	Investigation of Surface Charge Limit of Gallium Arsenide (GaAs)	0	\$264,099	\$264,099	12/1/2017	1/31/2020	
BNL18-028	Tunable High Power Fundamental Power Coupler (FPC) for Storage Superconducting Radio Frequency (SRF) Cavity	0	\$755,245	\$755,245	2/1/2018	1/31/2021	
BNL18-026	Electron Beam Formation via Ionization Injection for Next Generation Accelerator Research and Development	0	\$243,843	\$243,843	7/1/2018	6/30/2021	
BNL18-022	Interdisciplinary Cyber-Security Framework	0	\$194,927	\$194,927	6/1/2018	5/31/2021	
BNL18-020	Novel Development of Deep Learning and Radar Data Assimilation for Energy Resilience and Grid Reliability	0	\$333,264	\$333,264	3/1/2018	2/28/2021	
BNL18-017	Electrolyte Flow Battery for Smart Grid Application	0	\$604,011	\$604,011	4/1/2018	3/30/2021	
BNL18-015	Operando Studies of Three-Dimensional Printing with Nanostructured Inks	0	\$187,412	\$187,412	12/1/2017	11/30/2020	
BNL18-009	Visualization Toward White-Box Machine Learning for Image Registration in Multi-modal Imaging and Analysis	0	\$418,157	\$418,157	10/1/2017	9/30/2020	
BNL18-005	Provenance-enabled Sample Measurements and Tracking for Multi-modal Analysis and Predictive Synthesis	0	\$370,902	\$370,902	11/1/2017	10/31/2020	
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	\$447,255	\$447,255	3/1/2018	2/28/2021	
BNL17-029	High Performance X-ray Diffraction Simulation Toolkit Using Graphics Processing Unit and Central Processing Unit Clusters	0	\$94,934	\$94,934	4/1/2017	3/31/2020	
BNL17-024	Development of a New Approach to Remotely Measure Limitations on Plant Growth	0	\$355,832	\$355,832	8/1/2017	7/31/2020	
BNL17-023	Molecular Mechanisms of Alkane Hydroxylation	0	\$179,708	\$179,708	9/1/2017	8/31/2020	
BNL17-018	Genomes to Predictive Biology: Machine Learning for the Integration of Inter-Species Functional Genomics Data	0	\$200,995	\$200,995	6/1/2017	5/31/2020	
BNL17-017	Development of Compact, High Efficiency Nanofocusing Optics for Hard X-Ray Nano-Imaging	0	\$95,286	\$95,286	4/1/2017	3/31/2020	
BNL17-016	Diffraction-limited and Wavefront Preserving Reflective Optics Development	0	\$274,519	\$274,519	5/1/2017	4/30/2020	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
BNL17-015	National Synchrotron Light Source II High Brightness Upgrade Design Studies	0	\$286,359	\$286,359	2/1/2017	1/31/2020	
BNL17-011	Engineered Protein Arrays for Structural and In-Operando Studies	0	\$195,318	\$195,318	6/1/2017	5/31/2020	
BNL17-004	Next Generation Pad Readout for Neutron Detectors	0	\$286,713	\$286,713	1/1/2017	12/31/2019	
BNL17-003	Integrated Low-Noise and Low Drop-Out Voltage Regulator for Front-End Application Specific Integrated Circuit (ASIC)	0	\$311,992	\$311,992	2/1/2017	1/31/2020	
BNL17-002	High-Powered Erbium Doped Fiber Laser for 50 milliamp Highly Polarized Electron Beam	0	\$225,556	\$225,556	5/1/2017	4/30/2020	
BNL16-038	Preconceptual Design Study for Large Scale Structure Experiment Post Large Synoptic Survey Telescope/Dark Energy Spectroscopic Instrument	0	\$139,107	\$139,107	9/1/2016	8/31/2019	
BNL16-037	Exploring Hadron Structure with Ab Initio Lattice Quantum Chromo Dynamics Calculations and Making Predictions for an Electron-Ion Collider	0	\$143,110	\$143,110	8/1/2016	7/31/2019	
BNL16-034	Advanced Silicon Detectors Research and Development	0	\$40,110	\$40,110	3/1/2016	2/28/2019	
BNL16-010	100 Femtosecond Single-shot Electron Beam Slicing Technology Towards Ultra-fast Imaging	0	\$98,981	\$98,981	1/1/2016	12/31/2018	
Total # of Projects for BNL: 57		Total Equipment Cost for BNL: \$0	Total Other Cost for BNL: \$13,212,239	Total Cost for BNL: \$13,212,239			
KCNSC - Kansas City National Security Campus							
704599	Lead-Free Material. This project will focus on developing a new material composition for lightning arrestor connector granules to replace the current lead magnesium niobate - lead titanate granules. The drivers to replace the current lead-based granules are: domestic supply	0	(\$60)	(\$60)	10/1/2014	9/30/2019	Project did not exceed 3 years. This is a cost adjustment.
704716	Internal Integrated Computational Materials Engineering Development	0	(\$18,615)	(\$18,615)	10/1/2015	9/30/2019	Project had a late invoice, which caused cost to extend beyond fiscal year.
704984	Gallium Nitride Vibration Energy Harvester	0	\$274,606	\$274,606	10/1/2017	9/30/2019	
704992	Miniature Mechanisms Testing - This will improve a) troubleshooting of other low margin tests and b) assist with identification of critical manufacturing parameters that will drive test results at higher levels.	0	\$76,657	\$76,657	7/1/2018	9/30/2019	
705110	Financial Year18/19 Innovation, Development, Experimentation, and Assessment Carryover Project	0	\$162,264	\$162,264	8/1/2018	9/30/2019	
704994	Advanced Characterization of Additive Manufacturing Metals	0	\$109,475	\$109,475	7/1/2018	9/30/2019	
704932	Powder Simulations - This project will investigate how to correlate costly, high-fidelity models to fast, inexpensive tests that would be suitable for analyzing every batch of powder used in production machines. Several common powder tests will be compared, along with the variability and sensitivity of each using physical test results.	0	(\$322)	(\$322)	3/1/2018	9/30/2018	
704931	Pellet Additive Manufacturing Feedstock	0	\$758	\$758	2/1/2018	9/30/2019	
704929	Innovation, Development, Experimentation, and Assessment Financial Year18	0	\$23,014	\$23,014	10/1/2017	9/30/2019	
704881	Real-Time Tracking in Augmented Reality. This project will focus on developing methods for image/object recognition and tracking. The end goal will be to integrate methods into Kansas City National Security Campus developed Augmented Reality applications, and to identify/apply methods to other applications that can benefit from recognition/tracking techniques.	0	\$55,848	\$55,848	10/1/2017	9/30/2019	
704834	Maraging Steel Study. Steel samples will be tested in Los Alamos' neutron beam line to measure the quantity of body-centered cubic and face-centered cubic phases present. Samples will be heat treated during testing to determine the impact of time, temperature, and chemistry on reversion from body-centered cubic to face-centered cubic. Samples will be produced from both wrought and additively manufactured material.	0	\$4,156	\$4,156	10/1/2016	9/30/2019	
704765	Innovation, Development, Experimentation, and Assessment - Innovation, Development, Experimentation, and Assessment Projects for Financial Year 2018	0	\$109	\$109	10/1/2015	9/30/2019	Late invoicing caused a late payment across fiscal year.
704725	Power Line Monitoring - This project will develop the collection and analysis capability to monitor intermittent and/or high frequency disturbances on the facility power line. Scope will include developing, procuring, and installing power line monitoring capability to continuously monitor and store data at three locations in the facility - two at low voltage, and one at medium voltage.	0	(\$565)	(\$565)	10/1/2015	9/30/2018	
704928	Senior Design - Multiple universities require senior design projects in order for their engineering students to graduate. A call for projects was sent out to Honeywell Federal Manufacturing and Technologies employees, and engineers whose Plant Directed Research and Development projects were not selected were also approached and asked if it would be possible to rescope the project to be completed in a shorter amount of time by engineering students. All projects support Honeywell Federal Manufacturing and Technologies business in some way. These projects were sent out to Universities that we have partnered with in the past, and the projects selected by design teams will be completed with a Kansas City National Security Campus employee acting as a mentor to the senior design teams who selected their project.	0	\$249,629	\$249,629	10/1/2017	9/30/2019	
704927	Kansas City National Security Campus Policy Engagement and Training	0	\$109,537	\$109,537	10/1/2017	9/30/2019	
704925	Enhanced Precision Energetics - New empirically derived material models used for high strain rate simulations	0	\$10,483	\$10,483	10/1/2017	9/30/2019	
704924	Digital Requirements Management. Develop and test a requirements management software tool to facilitate requirements mapping (source requirements to trusted product models to manufacturing processes to test results) during the entire product life cycle.	0	(\$113)	(\$113)	10/1/2017	9/30/2018	
704923	Electronics X-Ray Inspection Shielding and Prediction Simulation	0	\$255,370	\$255,370	10/1/2017	9/30/2019	
704922	Model-Based, Interactive Simulation Training	0	\$940	\$940	10/1/2017	9/30/2019	
704921	Advanced Modeling and Simulations for Global Security	0	\$320,866	\$320,866	10/1/2017	9/30/2019	
704920	Investigation of Isogeometric Finite Element Analysis	0	\$496,670	\$496,670	10/1/2017	9/30/2019	
704919	Additively Manufactured Metals: A Continuing International Computational Materials Engineering approach at Kansas City National Security Campus	0	\$253,215	\$253,215	10/1/2017	9/30/2019	
704918	Augmented Reality Microscope. This project scope will investigate the capabilities of a reliable, accurate, and functional microscope integrated with augmented reality (Augmented Reality) technology. In more detail, the scope will only cover the physical components of the project and be integrated in such a way to successfully project an image/video within the microscope. This will easily allow the capability and functionality for Augmented Reality and deep learning in the future.	0	\$162,096	\$162,096	10/1/2017	9/30/2019	
704917	Automating Design for Manufacturability Analysis & Feedback	0	\$136,548	\$136,548	10/1/2017	9/30/2019	
704903	Solid State Dual Neutron/X-Ray Detector Development	0	\$290,840	\$290,840	10/1/2017	9/30/2019	
704901	Next Generation Telemetry Decommutator and Product Interface	0	\$333	\$333	10/1/2017	9/30/2019	
704900	Advanced Field-Programmable Gate Array Development	0	\$28,130	\$28,130	10/1/2017	9/30/2019	
704899	Validating New Instruments & Developing New Technology (Sounding Rockets)	0	\$677,468	\$677,468	10/1/2017	9/30/2019	
704898	Tailorable Resonant Plate Shock	0	\$205,839	\$205,839	10/1/2017	9/30/2019	
704897	Multiaxial (6 degree of freedom) Vibration Test to Assess Durability of Electronic Systems and Components	0	\$141,918	\$141,918	10/1/2017	9/30/2019	
704896	Constant Rate of Change Compression with Variable Sampling Rate	0	\$1,348	\$1,348	10/1/2017	9/30/2019	
704895	Computational X-Ray Dose Maps	0	\$1,700	\$1,700	10/1/2017	9/30/2019	
704894	Cognitive Software Defined Radio on a Field-Programmable Gate Array with Beam Steering	0	\$51,777	\$51,777	10/1/2017	9/30/2019	
704893	Tester Security - Identify Software/firmware/hardware in trusted base	0	\$95,617	\$95,617	10/1/2017	9/30/2019	
704892	Controller Area Network Bus Security	0	(\$2,091)	(\$2,091)	10/1/2017	9/30/2018	
704891	Embedded Hardware Access and Communication	0	(\$571)	(\$571)	10/1/2017	9/30/2018	
704890	Trusted Additive Manufacturing	0	\$189,901	\$189,901	10/1/2017	9/30/2019	
704889	Optical Monitoring of Fireset Current Using Faraday Rotation	0	\$64,654	\$64,654	10/1/2017	9/30/2019	
704888	High Side Analytics Big Data	0	\$991	\$991	10/1/2017	9/30/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
704885	Metallurgical and Mechanical Property Characterization of Additively Manufactured 304L Stainless Steel	0	\$86,921	\$86,921	10/1/2017	9/30/2019	
704884	Active Record of Assembly Mistake Proofing	0	\$35,796	\$35,796	10/1/2017	9/30/2019	
704883	Active Frequency Modulation Machine Learning	0	\$25,924	\$25,924	10/1/2017	9/30/2019	
704882	Material Risk Detection. Use analytics and machine learning to develop a model that analyzes data internally and externally from Supplier Data and third party sources from news feeds and legislation to identify likelihood of a material risk occurring. Risk could be a schedule delay, financial risk, or quality risk.	0	\$28,567	\$28,567	10/1/2017	9/30/2019	
704880	Transport Phenomena. The comparison of theoretical models to experimental data for flow restriction	0	\$143,101	\$143,101	10/1/2017	9/30/2019	
704875	Improved Diamond Like Carbon Recipe. The scope of this continuation project will include final analysis/selection of the new Diamond Like Carbon formulation(s), process implementation at the Kansas City National Security Campus, and coating analysis of real parts assembled into existing mechanisms. It is expected that the Kansas City National Security Campus will stand-up a new Diamond Like Carbon formulation/process and gain comparative data of how the new coating performs using existing mechanisms parts.	0	(\$322)	(\$322)	10/1/2017	9/30/2018	
704873	Advances in Superhydrophobic Coatings	0	\$1,268	\$1,268	10/1/2017	9/30/2019	
704872	Massachusetts Institute of Technology Plant Directed Research and Development Project	0	\$26,197	\$26,197	10/1/2017	9/30/2019	
704871	Hiperco Replacement - The scope of work for this project is to evaluate new materials in search of a replacement material for Hiperco (Iron-Cobalt). This project will develop an Integrated Computational Materials Engineering framework for the evaluation of magnetic and mechanical properties of materials, and leverage this framework to create new alloy designs for the purpose of similar magnetic performance to Hiperco, improved mechanical performance and other properties of interest.	0	\$471,119	\$471,119	10/1/2017	9/30/2019	
704870	Metal Filament Development	0	\$307,281	\$307,281	10/1/2017	9/30/2019	
704867	Polarization Measurements for Assessing Aging Dielectric Material	0	\$15,538	\$15,538	10/1/2017	9/30/2019	
704865	Sonic Fatigue Chamber to Generate 4 Kiloherz Vibration and Higher Frequencies	0	\$118,387	\$118,387	10/1/2017	9/30/2019	
704863	Experimental-Analytical Substructuring to Characterize Non-Linear Response of Environmental Test Systems	0	\$3,498	\$3,498	10/1/2017	9/30/2019	
704856	Future Glass Seals. University collaboration to assess laser heating of glass to formation of hermetic glass seals to 304L (Industry trade name).	0	\$328,791	\$328,791	10/1/2017	9/30/2019	
704855	Exploring Thermoset Additive Manufacturing	0	\$28,445	\$28,445	10/1/2017	9/30/2019	
704854	Room Temperature Vulcanizing Mix/Meter Dispense System	0	\$1,145	\$1,145	10/1/2017	9/30/2018	
704852	Increasing Integrated Circuit Reverse Engineering Capabilities	0	\$715,098	\$715,098	10/1/2017	9/30/2019	
704851	High Voltage Gallium Nitride Switch for Fireset Applications	0	\$4,561	\$4,561	10/1/2017	9/30/2019	
704844	Investigation of De-embedded Measurement Traceability	0	\$495	\$495	10/1/2016	9/30/2019	
704843	Ceramic Additive Manufacturing Materials Characterization	0	\$2,028	\$2,028	10/1/2016	9/30/2019	
704842	Direct Write Electronics	0	\$816,078	\$816,078	10/1/2016	9/30/2019	
704841	Development of Electromagnetic Compatibility Analysis Capabilities	0	(\$318)	(\$318)	10/1/2016	9/30/2018	
704840	Magnetic Video Camera	0	\$3,166	\$3,166	10/1/2016	9/30/2019	
704839	Next Generation Microfluidics	0	\$6,138	\$6,138	10/1/2016	9/30/2019	
704837	Augmented Reality Advanced Inspection	0	\$98,363	\$98,363	10/1/2016	9/30/2019	
704836	Polymer Additive Manufacturing Consortium - Plant Directed Research and Development	0	\$164,710	\$164,710	10/1/2016	9/30/2019	
704833	Non-contact Dimensional and Workmanship Inspection	0	\$158,909	\$158,909	10/1/2016	9/30/2019	
704831	Additive Manufacturing of Ceramic Composites	0	\$489,127	\$489,127	10/1/2016	9/30/2019	
704828	Digital Radar Target Simulator Prototype Development	0	(\$54)	(\$54)	10/1/2016	9/30/2018	
704827	Circular and Large Mass Reversible Helical Electromagnetic Launcher	0	\$334,077	\$334,077	10/1/2016	9/30/2019	
704826	Multi-Input Multi-Output - Active Vibration Control for High Frequency Random Vibration	0	\$28,726	\$28,726	10/1/2016	9/30/2019	
704823	Ink Jet Fabrication of Electrical and Optical Devices	0	(\$1,691)	(\$1,691)	10/1/2016	9/30/2018	
704820	Fixture Design and Damage Potential	0	\$361,690	\$361,690	10/1/2016	9/30/2019	
704816	Development of Material Point Method Simulation Capabilities	0	(\$626)	(\$626)	10/1/2016	9/30/2018	
704814	Investigation of Conformal Cell Structures for Heat Transfer in Circular Pipes	0	\$234,047	\$234,047	10/1/2016	9/30/2019	
704813	Scrubbing Native Model-Based Definitions	0	\$75,491	\$75,491	10/1/2016	9/30/2019	
704811	Dry Ice Blasting	0	\$1,088	\$1,088	10/1/2016	9/30/2019	
704809	Automated Optical Inspection Development	0	\$289	\$289	10/1/2016	9/30/2019	
704807	Machine Health Monitoring	0	\$2,098	\$2,098	10/1/2016	9/30/2019	
704806	Laser Oxidation for Wear Resistance and Lubrication	0	\$45,755	\$45,755	10/1/2016	9/30/2019	
704805	Large-Scale Additive Manufacturing with Wire Fed Systems	0	\$473	\$473	10/1/2016	9/30/2019	
704804	X-Ray Analysis of Selective Laser Melting	0	\$517,077	\$517,077	10/1/2016	9/30/2019	
704802	Additively Manufactured Magnetic Solenoid	0	\$4,624	\$4,624	10/1/2016	9/30/2019	
704800	7075 Aluminum Development for Electron Beam Melt Additive Manufacturing	0	\$701,016	\$701,016	10/1/2016	9/30/2019	
704796	Cleaning of Additively Manufactured Polymer Parts	0	\$3,548	\$3,548	10/1/2016	9/30/2019	
704795	Millimeter Wave Antennas and Transmitters	0	\$22,442	\$22,442	10/1/2016	9/30/2019	
704790	Millimeter Wave Radio-Frequency Identification	0	\$5,245	\$5,245	10/1/2016	9/30/2019	
704789	Engineered Substrates with High Thermal Conductivity	0	\$37,379	\$37,379	10/1/2016	9/30/2019	
704784	Selective Laser Sintering Research and Development System	0	\$22,869	\$22,869	10/1/2016	9/30/2019	
704783	Vector-Following Launch Simulation	0	(\$408)	(\$408)	10/1/2016	9/30/2018	
704777	Design and Manufacture of Cryogenic Systems	0	\$41,144	\$41,144	10/1/2016	9/30/2019	
704775	Identification of Non-oxide Ceramics	0	\$6,226	\$6,226	10/1/2016	9/30/2019	
704774	Unique Chip Identification Using Ion Implants	0	\$3,861	\$3,861	10/1/2016	9/30/2019	
704770	Copper Development for Additive Manufacturing	0	\$68,920	\$68,920	10/1/2016	9/30/2019	
704760	Frequency Response Inspection of Additively Manufactured Parts	0	(\$2,266)	(\$2,266)	10/1/2015	9/30/2018	
704751	Development of Steel for Selective Laser Melting	0	\$1,328	\$1,328	10/1/2015	9/30/2019	Late invoicing caused a late payment across fiscal year.
704741	Augmented Reality Vision. This project will perform an inspection and assembly using augmented reality to overlay instructions and part information onto smart glasses/tablets in order to simplify tasks and aid in efficiency and mistake proofing.	0	\$13,214	\$13,214	10/1/2015	9/30/2019	Late invoicing caused a late payment across the fiscal year.
704719	Radar 2021. This project will focus on researching new and innovative methods for reducing automated production tester size. The end goal will be to identify common functions and identify potential new solutions that optimize architecture/footprint, while still meeting	0	\$241,673	\$241,673	10/1/2015	9/30/2019	Late invoicing caused a late payment of a contract.
705111	FiscalYear19 Innovation, Development, Experimentation, and Assessment	0	\$1,380,196	\$1,380,196	10/1/2018	9/30/2019	
705088	Radar Signal Processing	0	\$8,672	\$8,672	8/1/2018	9/30/2019	
705067	Integrated Circuit Design for Printed Sensors	0	\$12,650	\$12,650	8/1/2019	9/30/2019	
705021	FiscalYear19/FiscalYear20 Carryover Projects	0	\$125,348	\$125,348	10/1/2018	9/30/2019	
705020	Smart System Ultra High Shock	0	\$230,792	\$230,792	10/1/2018	9/30/2019	
705019	Miniaturized Production System. This project will focus on researching new and innovative methods for reducing automated production tester size. The end goal will be to identify common functions and identify potential new solutions that optimize architecture/footprint.	0	\$34,719	\$34,719	10/1/2018	9/30/2019	
705018	Cyber-Physical Tester Security. Create and analyze a Boundary Scope document to define the Cyber-Physical Interfaces of a typical test system and a strategy to secure the Cyber-Physical interfaces of a typical test system.	0	\$51,447	\$51,447	10/1/2018	9/30/2019	
705017	Hopkinson Method Development	0	\$135,427	\$135,427	10/1/2018	9/30/2019	
705016	Test Engineering Modeling and Simulation	0	\$196,817	\$196,817	10/1/2018	9/30/2019	
705015	Digital Radar Target Simulator	0	\$219,898	\$219,898	10/1/2018	9/30/2019	
705014	Fast static angle radiography	0	\$247,277	\$247,277	10/1/2018	9/30/2019	
705013	Learning Interconnect Signals	0	\$65,938	\$65,938	10/1/2018	9/30/2019	
705012	Millimeter Wave Hazardous Imaging	0	\$171,160	\$171,160	10/1/2018	9/30/2019	
705011	Digital Protective Environment	0	\$332,044	\$332,044	10/1/2018	9/30/2019	
705010	Virtual Environ Integration	0	\$103,167	\$103,167	10/1/2018	9/30/2019	
705009	Standard for the Exchange of Product Digital Authorization	0	\$54,510	\$54,510	10/1/2018	9/30/2019	
705008	Modeling/Simulation Device Disintegration	0	\$104,933	\$104,933	10/1/2018	9/30/2019	
705007	Modeling, Aging, and Design Approach New Polymers	0	\$111,814	\$111,814	10/1/2018	9/30/2019	

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705006	Model Based Quality Technology	0	\$196,585	\$196,585	10/1/2018	9/30/2019	
705005	Polymer Constitutive Modeling	0	\$84,300	\$84,300	10/1/2018	9/30/2019	
705004	Additive Manufacturing Metal Cellular Structures	0	\$139,805	\$139,805	10/1/2018	9/30/2019	
705003	Modeling Develop of Beta-Titanium	0	\$154,049	\$154,049	10/1/2018	9/30/2019	
705002	Simulation Grain-level Laser Welding	0	\$171,815	\$171,815	10/1/2018	9/30/2019	
705001	Distortion Analyses for Additive Manufacturing	0	\$155,994	\$155,994	10/1/2018	9/30/2019	
705000	Improved Technical Agility	0	\$366,551	\$366,551	10/1/2018	9/30/2019	
704996	Auto Vehicle Design. In collaboration with the Bio Computation laboratory at the University of New Mexico this project targets research into physical Unmanned Autonomous Vehicles.	0	\$111,460	\$111,460	10/1/2018	9/30/2019	
704995	Iowa State University Technical Fellowship	0	\$96,110	\$96,110	10/1/2018	9/30/2019	
704993	Pick by Light System. Research Pick by Light Systems to meet Stores/National Nuclear Security Administration requirements.	0	\$141,001	\$141,001	10/1/2018	9/30/2019	
704991	Application of Eye Tracking Technology	0	\$105,335	\$105,335	10/1/2018	9/30/2019	
704989	Smart Surface Mount Technology Cleaning process	0	\$141,819	\$141,819	10/1/2018	9/30/2019	
704988	Advanced Mold Technology	0	\$73,261	\$73,261	10/1/2018	9/30/2019	
704987	Radiofrequency Identification	0	\$160,865	\$160,865	10/1/2018	9/30/2019	
704986	Safeguards Automatic Process Equipment	0	\$145,727	\$145,727	10/1/2018	9/30/2019	
704985	Auto Three-Dimensional Inspection of Solder Joints	0	\$73,458	\$73,458	10/1/2018	9/30/2019	
704983	Secure Wireless Equip Sensors	0	\$83,790	\$83,790	10/1/2018	9/30/2019	
704982	Collaborative Robotics	0	\$170,397	\$170,397	10/1/2018	9/30/2019	
704981	Secure Augmented Training Head Mounted Displays	0	\$52,655	\$52,655	10/1/2018	9/30/2019	
704979	Auto Compute Tomography Process	0	\$48,397	\$48,397	10/1/2018	9/30/2019	
704978	On Board Diagnostics Data Vehicle and Monitor	0	\$38,642	\$38,642	10/1/2018	9/30/2019	
704977	Enhancements in heat exchanger	0	\$202,437	\$202,437	10/1/2018	9/30/2019	
704976	Research Platform. Work with IPG Photonics (company name) to supply an open-architecture powder bed fusion additive manufacturing system.	0	\$70,471	\$70,471	10/1/2018	9/30/2019	
704975	Laminated Hiperco Prime Movers	0	\$112,993	\$112,993	10/1/2018	9/30/2019	
704974	Exploiting Cobots in Mechanism	0	\$107,665	\$107,665	10/1/2018	9/30/2019	
704973	Precision Machining Structures	0	\$150,621	\$150,621	10/1/2018	9/30/2019	
704972	Secure Assembly 2 (Classified)	0	\$155,240	\$155,240	10/1/2018	9/30/2019	
704971	Advanced Support Removal Method. The scope of work for this project is to explore chemical methods to etch away and remove metal support structures from additively manufactured parts, which will save time and money from typical post-processing and also improve surface finish of the parts	0	\$377,710	\$377,710	10/1/2018	9/30/2019	
704970	Frequency Inspection of Additive Manufacturing Parts	0	\$247,700	\$247,700	10/1/2018	9/30/2019	
704969	Additive Manufacturing Machine Sensing	0	\$1,084	\$1,084	10/1/2018	9/30/2019	
704968	Acceleration of Additive Manufacturing Chemistries	0	\$191,203	\$191,203	10/1/2018	9/30/2019	
704967	Wire-fed Electron Beam Additive Manufacturing Machine	0	\$366,590	\$366,590	10/1/2018	9/30/2019	
704966	Additive Manufacturing Composition Corrosion Advanced Aging	0	\$18,980	\$18,980	10/1/2018	9/30/2019	
704965	Thin Film for Complex Shapes	0	\$109,091	\$109,091	10/1/2018	9/30/2019	
704964	Ceramic Machining Evaluation	0	\$332,831	\$332,831	10/1/2018	9/30/2019	
704963	Two-Dimensional Electronic Material	0	\$406,338	\$406,338	10/1/2018	9/30/2019	
704962	Atomic layer conformal coating	0	\$194,119	\$194,119	10/1/2018	9/30/2019	
704961	Fuel Cell Feasibility	0	\$89,384	\$89,384	10/1/2018	9/30/2019	
704960	Conformal Coating Tin Whiskers	0	\$175,688	\$175,688	10/1/2018	9/30/2019	
704959	Chip Slapper Process Enhance	0	\$68,041	\$68,041	10/1/2018	9/30/2019	
704958	Metamaterial Radar and Supply Chain	0	\$242,383	\$242,383	10/1/2018	9/30/2019	
704957	Diamond-like Composites	0	\$320,290	\$320,290	10/1/2018	9/30/2019	
704956	Variable Microwaves Alternative Cure	0	\$184,081	\$184,081	10/1/2018	9/30/2019	
704955	Ion Beam Assisted Thin Films	0	\$18,507	\$18,507	10/1/2018	9/30/2019	
704954	Laser Sintering	0	\$324,371	\$324,371	10/1/2018	9/30/2019	
704953	Polymer Additive Manufacturing Material Feedstock	0	\$89,996	\$89,996	10/1/2018	9/30/2019	
704952	Material for Extreme Environment	0	\$497,975	\$497,975	10/1/2018	9/30/2019	
704951	Polymeric Nanocomposites	0	\$345,332	\$345,332	10/1/2018	9/30/2019	
704950	Advanced Materials for Polymer Additive Manufacturing	0	\$907,375	\$907,375	10/1/2018	9/30/2019	
704949	Three-Dimensional Printed Materials for Trust	0	\$328,722	\$328,722	10/1/2018	9/30/2019	
704948	Logic Mapping and Focus Assist using Landside susceptibility mapping	0	\$152,484	\$152,484	10/1/2018	9/30/2019	
704946	Augmented Reality LookingGlass Transparent Identification	0	\$87,379	\$87,379	10/1/2018	9/30/2019	
704945	Electromagnetic Interference Susceptibility of Radio Frequency Integrated Circuits	0	\$116,313	\$116,313	10/1/2018	9/30/2019	
704944	Radiofrequency Remodulation	0	\$124,731	\$124,731	10/1/2018	9/30/2019	
704943	Tensor Flow Recognition Live Video	0	\$30,194	\$30,194	10/1/2018	9/30/2019	
704942	Radiofrequency/Direct Current over Fiber	0	\$2,494	\$2,494	10/1/2018	9/30/2019	
704941	Security Hardened Embedded Systems Counter-Measures	0	\$103,304	\$103,304	10/1/2018	9/30/2019	
704940	Photonic Sintering Fundamental	0	\$4,316	\$4,316	10/1/2018	9/30/2019	
704939	Advanced Mobile Communications Testbed	0	\$233,693	\$233,693	10/1/2018	9/30/2019	
704938	Efficient Ultrahigh Frequency Transmitter	0	\$152,391	\$152,391	10/1/2018	9/30/2019	
704937	Submicron Photolithography	0	\$332,222	\$332,222	10/1/2018	9/30/2019	
704936	Millimeter Wave Phased Array Modules	0	\$176,036	\$176,036	10/1/2018	9/30/2019	
704935	Programmable Device Data Extraction	0	\$363,967	\$363,967	10/1/2018	9/30/2019	
704934	Gallium Nitride Materials Research and Development	0	\$319,991	\$319,991	10/1/2018	9/30/2019	
704933	Radar Consortium	0	\$2,466,260	\$2,466,260	10/1/2018	9/30/2019	
26432	Low Value Equipment Plant Directed Research Development Liquid extraction machine	0	\$40,442	\$40,442	10/1/2018	9/30/2019	
26429	Low Value Equipment Plant Directed Research Development Spectrum Analyzer	0	\$109,823	\$109,823	10/1/2018	9/30/2019	
26427	Low Value Equipment Plant Directed Research Development Denton Desk	0	\$38,168	\$38,168	10/1/2018	9/30/2019	
26425	Low Value Equipment Plant Directed Research Development Vibration Machine	0	\$67,380	\$67,380	10/1/2018	9/30/2019	
26424	Low Value Equipment Plant Directed Research Development High Power Ultrafast Fiber	0	\$223,650	\$223,650	10/1/2018	9/30/2019	
26423	Low Value Equipment Plant Directed Research Development Glove box for Ceramic	0	\$95,293	\$95,293	10/1/2018	9/30/2019	
26421	Low Value Equipment Plant Directed Research Development Elite Auto	0	\$214,704	\$214,704	10/1/2018	9/30/2019	
26419	Low Value Equipment Plant Directed Research Development Low Humidity Storage Cabinet	0	\$14,200	\$14,200	10/1/2018	9/30/2019	
26418	Low Value Equipment Plant Directed Research Development Cryopump	0	\$16,979	\$16,979	10/1/2018	9/30/2019	
26417	Low Value Equipment Plant Directed Research Development MarkForged Mark 2 Print	0	\$26,247	\$26,247	10/1/2018	9/30/2019	
26412	Low Value Equipment Plant Directed Research Development Three-Dimensional Printer	0	\$340,783	\$340,783	10/1/2018	9/30/2019	
26406	Low Value Equipment Plant Directed Research Development Spectrometer	0	\$117,280	\$117,280	10/1/2018	9/30/2019	
26404	Low Value Equipment Plant Directed Research Development Spectrum Analyzer	0	\$5,755	\$5,755	10/1/2018	9/30/2019	
26402	Low Value Equipment Plant Directed Research Development Three-Dimensional Printer	0	\$30,945	\$30,945	10/1/2018	9/30/2019	
26400	Low Value Equipment Plant Directed Research Development Electromagnetic Compatibility 40 Gigahertz	0	\$54,471	\$54,471	10/1/2018	9/30/2019	
26399	Low Value Equipment Plant Directed Research Development Ultraviolet Laser Marker	0	\$67,138	\$67,138	10/1/2018	9/30/2019	
26398	Low Value Equipment Plant Directed Research Development Microreactor	0	\$73,805	\$73,805	10/1/2018	9/30/2019	
26397	Low Value Equipment Plant Directed Research Development Microreactor System	0	\$62,704	\$62,704	10/1/2018	9/30/2019	
26394	Low Value Equipment Plant Directed Research Development Signal Analyzer	0	\$25,512	\$25,512	10/1/2018	9/30/2019	
26393	Low Value Equipment Plant Directed Research Development Tester	0	\$186,322	\$186,322	10/1/2018	9/30/2019	
26392	Low Value Equipment Plant Directed Research Development Wet Bench with Fume Hood	0	\$140,108	\$140,108	10/1/2018	9/30/2019	
26391	Low Value Equipment Plant Directed Research Development Box Furnace	0	\$49,677	\$49,677	10/1/2018	9/30/2019	
26390	Low Value Equipment Plant Directed Research Development Vapor Prime Oven	0	\$82,534	\$82,534	10/1/2018	9/30/2019	
26389	Low Value Equipment Plant Directed Research Development Plasma Cleaning Chamber	0	\$96,976	\$96,976	10/1/2018	9/30/2019	
26388	Low Value Equipment Plant Directed Research Development FieldFox Port Spectrum Analyzer	0	\$37,715	\$37,715	10/1/2018	9/30/2019	

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26385	Low Value Equipment Plant Directed Research Development Spectrometer	0	\$109,282	\$109,282	10/1/2018	9/30/2019	
26378	Low Value Equipment Plant Directed Research Development Roughness Meter	0	\$28,389	\$28,389	10/1/2018	9/30/2019	
26377	Low Value Equipment Plant Directed Research Development Vision System	0	\$102,931	\$102,931	10/1/2018	9/30/2019	
26366	Low Value Equipment Plant Directed Research Development Mill	0	\$33,739	\$33,739	10/1/2018	9/30/2019	
26365	Low Value Equipment Plant Directed Research Development National Instruments USRP 2955	0	\$33,421	\$33,421	10/1/2018	9/30/2019	
26363	Low Value Equipment Plant Directed Research Development Electrochemical Potentiometers	0	\$49,308	\$49,308	10/1/2018	9/30/2019	
26361	Low Value Equipment Plant Directed Research Development Retort Furnace	0	\$48,195	\$48,195	10/1/2018	9/30/2019	
26355	Low Value Equipment Plant Directed Research Development (2) high end computer system	0	\$31,519	\$31,519	10/1/2018	9/30/2019	
26352	Low Value Equipment Plant Directed Research Development Nordson Robot	0	\$48,330	\$48,330	10/1/2018	9/30/2019	
26351	Low Value Equipment Plant Directed Research Development University Robotics	0	\$42,259	\$42,259	10/1/2018	9/30/2019	
26343	Low Value Equipment Plant Directed Research Development Rheometer	0	\$76,671	\$76,671	10/1/2018	9/30/2019	
26341	Low Value Equipment Plant Directed Research Development Profilometer	0	\$64,525	\$64,525	10/1/2018	9/30/2019	
26340	Low Value Equipment Plant Directed Research Development University Robotics	0	\$76,566	\$76,566	10/1/2018	9/30/2019	
26339	Low Value Equipment Plant Directed Research Development Olympus	0	\$57,812	\$57,812	10/1/2018	9/30/2019	
26335	Low Value Equipment Plant Directed Research Development Newport 6 axis Hexapod	0	\$55,763	\$55,763	10/1/2018	9/30/2019	
26302	Low Value Equipment Plant Directed Research Development Splat Quencher	0	\$184,485	\$184,485	10/1/2018	9/30/2019	
26301	Low Value Equipment Plant Directed Research Development Irradiator	0	\$98,548	\$98,548	10/1/2018	9/30/2019	
26300	Low Value Equipment Plant Directed Research Development Vision System	0	\$21,924	\$21,924	10/1/2018	9/30/2019	
26283	Low Value Equipment Plant Directed Research Development Hydrophone with Acoustic	0	\$2,447	\$2,447	7/1/2018	9/30/2019	
26269	Low Value Equipment Plant Directed Research Development LiquiSonic Controller	0	(\$765)	(\$765)	6/1/2018	9/30/2019	
26265	Low Value Equipment Plant Directed Research Development Vacuum Chamber	0	(\$26)	(\$26)	6/1/2018	9/30/2019	
26231	Low Value Equipment Plant Directed Research Development Helium Liquefier	0	\$127,218	\$127,218	10/1/2018	9/30/2019	
26194	Low Value Equipment Plant Directed Research Development Grind and Mix Machine	0	\$424,129	\$424,129	10/1/2018	9/30/2019	
26033	Low Value Equipment Plant Directed Research Development Attrition mill	0	\$16,283	\$16,283	10/1/2017	9/30/2019	
24859	Low Value Equipment Plant Directed Research Development Fatigue Tester	0	\$2,643	\$2,643	10/1/2018	9/30/2019	
1968901	Capital Equipment Plant Directed Research Development Wire-fed Electron Beam Additive Manufacturing	0	\$1,434,465	\$1,434,465	10/1/2017	9/30/2019	
1022701	Capital Equipment Plant Directed Research Development Research Platform	0	\$837,523	\$837,523	10/1/2018	9/30/2019	
1021101	Capital Equipment Plant Directed Research Development EOS (company name) Ranger Selective Laser Sintering Printer	0	\$36,270	\$36,270	5/1/2018	9/30/2019	
Total # of Projects for KCNSC - 233		Total Equipment Cost for KCNSC: \$0	Other Cost for KCNSC: \$35,161,579	Total Cost for KCNSC: \$35,161,579			
LANL - Los Alamos National Lab							
LANL-2019999ER	Post-project Debits and Credits	0	\$38,317	\$38,317	10/1/2018	9/30/2019	
LANL-20190656PRD4	Defect tolerant scintillators: Linking structure and performance via machine learning	0	\$5,203	\$5,203	9/16/2019	9/15/2021	
LANL-20190655PRD4	Unraveling Lipoprotein Signatures for Tick-Borne Pathogens	0	\$5,618	\$5,618	9/16/2019	9/15/2021	
LANL-20190654PRD4	Exploration of Colossal Thermoelectric Power in Topological Magnets	0	\$7,805	\$7,805	9/9/2019	9/8/2021	
LANL-20190653PRD4	Toward a Universal Description for Aqueous Solutions	0	\$8,065	\$8,065	9/9/2019	9/8/2021	
LANL-20190651DR	Advanced Signatures, Processing, and Exploitation for Counter-proliferation	0	\$229,239	\$229,239	7/8/2019	9/30/2020	
LANL-20190650DR	A Multidisciplinary Approach to Advance Our Understanding of Actinide-Bearing Molten Salt Systems	0	\$158,282	\$158,282	6/17/2019	9/30/2020	
LANL-20190649DR	Demonstration of Advanced Experimental and Theoretical Characterization of Hydrogen Dynamics and Associated Behavior in Advanced Reactors	0	\$249,368	\$249,368	6/10/2019	9/30/2020	
LANL-20190648PRD3	The Optoelectronic Device Applications of Two-Dimensional Interlayer Moiré Excitons	0	\$7,805	\$7,805	9/9/2019	9/8/2021	
LANL-20190647PRD3	Designing New Ferroelectric Materials with Spin Crossover Transitions	0	\$51,257	\$51,257	7/8/2019	7/7/2021	
LANL-20190644PRD3	Multiscale Quantitative Description of Drug Resistance Mechanisms in Bacterial Systems	0	\$9,886	\$9,886	9/3/2019	9/2/2021	
LANL-20190643DR	Novel In situ Probes of Mesoscale Materials Dynamics	0	\$438,825	\$438,825	6/10/2019	9/30/2020	
LANL-20190642PRD3	Ex Machina Hamiltonians for Next-Generation Molecular Simulations	0	\$46,484	\$46,484	6/10/2019	6/9/2021	
LANL-20190641PRD3	Development and Implementation of a Portable Microfluidic J-Coupled Spectrometer for Rapid Detection and Identification of Emerging Chemical Threats	0	\$43,844	\$43,844	6/10/2019	6/9/2021	
LANL-20190640PRD3	Synthesis of Platinum-Rare Earth Intermetallic Fuel Cell Catalysts	0	\$72,658	\$72,658	6/10/2019	6/9/2021	
LANL-20190639PRD2	In Situ Mesoscale Response under Combined Pressure-Shear Dynamic Loading	0	\$46,932	\$46,932	6/10/2019	6/10/2021	
LANL-20190638ER	Non-invasive Pipe Pressure Monitoring for Safeguards	0	\$148,483	\$148,483	4/9/2019	9/30/2019	
LANL-20190637ER	Searching for ConText: Microtasking to Solve Computationally Unsolvable Problems	0	\$147,587	\$147,587	4/29/2019	9/30/2019	
LANL-20190636ER	Materials Informatics for Actinide-Based Two-dimensional Materials	0	\$102,735	\$102,735	4/15/2019	9/30/2019	
LANL-20190635ER	Statistical Numerics for Predictive Science	0	\$156,595	\$156,595	4/15/2019	9/30/2019	
LANL-20190634ER	Stochastic Viral Dynamic Models for Rational Design of Therapeutics to Achieve a Functional Human Immunodeficiency Virus Cure	0	\$170,824	\$170,824	5/20/2019	9/30/2019	
LANL-20190633ER	Neutron Radiography for the Determination of Molten Chloride Viscosity, Density, and Homogeneity	0	\$167,786	\$167,786	4/18/2019	9/30/2019	
LANL-20190630ER	Physics-Based Machine Learning for Electric Power Outage Prediction	0	\$139,137	\$139,137	4/18/2019	9/30/2019	
LANL-20190628ER	Using Acoustic Signals from Laser-Induced Breakdown Spectroscopy Plasma Shock Waves to Identify Surface Coatings and Layers on Martian Rocks	0	\$126,647	\$126,647	4/15/2019	9/30/2019	
LANL-20190627ER	Genomics to Facilitate a New Approach to Infections Disease Forecasting	0	\$167,620	\$167,620	4/18/2019	9/30/2019	
LANL-20190626PRD2	Searching for Dark Matter with Fixed Target Experiments	0	\$7,805	\$7,805	9/9/2019	9/8/2021	
LANL-20190625PRD2	Smart Mobile Sensor Platform Development for Radiological Mapping of Large-Scale Areas	0	\$7,805	\$7,805	9/9/2019	9/8/2021	
LANL-20190624PRD2	Phase Diagrams and Conductivity in the Interiors of White Dwarf Stars	0	\$33,027	\$33,027	7/22/2019	7/21/2021	
LANL-20190623PRD2	Novel X-ray Imaging to Unlock the Potential of Antiferromagnetic Materials	0	\$82,648	\$82,648	3/11/2019	3/10/2021	
LANL-20190622PRD2	State-of-the-Art Predictions for the Matter-Antimatter Asymmetry	0	\$9,886	\$9,886	8/26/2019	8/25/2021	
LANL-20190620PRD1	A Novel "Three-in-One" Metal Organic Framework-Based Platform For Nanoparticle Encapsulation and Organization	0	\$69,833	\$69,833	4/15/2019	4/14/2021	
LANL-20190619PRD1	Analyticity, Unitarity, and the Behavior of Neutrino Scattering	0	\$27,204	\$27,204	2/4/2019	4/26/2019	
LANL-20190618PRD1	Disease Outcome Analysis for Improved Disease Interventions	0	\$43,198	\$43,198	2/11/2019	2/10/2021	
LANL-20190617PRD1	Matter and Nuclei at Neutron-Rich Extremes	0	\$81,111	\$81,111	2/18/2019	2/17/2021	
LANL-20190616PRD1	Enabling Artificial Selection Programs through Characterizing the Lifecycle of Green Algae	0	\$95,798	\$95,798	1/14/2019	1/13/2021	
LANL-20190615PRD1	Toward a Next-Generation Pathogen Surveillance Platform: Integrating Clinical Metagenomics with Epidemiological Modeling to Characterize/Understand Disease	0	\$86,818	\$86,818	1/21/2019	8/9/2019	
LANL-20190614PRD1	Biophysical Interactions of Amphiphiles with Biomimetically Patterned Membranes	0	\$117,674	\$117,674	1/21/2019	1/20/2022	
LANL-20190613PRD1	Perovskite-type Metal-Organic Framework with Strong Magnetolectric Coupling	0	\$151,308	\$151,308	1/14/2019	1/13/2022	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
LANL-20190608ER	Diagnosing Near-Future Changes in Arctic Sea Ice and Ocean Conditions	0	\$184,256	\$184,256	1/15/2019	9/30/2019	
LANL-20190607ER	Variational Quantum Eigensolver for Single-Point Water Electronic Energy Calculation	0	\$161,474	\$161,474	4/15/2019	9/30/2019	
LANL-20190606ER	Application-specific Critical and Subcritical Benchmarks for Nuclear Data and Analytical Methods Validation	0	\$329,949	\$329,949	2/4/2019	9/30/2019	
LANL-20190604ER	Plutonium Hydriding Dynamics	0	\$368,351	\$368,351	1/15/2019	9/30/2019	
LANL-20190603ER	Towards Operationalized Data Fusion for Activity-Based Intelligence	0	\$270,647	\$270,647	1/17/2019	9/30/2019	
LANL-20190602ER	Chiroptical Characterization and Photocatalytic Destruction of Organophosphorus Nerve Agents	0	\$155,652	\$155,652	1/17/2019	9/30/2019	
LANL-20190601ER	Laboratory Demonstration of the High-electron Mobility Transistors - Driven Accelerator	0	\$121,980	\$121,980	11/29/2018	9/30/2019	
LANL-20190595ECR	Persistent Signatures of Neutron Fluence in Structural Materials	0	\$150,605	\$150,605	1/28/2019	1/3/2020	
LANL-20190588ECR	A Dual n-gamma Detector Array to Correct Neutron Transport Simulations	0	\$173,444	\$173,444	1/15/2019	1/14/2021	
LANL-20190581ECR	Accurate Model for Predicting Mosquito Population Response to Weather and Water Management	0	\$155,118	\$155,118	1/15/2019	1/14/2021	
LANL-20190580ECR	In-Process, Full Part Defect Detection for Additive Manufacturing	0	\$152,154	\$152,154	1/15/2019	1/14/2021	
LANL-20190574ECR	Nonlinear Photonics of Topological Phase Transitions in the Graphene Family	0	\$76,338	\$76,338	6/3/2019	6/2/2021	
LANL-20190571ECR	Adaptive Framework for Enabling Real-time Feedback During Three-dimensional Mesoscale Microstructure Evolution Measurements	0	\$156,221	\$156,221	1/15/2019	1/14/2021	
LANL-20190568ECR	Understanding the Wave Mechanics of Micro-architected Waveguides to Design Acoustic Quick Response Codes	0	\$100,995	\$100,995	4/15/2019	4/14/2021	
LANL-20190566ECR	Optimizing Scientific Codes in the Presence of Extreme Heterogeneity Using Machine Learning	0	\$157,370	\$157,370	1/15/2019	1/14/2021	
LANL-20190565ECR	Granddaughter Radiochronometry for Nuclear Forensics	0	\$157,042	\$157,042	1/15/2019	1/14/2021	
LANL-20190552ECR	Illuminating the Subsurface with Nonlinear Behavior	0	\$144,056	\$144,056	1/15/2019	1/14/2021	
LANL-20190547ER	Imager-Based Qualification and Control of Metallic Additive Manufacturing Processes	0	\$138,216	\$138,216	11/26/2018	6/16/2019	
LANL-20190546ECR	Improving Predictions of Complex Systems with Predictive Discrepancy Models and Data Fusion	0	\$157,046	\$157,046	1/15/2019	1/14/2021	
LANL-20190541ER	Modeling Late-Time Electromagnetic Pulse and Its Disturbed Atmospheric Environment	0	\$338,147	\$338,147	11/26/2018	9/30/2020	
LANL-20190539ER	The Effect of Prompt Neutrons on Electronics	0	\$148,762	\$148,762	11/26/2018	7/31/2019	
LANL-20190536ECR	Adaptive Process Control for Beyond-State-of-the-Art Alkali Antimonide Photocathodes	0	\$153,656	\$153,656	1/15/2019	1/14/2021	
LANL-20190530ER	A Simplified Design and Advanced Manufacture for Expedited Explosive Hydrodynamic Testing and Equation of State Development using Extreme Scaling	0	\$341,706	\$341,706	11/29/2018	9/30/2020	
LANL-20190529ECR	A Multidimensional Multiscale Vlasov-Fokker-Planck Algorithm for Modeling High Energy Density and Inertial Confinement Fusion Applications	0	\$36,918	\$36,918	6/3/2019	6/2/2021	
LANL-20190528ER	Modeling an Artificial Radiation Belt of Ionized Fission Fragments After a High-altitude Nuclear Explosion	0	\$300,996	\$300,996	11/26/2018	9/30/2020	
LANL-20190526ER	Customized Materials to Attenuate Ionizing Radiation	0	\$146,696	\$146,696	11/26/2018	6/16/2019	
LANL-20190524ER	High Efficiency Automated Leaching of Gloveboxes	0	\$293,184	\$293,184	11/26/2018	9/30/2020	
LANL-20190519ECR	Numerical Methods for Radiation Hydrodynamics Simulations on Current and Future Advanced Parallel Architectures	0	\$113,483	\$113,483	1/15/2019	1/14/2021	
LANL-20190517ECR	High Efficiency Active Environmental Sampling of Chemical Traces	0	\$117,701	\$117,701	2/5/2019	2/4/2021	
LANL-20190516ECR	Electronic Transport in Atomically Thin Materials at Far from Mechanical Equilibrium Conditions	0	\$176,636	\$176,636	1/15/2019	1/14/2021	
LANL-20190505ER	Non-Destructive Analysis and Surveillance of Containers used for Nuclear Material Storage	0	\$245,962	\$245,962	11/26/2018	9/30/2020	
LANL-20190499ER	Evaluating and Increasing the Reliability of Supercomputer and Autonomous Vehicles (Rosen Scholar)	0	\$188,171	\$188,171	3/18/2019	12/31/2019	
LANL-20190498ER	Discovering the Three-dimensional Structure and Dynamics of the Sun-Interstellar Medium System on a Global Scale	0	\$239,976	\$239,976	10/16/2018	9/30/2021	
LANL-20190497ER	Theoretical and Experimental Materials Science	0	\$510,684	\$510,684	11/29/2018	9/30/2020	
LANL-20190496DR	The Dynamics of Systems Far From Equilibrium	0	\$463,022	\$463,022	10/1/2018	9/30/2021	
LANL-20190495DR	Theory and Computation on Quantum Systems	0	\$471,042	\$471,042	10/1/2018	9/30/2021	
LANL-20190494ER	Emulating Quantum Magnetism with Rydberg Atoms	0	\$348,230	\$348,230	10/29/2018	9/30/2021	
LANL-20190493DR	Hyperspectral X-ray Imaging for Scanning Electron Microscopes	0	\$338,555	\$338,555	10/1/2018	4/14/2019	
LANL-20190463ER	Three-dimensional Printed Hierarchically Porous Heat Pipe Wicks	0	\$306,996	\$306,996	10/1/2018	9/30/2020	
LANL-20190441ER	Understanding Glycan Dynamics and Heterogeneity for Effective Human Immunodeficiency Virus Vaccine Development	0	\$303,795	\$303,795	10/1/2018	9/30/2021	
LANL-20190440ER	Mixed Conductors for Enhanced Fuel Cell Performance	0	\$317,544	\$317,544	10/1/2018	9/30/2021	
LANL-20190430ER	Magnetization Fluctuation Spectroscopy as a Dynamic Probe of Emergent Magnetic Phases	0	\$344,959	\$344,959	10/1/2018	9/30/2021	
LANL-20190420ER	Organic Molecular Electrocatalysts for Hydrogen Evolution Reaction	0	\$331,822	\$331,822	10/1/2018	9/30/2021	
LANL-20190392ER	Viral Mosaic Biosensor	0	\$326,382	\$326,382	10/1/2018	9/30/2021	
LANL-20190383ER	Origin of High-Energy Astrophysical Neutrinos: Multi-messenger Signals from Flares of Extragalactic Jets	0	\$306,945	\$306,945	10/1/2018	9/30/2021	
LANL-20190373ER	Novel, Fast Enhancements to Bragg Pycnometry	0	\$300,251	\$300,251	10/1/2018	9/30/2021	
LANL-20190372ER	Biogenic Uranium Isotope Fractionation for Biotechnology	0	\$289,355	\$289,355	10/1/2018	9/30/2021	
LANL-20190364ER	Illuminating Plutonium: Spectroelectrochemistry in High Temperature Molten Salts	0	\$300,281	\$300,281	10/1/2018	9/30/2021	
LANL-20190360ER	Emergent Bogoliubov Fermi Surface in Unconventional Superconductors	0	\$339,112	\$339,112	10/1/2018	9/30/2021	
LANL-20190351ER	Statistical Learning in Cyberphysical Systems	0	\$282,503	\$282,503	10/1/2018	9/30/2021	
LANL-20190342ER	Thermally Expandable Microspheres for Plastic-bonded Explosive Properties Control	0	\$266,681	\$266,681	10/1/2018	9/30/2021	
LANL-20190339ER	Constrained Minimization Approach for Spacecraft-charging Calculations	0	\$250,775	\$250,775	1/15/2019	9/30/2019	
LANL-20190334ER	Quantum Metrology with an Atom Superconducting Quantum Interference Device	0	\$331,879	\$331,879	10/1/2018	9/30/2021	
LANL-20190310ER	Innovating Wildfire Representation in Earth System Models	0	\$303,445	\$303,445	10/1/2018	9/30/2021	
LANL-20190294ER	A Non-Invasive Current Profile Diagnostic for Electron Bunches	0	\$281,474	\$281,474	10/1/2018	9/30/2021	
LANL-20190268ER	Reduced-profile Current-sheet Array Antenna with Simpler Drive and Better Antenna Efficiency	0	\$210,914	\$210,914	10/1/2018	9/30/2020	
LANL-20190262ER	Using Solar Energetic Protons to Monitor the Outer Magnetosphere	0	\$280,731	\$280,731	10/1/2018	9/30/2021	
LANL-20190238ER	Boron and Ribose in Clay: a Precursor for Life on Earth and Mars?	0	\$315,870	\$315,870	10/1/2018	9/30/2021	
LANL-20190236ER	Wavelength-Selectable, Electrically Driven Single-Photon Sources Operating at Room Temperature	0	\$299,912	\$299,912	10/1/2018	9/30/2021	
LANL-20190232ER	Quantum Dot Sunlight Collectors for Building-Integrated Photovoltaics	0	\$304,662	\$304,662	10/1/2018	9/30/2020	
LANL-20190228ER	Accelerated Aging of Crystalline Plutonium Compounds	0	\$296,261	\$296,261	10/1/2018	9/30/2021	
LANL-20190227ER	Stable, Conservative, High-Order Numerical Methods for Direct Numerical Simulations in Complex Geometries	0	\$265,878	\$265,878	10/1/2018	9/30/2021	
LANL-20190224ER	Strongly Interacting Polariton Condensates at Room Temperature	0	\$307,097	\$307,097	10/1/2018	9/30/2021	
LANL-20190206ER	The Influence of Multiple Scattering on the Opacities of Warm and Hot Dense Matter	0	\$302,467	\$302,467	10/1/2018	9/30/2021	
LANL-20190195ER	Towards Memristor Supremacy with Novel Machine Learning Algorithms	0	\$307,278	\$307,278	10/1/2018	9/30/2021	
LANL-20190167DR	A Clustered Regularly Interspaced Short Palindromic Repeats Future Understanding and Predicting Hydrocarbon Behaviors in Nanopores of Tight Reservoirs	0	\$1,546,949	\$1,546,949	10/1/2018	9/30/2021	
LANL-20190153ER	Objective Flow Topology	0	\$307,126	\$307,126	10/1/2018	9/30/2021	
LANL-20190143ER	A New Computation Framework for the Nonlinear Beam Dynamics with Radiation Self-fields	0	\$308,865	\$308,865	10/1/2018	9/30/2021	
LANL-20190131ER	Hot Electron Beam Generation and Transport for Fast Ignition	0	\$315,866	\$315,866	10/1/2018	9/30/2021	
LANL-20190124ER	Air-Buoyant Vessel	0	\$336,207	\$336,207	10/1/2018	9/30/2021	
LANL-20190119ER	Ultraflight Bosonic Dark Matter Search with an Optically Pumped Magnetometer	0	\$307,470	\$307,470	10/1/2018	9/30/2020	
LANL-20190113ER	Early Detection of Explosive Volcanic Eruptions Using Very High Frequency Radiation from Vent Discharges	0	\$315,845	\$315,845	10/1/2018	9/30/2021	
LANL-20190107ER	Convincing Search for Sterile Neutrinos at Lujan	0	\$333,111	\$333,111	10/1/2018	9/30/2021	
LANL-20190098DR	Chemistry of a New Oxidation State for Early Transuranic Elements	0	\$1,595,306	\$1,595,306	10/1/2018	9/30/2021	
LANL-20190091ER	Shockwave Metamaterials: Harnessing Structural Hierarchy for Tailorable Dynamic Response	0	\$316,663	\$316,663	10/1/2018	9/30/2021	
LANL-20190084ER		0	\$298,758	\$298,758	10/1/2018	9/30/2021	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
LANL-20190079DR	Long-pulse, Ultra-high-gradient Radio-frequency Accelerator Structures—Better Performance through Smart Design, Manufacturing and Breakdown Suppression	0	\$730,062	\$730,062	10/1/2018	9/30/2019	
LANL-20190076ER	Tuning Functionality via Dimensionality in 4f-Based Nanowires	0	\$308,691	\$308,691	10/1/2018	9/30/2021	
LANL-20190066ER	Wideband Sub-Millimeter Source for Deployed Applications	0	\$228,072	\$228,072	10/1/2018	9/30/2021	
LANL-20190065DR	Taming Defects in Quantum Computers	0	\$1,585,646	\$1,585,646	10/1/2018	9/30/2021	
LANL-20190064DR	Radiation Belt Remediation: A Complex Engineered System (RBR-ACES)	0	\$792,472	\$792,472	10/1/2018	9/30/2019	
LANL-20190059DR	Machine Learning for Turbulence	0	\$1,766,493	\$1,766,493	10/1/2018	9/30/2021	
LANL-20190057DR	Salts in Hot Water—Developing a Scientific Basis for Supercritical Desalination, Strategic Metal Recovery, and Industrial Water Treatment	0	\$1,562,130	\$1,562,130	10/1/2018	9/30/2021	
LANL-20190049DR	Understanding New Discoveries by High Altitude Water Cherenkov Observatory of Greater than 10 Tera Electron Volts Galactic Sources	0	\$612,856	\$612,856	10/29/2018	9/30/2019	
LANL-20190048ER	Ultra-Cold Neutron Experiment for Proton Branching Ratio in Neutron Beta Decay	0	\$285,848	\$285,848	10/1/2018	9/30/2021	
LANL-20190043DR	Brighter, Faster, Tougher: Adaptive Co-design of Resilient Radiation Detector Materials	0	\$1,552,280	\$1,552,280	10/1/2018	9/30/2021	
LANL-20190041DR	The Neutron Electric Dipole Moment as a Gateway to New Physics	0	\$1,623,431	\$1,623,431	10/1/2018	9/30/2021	
LANL-20190034ER	Massively-Parallel Acceleration of the Dynamics of Complex Systems: a Data-Driven Approach	0	\$292,985	\$292,985	10/1/2018	9/30/2021	
LANL-20190033ER	Using Quarkonia to Probe Matter from the Early Universe	0	\$309,952	\$309,952	10/1/2018	9/30/2021	
LANL-20190026DR	Driven Quantum Matter: A Route Towards Novel Phases	0	\$1,590,995	\$1,590,995	10/1/2018	9/30/2021	
LANL-20190021DR	Nucleosynthesis Probes of Cosmic Explosions	0	\$1,589,479	\$1,589,479	10/1/2018	9/30/2021	
LANL-20190020DR	Tensor Networks: Robust Unsupervised Machine Learning for Big-Data Analytics	0	\$1,727,780	\$1,727,780	10/1/2018	9/30/2021	
LANL-20190005DR	Enabling Predictive Scale-Bridging Simulations through Active Learning	0	\$1,771,183	\$1,771,183	10/1/2018	9/30/2021	
LANL-20190003DR	Maximizing Food Security Under Environmental Stress	0	\$203,025	\$203,025	1/15/2019	9/30/2019	
LANL-20190002DR	Hyperspectral X-ray Imaging: Nanochemical Analysis of Actinide and Explosive Materials	0	\$1,026,588	\$1,026,588	4/15/2019	3/31/2022	
LANL-20190001DR	BioManufacturing with Intelligent Adaptive Control	0	\$1,555,789	\$1,555,789	10/1/2018	9/30/2021	
LANL-20180759PRD4	Investigating Actinide-Based Molecular Magnetism with Electron Paramagnetic Resonance	0	\$118,609	\$118,609	1/28/2019	1/27/2021	
LANL-20180758PRD4	Overcoming the Curse of Dimensionality to Predict Chemical Reactivity	0	\$121,223	\$121,223	1/28/2019	1/27/2022	
LANL-20180756PRD4	Conservative Slow-Manifold Integrators	0	\$122,440	\$122,440	1/7/2019	1/6/2022	
LANL-20180754PRD4	Doped Carbon Dots for Enhanced Fuel Cell Catalysis	0	\$182,542	\$182,542	12/3/2018	12/2/2020	
LANL-20180751PRD3	Improving Public Health by Linking Virus Genetic Evolution and Epidemic Spread	0	\$99,910	\$99,910	2/19/2019	2/18/2022	
LANL-20180709PRD1	Conformal Field Theories with the Bootstrap	0	\$148,805	\$148,805	10/1/2018	9/30/2020	
LANL-20180628ECR	Machine Learning of Quantum Computing Algorithms	0	\$212,034	\$212,034	10/1/2018	9/30/2020	
LANL-20170692PRD4	Molecular Basis of Ras-related Cancers	0	\$106,247	\$106,247	12/3/2018	12/2/2020	
LANL-20180753PRD3	An Atomtronic Rotation Sensor	0	\$120,851	\$120,851	7/30/2018	7/29/2020	
LANL-20180748PRD3	Unraveling Nature's Mysteries at the World's Highest Energy Colliders	0	\$119,183	\$119,183	6/25/2018	6/24/2020	
LANL-20180747PRD3	Ferromagnetism and Spin Fluctuations in the Atomically-Thin Limit	0	\$144,945	\$144,945	8/13/2018	8/12/2020	
LANL-20180746PRD3	Principles for Optimal Establishment and Resilience of Microbial Communities	0	\$161,330	\$161,330	6/11/2018	6/10/2020	
LANL-20180745PRD3	Machine Learning of Membrane Transport of Signals and Drugs	0	\$124,647	\$124,647	9/4/2018	9/3/2020	
LANL-20180744PRD3	Development of an Innovative Mechanical Testing System and Techniques for Characterizing Irradiated Advanced Cladding Concepts and Novel Materials	0	\$141,237	\$141,237	6/11/2018	10/23/2020	
LANL-20180719ER	Rapid Response: Novel Computing	0	\$633,341	\$633,341	4/23/2018	9/30/2020	
LANL-20180718PRD2	Understanding and Controlling Ultrafast Exciton Dynamics in Group-VII Transition Metal Dichalcogenides	0	\$40,696	\$40,696	4/16/2018	2/8/2019	
LANL-20180717DR	Theoretical Studies of Strongly Correlated Electron Systems	0	\$202,500	\$202,500	5/16/2018	7/15/2019	
LANL-20180716PRD2	Extreme Radiation Magnetohydrodynamics Around Black Holes	0	\$122,349	\$122,349	5/21/2018	5/20/2020	
LANL-20180715PRD2	How Biological Communities Can Unlock Hidden Signatures of Environmental Change	0	\$110,799	\$110,799	4/16/2018	4/15/2020	
LANL-20180714PRD2	Shock-accelerated Variable-density Mixing in a Subsonic Cross Flow	0	\$105,733	\$105,733	3/26/2018	3/25/2020	
LANL-20180713PRD2	Exploration of New Topological States of Matter in Strongly Correlated Materials and in Ultra-high Magnetic Fields	0	\$112,509	\$112,509	3/26/2018	2/19/2021	
LANL-20180711PRD2	Atomic Layer Deposition of Templated Electrode Structures for Electrochemical Devices	0	\$139,929	\$139,929	3/12/2018	3/11/2020	
LANL-20180710PRD1	Design of State-of-the-art Flow Cells for Energy Applications	0	\$161,247	\$161,247	2/12/2018	2/11/2021	
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	\$42,948	\$42,948	2/5/2018	2/8/2019	
LANL-20180705PRD1	New First Row Transition Metal Based Catalysts for Sustainable Energy Production	0	\$113,659	\$113,659	4/2/2018	4/1/2020	
LANL-20180704PRD1	Forest Ecosystems: Resilience or Tipping Point?	0	\$89,489	\$89,489	1/29/2018	6/30/2019	
LANL-20180703PRD1	Unusual Oxidation States and Covalency-Tuning in Transuranic Molecules	0	\$191,335	\$191,335	4/16/2018	4/15/2021	
LANL-20180702PRD1	Optimal Control of Quantum Machines	0	\$151,987	\$151,987	1/8/2018	1/7/2021	
LANL-20180701PRD1	Soft Matter-Directed Photonic Materials by Data-Driven Design	0	\$104,777	\$104,777	1/8/2018	8/9/2019	
LANL-20180700PRD1	Machine Learning the Physics of an Active Gold Mine	0	\$164,608	\$164,608	1/8/2018	1/7/2021	
LANL-20180655ER	Translational Cold Cathode Designs for Mission-Specific Applications	0	\$8,011	\$8,011	12/7/2017	10/15/2018	
LANL-20180633ECR	Overdriven Shock and Initiation Effects on Detonator-Scale Energetic Materials	0	\$140,499	\$140,499	1/16/2018	1/14/2020	
LANL-20180622ECR	New Physics at the Giga Electron Volt Scale, with Implications for the Strong Charge-conjugation x Parity Problem	0	\$209,806	\$209,806	1/16/2018	1/14/2020	
LANL-20180621ECR	Joint Critical Thresholds and Extremes for Vulnerability Assessment of Regional Stability	0	\$270,103	\$270,103	2/26/2018	2/25/2020	
LANL-20180618ECR	Probing Quantum Fluctuations via Thermal Expansion Measurements under Pressure	0	\$211,929	\$211,929	1/16/2018	1/14/2020	
LANL-20180613ECR	Hybrid Density Functional Theory	0	\$195,010	\$195,010	4/16/2018	4/14/2020	
LANL-20180612ECR	Modeling Heterogeneous Surveillance Data for Adaptive Real-time Response to Epidemics	0	\$214,545	\$214,545	1/16/2018	1/14/2020	
LANL-20180607ECR	Robust Anomaly Detection in Complex Networks: Data Fusion and New-Link Prediction	0	\$209,385	\$209,385	1/16/2018	1/14/2020	
LANL-20180605ER	New Methods for Producing Stockpile Equivalent High Explosive Components	0	\$560,594	\$560,594	12/7/2017	9/30/2019	
LANL-20180602ER	Disrupting Actinide Aqueous Processing: Additively Manufacturing High-Speed Counter-Current Chromatography Devices	0	\$600,106	\$600,106	12/7/2017	9/30/2019	
LANL-20180597ECR	Tracking Ultrafast Morphology Changes in Solid Explosives During a Detonation using Visible Laser Speckle	0	\$224,208	\$224,208	1/16/2018	1/14/2020	
LANL-20180589ECR	Establishing a Scientific Understanding for the Generation of Radiofrequency Signals from High Explosives	0	\$132,953	\$132,953	1/16/2018	1/14/2020	
LANL-20180579ECR	Advancing Discrete Fracture Matrix Models using Topologically Driven System Reduction	0	\$208,366	\$208,366	7/2/2018	7/1/2020	
LANL-20180575ER	Noninvasive Thermal Mass Flow Meter for Safeguards	0	\$559,804	\$559,804	12/19/2017	9/30/2019	
LANL-20180573ECR	Critical Analysis of Neutrinoless Double Beta Decay with Effective Field Theories	0	\$209,316	\$209,316	1/16/2018	1/14/2020	
LANL-20180552ECR	Excited State Dynamics for Spin Systems	0	\$197,969	\$197,969	1/16/2018	1/14/2020	
LANL-20180551ER	Additive Re-Manufacturing Guided by Process and Hydrodynamic Modeling	0	\$576,980	\$576,980	12/7/2017	9/30/2019	
LANL-20180549ECR	Advanced Understanding of Ocean Heat Storage by Coupling Large Eddy Simulation to a Global Ocean Model	0	\$208,663	\$208,663	1/16/2018	1/14/2020	
LANL-20180535ECR	Integrated Study of X-ray Free-electron Lasers Performance with High Brightness Bunched Electron Beams	0	\$211,202	\$211,202	1/16/2018	1/14/2020	
LANL-20180533ECR	Using Solar-analog Stars to Understand Extreme Space Weather	0	\$9,263	\$9,263	1/16/2018	10/15/2018	
LANL-20180529ECR	Geospatial Change Surveillance with Heterogeneous Data	0	\$206,831	\$206,831	1/16/2018	1/14/2020	
LANL-20180475DR	Emerging Challenges in Space and Earth Science	0	\$1,833,665	\$1,833,665	10/11/2017	9/30/2020	
LANL-20180474DR	Properties, Theory, and Measurements for Understanding the Function of Heavy Elements	0	\$1,174,024	\$1,174,024	10/1/2017	9/30/2020	
LANL-20180468ER	Optimization Aware Uncertainty Quantification in Non-Linear Networked Systems	0	\$299,084	\$299,084	10/1/2017	9/30/2020	
LANL-20180449ER	Next Generation Models for Radial Diffusion of Energetic Electrons in the Earth's Radiation Belts	0	\$303,559	\$303,559	10/1/2017	9/30/2020	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
LANL-20180441ER	Methods and Algorithms to Account for Field Fluctuations Obtained by Homogenization in Solid Mechanics	0	\$299,716	\$299,716	10/1/2017	9/30/2020	
LANL-20180428ER	Novel Algorithms for Large-Scale Ab-Initio Materials Simulations: Extending the Reach of Quantum Mechanics	0	\$298,451	\$298,451	10/1/2017	9/30/2020	
LANL-20180393ER	Removing and Swapping Photoreceptors in Algae to Improve Biomass Yield	0	\$289,921	\$289,921	10/1/2017	9/30/2020	
LANL-20180387ER	Engineering the Universal Bacterial Sensor	0	\$297,741	\$297,741	10/1/2017	9/29/2019	
LANL-20180382ER	ERIS: Electrolysis Rocket Ignition System	0	\$442,598	\$442,598	10/1/2017	9/30/2019	
LANL-20180372ER	Breaking the Efficiency Limits in Quantum Dot Emitters Using Dual-Band Metamaterials	0	\$299,695	\$299,695	10/1/2017	9/30/2020	
LANL-20180369ER	Switchable Spin Crossover Explosives: Nitrogen-rich Iron (Fe II) Complexes for On-Demand Initiation Sensitivity	0	\$315,916	\$315,916	10/1/2017	9/30/2020	
LANL-20180360ER	Two-dimensional Nanostructure-Engineered Durable Supercapacitors	0	\$325,323	\$325,323	10/1/2017	9/30/2020	
LANL-20180352ER	Scalable Dielectric Technology for Very Low Frequency Antennas	0	\$307,291	\$307,291	10/1/2017	9/30/2019	
LANL-20180295ER	In Situ Characterization of Uranium Hydriding Corrosion	0	\$275,857	\$275,857	10/1/2017	9/30/2020	
LANL-20180283ER	Dopant Profiling in Semiconductors by Scanning Frequency Comb Microscopy	0	\$269,998	\$269,998	10/1/2017	9/30/2020	
LANL-20180267ER	Preprocessing Algorithms for Boosting Quantum Annealing Scalability	0	\$295,319	\$295,319	10/1/2017	9/30/2020	
LANL-20180257ER	Ultra-Diffuse Galaxies, Tidal Streams and Dwarf Galaxies: The Low-Surface Brightness Frontier	0	\$320,740	\$320,740	10/1/2017	9/30/2020	
LANL-20180250ER	Next Generation Discrete Dislocation Dynamics Modelling for Materials Science Applications	0	\$302,073	\$302,073	10/1/2017	9/30/2020	
LANL-20180244ER	OrganiCam: A High-Sensitivity Radiation-Hardened Imaging Organic Detector For Space and Programmatic Applications	0	\$334,517	\$334,517	10/1/2017	9/30/2020	
LANL-20180242ER	Ultrafast X-ray Imaging Using Slow, Visible Cameras	0	\$345,357	\$345,357	10/1/2017	9/30/2020	
LANL-20180238ER	Proton Radiography for Advanced Cancer Therapy	0	\$328,696	\$328,696	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	\$321,163	\$321,163	10/1/2017	9/30/2020	
LANL-20180220ER	Improved Biologically Friendly Polymer Drag Reducers From Novel Architectures	0	\$303,270	\$303,270	10/1/2017	9/30/2020	
LANL-20180213ER	Hamiltonian on Demand for Computational Materials Using Machine Learning	0	\$292,996	\$292,996	10/1/2017	9/30/2020	
LANL-20180210ER	Properties of Medium Nuclei from First Principles	0	\$258,276	\$258,276	10/1/2017	9/30/2020	
LANL-20180197ER	Mixing Physics behind X-ray Emission from High-Energy-Density Plasmas	0	\$309,395	\$309,395	10/1/2017	9/30/2020	
LANL-20180189ER	Visualizing Nanoscale Spatio-Temporal Dynamics in Single Quantum Systems	0	\$297,164	\$297,164	10/1/2017	9/30/2020	
LANL-20180158ER	Geophysical Signatures of Changing Water Resources	0	\$237,901	\$237,901	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	\$297,382	\$297,382	10/1/2017	9/30/2020	
LANL-20180151ER	Visualizing and Understanding Complex Fluid Transport in Three-Dimensional Microstructure	0	\$295,022	\$295,022	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	\$405,936	\$405,936	10/1/2017	9/30/2020	
LANL-20180137ER	Electronic Structure of Putative Topological Kondo Insulators	0	\$341,539	\$341,539	10/1/2017	9/30/2020	
LANL-20180131ER	Novel Multichannel Atomic Magnetometer	0	\$299,292	\$299,292	10/1/2017	9/30/2019	
LANL-20180129ER	Search for Axion-mediated Interactions with a Spin-exchange Relaxation-free Magnetometer	0	\$353,530	\$353,530	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	\$286,671	\$286,671	10/1/2017	9/30/2020	
LANL-20180125ER	Atomic Structure of Actinides	0	\$295,746	\$295,746	10/1/2017	9/30/2020	
LANL-20180114ER	Making the Unmakeable: Nanostabilized Magnetic Alloys	0	\$327,203	\$327,203	10/1/2017	9/30/2020	
LANL-20180100DR	Boom or Bust? Predicting Explosive Safety under Impacts	0	\$1,516,352	\$1,516,352	10/1/2017	9/30/2020	
LANL-20180098ER	Quantitative Understanding of Electronic Correlations in F-Electron Quantum Matter	0	\$275,066	\$275,066	10/1/2017	9/30/2020	
LANL-20180097ER	Enabling Fast Disaggregation of Large Parameter Spaces	0	\$301,140	\$301,140	10/1/2017	9/30/2020	
LANL-20180078ER	Production of Shaped Electron Bunches with Diamond Field Emitter Array Cathodes	0	\$344,128	\$344,128	10/1/2017	9/30/2020	
LANL-20180074ER	Nonlinear Dynamics of Cross-Beam Energy Transfer for Multi-Speckled Laser Beams	0	\$270,167	\$270,167	10/1/2017	9/30/2020	
LANL-20180066DR	The Fundamental Physical Interpretation and Exploitation of Stable Isotope Fractionation	0	\$1,531,215	\$1,531,215	10/1/2017	9/30/2020	
LANL-20180062DR	Dominating the Electromagnetic Spectrum with Spatio-Temporal Modulated Metasurfaces	0	\$1,679,518	\$1,679,518	10/1/2017	9/30/2020	
LANL-20180058ER	Imaging Neural Dynamics With Ultra-Low Field Magnetic Resonance Imaging	0	\$367,659	\$367,659	10/1/2017	9/30/2020	
LANL-20180051DR	A Low Fuel Convergence Path to Inertial Confinement Fusion on the National Ignition Facility	0	\$2,047,284	\$2,047,284	10/1/2017	9/30/2020	
LANL-20180045DR	Atomtronics: A New Approach to Sensing, Signal Processing, and Signal Analysis	0	\$1,527,798	\$1,527,798	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	\$1,488,175	\$1,488,175	10/1/2017	9/30/2020	
LANL-20180038DR	Deepening Los Alamos National Laboratory's Neutrino Legacy	0	\$1,538,422	\$1,538,422	10/1/2017	9/30/2020	
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 Stoppige Stewardship programs	0	\$341,365	\$341,365	10/1/2017	9/30/2019	
LANL-20180033DR	Adaptation Science for Complex Natural-Engineered Systems	0	\$1,543,966	\$1,543,966	12/16/2017	12/17/2020	
LANL-20180026DR	Rational Design of Halide Perovskites for Next Generation Gamma-ray Detection	0	\$1,390,485	\$1,390,485	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	\$1,668,331	\$1,668,331	10/1/2017	9/30/2020	
LANL-20180017ER	Effects of Cosmic Ray Neutrons on Modern High Performance Computing Components	0	\$323,540	\$323,540	10/1/2017	9/30/2020	
LANL-20180007DR	Understanding Actinide-Water Interactions in High Pressure-Temperature Environments	0	\$1,573,614	\$1,573,614	10/1/2017	9/30/2020	
LANL-20180005DR	Establishing a Radiotherapeutic Capability to Counter Biothreats	0	\$1,758,206	\$1,758,206	10/1/2017	9/30/2020	
LANL-20170695PRD4	Excited State Dynamics for Photochemistry and Light-Matter Interactions	0	\$96,930	\$96,930	1/2/2018	1/1/2020	
LANL-20170694PRD4	Full-Field Characterization of the Micromechanical Cues Associated with the Breakdown of the Cytoskeleton During Cancer Metastasis	0	\$112,883	\$112,883	6/4/2018	8/23/2019	
LANL-20170693PRD4	Mega Electron Volt Gamma-Ray Astronomy: Exploring the Universe in the Nuclear Transition Region	0	\$100,415	\$100,415	10/23/2017	10/22/2020	
LANL-20170691PRD4	Accelerated Discovery of New Nanocomposites for Energy Applications	0	\$105,546	\$105,546	10/30/2017	10/29/2019	
LANL-20170690PRD4	Epigenetic Control of Synchronized Proliferation in Harmful Algal Blooms	0	\$122,170	\$122,170	9/11/2017	10/15/2019	
LANL-20170688PRD3	Engineering Deoxyribonucleic Acid Protected Silver Nanoclusters via Doping and Alloying	0	\$14,120	\$14,120	9/5/2017	7/24/2020	
LANL-20170687PRD3	Measurement of Cross Sections Crucial for Constraining Stellar Nucleosynthesis	0	\$65,373	\$65,373	6/19/2017	6/18/2019	
LANL-20170686PRD3	Modeling of Two-Dimensional Materials and Hybrid Perovskite Optoelectronic Devices	0	\$71,186	\$71,186	6/26/2017	5/24/2019	
LANL-20170685PRD3	Tandem Dehydrogenation of Formic Acid and Olefin Hydrogenation: Steps Towards a Self-Sustaining Pressure/Volume System	0	\$44,735	\$44,735	6/19/2017	7/26/2019	
LANL-20170677PRD2	Prediction of Magnetic Properties of Actinide Complexes Using Ab Initio Methods	0	\$86,836	\$86,836	7/31/2017	7/30/2020	
LANL-20170674PRD2	Joint Mapping of Charge and Spin Degrees of Freedom in Intermediate Valence Materials	0	\$74,532	\$74,532	7/31/2017	8/2/2019	
LANL-20170673PRD2	Forecasting Failure	0	\$51,771	\$51,771	7/3/2017	7/2/2020	
LANL-20170672PRD2	Valley Dynamics and Coherence in Atomically-Thin Semiconductors	0	\$121,505	\$121,505	9/25/2017	9/24/2020	
LANL-20170671PRD2	Developing a Unique Technology to Control Emerging Threats of Antibiotic-resistant Pathogens	0	\$93,554	\$93,554	4/3/2017	11/2/2019	
LANL-20170670PRD1	Toward Controlled Synthesis of Actinide Oxide Nanocrystals: A Theoretical Perspective	0	\$54,935	\$54,935	2/27/2017	2/7/2020	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
LANL-20170668PRD1	Impacts of Climate and Land Use on Global River Dynamics	0	\$50,276	\$50,276	4/3/2017	4/2/2020	
LANL-20170667PRD1	A Gruneisen Approach to Quantum Criticality	0	\$102,857	\$102,857	4/17/2017	4/16/2020	
LANL-20170666PRD1	Jets in Strongly Interacting Plasmas	0	\$153,418	\$153,418	8/21/2017	8/20/2020	
LANL-20170665ER	Driven Quantum Matter	0	\$10,563	\$10,563	3/9/2017	11/16/2018	
LANL-20170664PRD1	Novel Topological Orders in Strongly-Correlated Systems	0	\$20,786	\$20,786	1/9/2017	11/30/2018	
LANL-20170663PRD1	Quantifying Covalency in Californium and the Other +3 Actinides	0	\$20,636	\$20,636	1/9/2017	7/23/2019	
LANL-20170662PRD1	First Principles Approach to Factorization Violation	0	\$147,797	\$147,797	1/9/2017	1/8/2020	
LANL-20170661PRD1	Dark Matter and the Validity of Effective Field Theories	0	\$164,505	\$164,505	9/5/2017	9/4/2020	
LANL-20170660PRD1	Neuromorphic Memcomputing via Interacting Nanomagnets	0	\$178,168	\$178,168	2/21/2017	2/20/2020	
LANL-20170610ECR	New Nanomaterials with Confined Oxide/Metal Interfaces for Flexible Electrodes	0	\$167,313	\$167,313	7/3/2017	7/2/2019	
LANL-20170574ECR	Large-Scale Nonlinear Optimization via Cloud Computing	0	\$153,546	\$153,546	6/19/2017	9/30/2019	
LANL-20170573ECR	Laser-Based Mega Electron Volt X-ray Source for Double-Shell Radiography	0	\$58,236	\$58,236	1/9/2017	1/8/2019	
LANL-20170569ECR	Glue Saturation Search with Large Hadron Collider Beauty Experiment	0	\$107,391	\$107,391	1/9/2017	1/8/2019	
LANL-20170549ECR	Convolutional Compressive Sensing for Scientific Imaging	0	\$55,620	\$55,620	1/9/2017	3/15/2019	
LANL-20170541ECR	High Resolution Laser Velocimetry and Ranging for Materials Research	0	\$55,603	\$55,603	1/9/2017	1/18/2019	
LANL-20170539ECR	Understanding the Magnetic Properties of Heavy Fermion Materials	0	\$195,791	\$195,791	10/1/2017	9/30/2019	
LANL-20170533ECR	Boosting Algae Biomass for Biofuels with Plant Substrate Utilization	0	\$55,352	\$55,352	1/9/2017	1/8/2019	
LANL-20170529ER	Aromatic Actinide Metallacycles	0	\$200,323	\$200,323	1/24/2017	9/30/2019	
LANL-20170527ECR	Next Generation Radiation Hydrodynamics for Astrophysics	0	\$41,082	\$41,082	1/9/2017	1/8/2019	
LANL-20170509DR	Multiscale Modeling of Biological Systems	0	\$555,504	\$555,504	10/1/2016	9/30/2019	
LANL-20170508DR	Optimization and Physics Inspired Machine Learning Approaches	0	\$446,110	\$446,110	10/1/2016	9/30/2019	
LANL-20170490ER	Enabling Electron Excitations in the Modeling of Warm Dense Matter	0	\$271,251	\$271,251	10/1/2016	9/30/2019	
LANL-20170460ER	Computational algorithms for modeling non-adiabatic dynamics in molecular systems	0	\$345,220	\$345,220	10/1/2016	9/30/2019	
LANL-20170457ER	Beat-Wave Magnetization of a Dense Plasma	0	\$244,192	\$244,192	10/1/2016	9/30/2019	
LANL-20170450ER	Quantum Molecular Dynamics of Strongly Correlated Materials	0	\$293,276	\$293,276	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	\$388,046	\$388,046	10/1/2016	9/30/2019	
LANL-20170435ER	Quantum-Dot-Based Infrared Photodetectors with Picosecond Temporal Resolution Operating at Room Temperature	0	\$324,673	\$324,673	10/1/2016	9/30/2019	
LANL-20170430ER	Quantum Effects on Cosmological Observables: Probing Physics Beyond the Standard Model	0	\$311,252	\$311,252	10/1/2016	9/30/2019	
LANL-20170423ER	Probing Ionosphere and Magnetosphere Connections with an Electron Gun	0	\$317,260	\$317,260	10/1/2016	9/30/2019	
LANL-20170414ER	Life on the Edge: Microbes in Rock Varnish	0	\$339,034	\$339,034	10/1/2016	9/30/2019	
LANL-20170393ER	Chemical Approaches to Stable, Narrow-Bandgap Perovskite Materials	0	\$274,805	\$274,805	10/1/2016	9/30/2019	
LANL-20170367ER	Realization of a Laboratory Turbulent Magnetic Dynamo: A Gateway to New Laboratory Astrophysics and Inertial Confinement Fusion Experiments	0	\$344,729	\$344,729	10/1/2016	9/30/2019	
LANL-20170328ER	Hetero-Interfaces of Novel Two-Dimensional Dirac Semiconductors	0	\$282,725	\$282,725	10/1/2016	9/30/2019	
LANL-20170317ER	Exploring the Multi-scale Physics that Regulates Black Hole Accretion	0	\$314,976	\$314,976	10/1/2016	9/30/2019	
LANL-20170290ER	Lepton Number Violation: Connecting the Teraelectron Volt Scale to Nuclei	0	\$296,359	\$296,359	10/1/2016	9/30/2019	
LANL-20170288ER	Fluctuating Domains in Antiferromagnets for Sensing and Switching Applications	0	\$323,892	\$323,892	10/1/2016	9/30/2019	
LANL-20170279ER	"Zero-Threshold Gain" and Continuous-Wave Lasing Using Charged Quantum Dots	0	\$300,995	\$300,995	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	\$300,604	\$300,604	10/1/2016	9/30/2019	
LANL-20170249ER	Sensitive Optical Super-resolution Neuroimaging	0	\$288,020	\$288,020	10/1/2016	9/30/2019	
LANL-20170236ER	Harnessing Dark Excitons in Carbon Nanotubes through Covalent Doping Chemistry	0	\$326,098	\$326,098	10/1/2016	9/30/2019	
LANL-20170221ER	Exploiting Quantum Interference to Control Ultracold Molecular Collisions	0	\$291,638	\$291,638	10/1/2016	9/30/2019	
LANL-20170218ER	Strontium Bose-Einstein Condensate Atom Interferometer with Matter Wave Circuits	0	\$322,053	\$322,053	10/1/2016	9/30/2019	
LANL-20170211ER	Dynamics of Nonequilibrium Phase Transitions and Universality	0	\$370,947	\$370,947	10/1/2016	9/30/2019	
LANL-20170207ER	Breaking the "Curse of Dimensionality" for Boltzmann-like Systems	0	\$306,975	\$306,975	10/1/2016	9/30/2019	
LANL-20170204ER	Continuous in-situ Tuning and Nuclear Magnetic Resonance Spectroscopy of Correlated Matter	0	\$303,348	\$303,348	10/1/2016	9/30/2019	
LANL-20170203ER	A Novel Ultrasound Tomography Technique for High-Resolution Imaging	0	\$296,318	\$296,318	10/1/2016	9/30/2019	
LANL-20170201ER	A Polyhedral Outer-Approximation, Dynamic-Discretization Solver for Mixed-Integer Semi-Definite Programming	0	\$303,346	\$303,346	10/1/2016	9/30/2019	
LANL-20170199ER	Laser Radiochrometry	0	\$315,094	\$315,094	10/1/2016	9/30/2019	
LANL-20170198ER	Development of Computational Methods for Large-Scale Simulations of Heavy Elements in Solution Environments	0	\$269,477	\$269,477	10/1/2016	9/30/2019	
LANL-20170183ER	Next Generation Image Processing and Analysis Algorithms for Persistent Sky Surveillance	0	\$294,881	\$294,881	10/1/2016	9/30/2019	
LANL-20170179ER	High Energy Lightning: Understanding Relations Between Energetic Particles and Lightning Discharges in Thunderclouds	0	\$328,583	\$328,583	10/1/2016	3/31/2020	This project deploys lightning sensors to the High-Altitude Water Cherenkov Observatory near Pueblo, Mexico. Due to several safety incidents related to high crime rates in the area, Laboratory management and collaborators at the Observatory recommend against U.S. scientists and staff traveling to the site, preventing the team from retrieving the sensors. A 6 month extension was approved. During this extension period, the instruments will continuously collect and transfer scientific data to the Laboratory, potentially yielding additional high-impact scientific results.
LANL-20170156ER	Mapping Cotranscriptional Assembly of the 30S Ribosomal Subunit to Illuminate Mechanisms of Antibiotic Interference	0	\$293,331	\$293,331	10/1/2016	9/30/2019	
LANL-20170155ER	Three-Dimensional Structure from Drone and Stereo Video	0	\$311,832	\$311,832	10/1/2016	9/30/2019	
LANL-20170147ER	Designing Emergent Behavior in the Collective Dynamics of Interacting Nano-Magnets	0	\$289,925	\$289,925	10/1/2016	9/30/2019	
LANL-20170141ER	Three-Dimensional Nuclear Quadrupole Resonance Imaging	0	\$296,137	\$296,137	10/1/2016	9/30/2019	
LANL-20170127ER	Asynchronous Navier-Stokes Solver on Three-Dimensional Unstructured Grids for the Exascale Era	0	\$352,817	\$352,817	10/1/2016	9/30/2019	
LANL-20170121ER	Interfacial Structure Transfer for Direct Band Gap Wurtzite Group-IV Semiconductors	0	\$292,654	\$292,654	10/1/2016	9/30/2019	
LANL-20170109ER	Walking the Road from Impacts to Seismic Sources for Celestial Bodies	0	\$285,799	\$285,799	10/1/2016	9/30/2019	
LANL-20170103DR	Advancing Predictive Capability for Brittle Failure Using Dynamic Graphs	0	\$1,470,347	\$1,470,347	10/1/2016	9/30/2019	
LANL-20170082DR	Understanding Ejecta, Transport, Break-up and Conversion Processes	0	\$1,578,256	\$1,578,256	10/1/2016	9/30/2019	
LANL-20170073DR	Probing Quark-Gluon Plasma with Bottom Quark Jets at sPHENIX	0	\$1,619,835	\$1,619,835	10/1/2016	9/30/2019	
LANL-20170070DR	Shocked Chemical Dynamics in High Explosives	0	\$1,318,796	\$1,318,796	10/1/2016	9/30/2019	
LANL-20170055DR	Agile Spectral Reconnaissance from CubeSats	0	\$1,404,878	\$1,404,878	10/3/2016	9/30/2019	
LANL-20170051DR	High-Order Hydrodynamic Algorithms for Exascale Computing	0	\$1,461,543	\$1,461,543	10/1/2016	9/30/2019	
LANL-20170048DR	Fieldable Chemical Threat Mapping by Multi-Modal Low Magnetic Field Nuclear Magnetic Resonance Signatures	0	\$1,666,724	\$1,666,724	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	\$1,477,848	\$1,477,848	10/1/2016	9/30/2019	
LANL-20170046DR	Flow Cells for Scalable Energy Conversion and Storage	0	\$1,556,844	\$1,556,844	10/1/2016	9/30/2019	
LANL-20170033DR	Material Processing to Performance: A Path to Physically-Based Predictive Capability	0	\$1,477,543	\$1,477,543	10/1/2016	9/30/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
LANL-20170029DR	Real-time Adaptive Acceleration of Dynamic Experimental Science	0	\$1,540,409	\$1,540,409	10/1/2016	9/30/2019	
LANL-20170060DR	New Science and Technology for a Tabletop Accelerator	0	\$1,505,009	\$1,505,009	10/1/2016	9/30/2019	
LANL-20170004DR	Critical Stress in Earth Crust	0	\$1,242,277	\$1,242,277	10/1/2016	9/30/2019	
LANL-20170001DR	Hybrid Photonic-Plasmonic Materials: Toward Ultimate Control Over the Generation and Fate of Photons	0	\$1,489,324	\$1,489,324	10/1/2016	9/30/2019	
LANL-20160681PRD4	Turbulence in Supernova Progenitors	0	\$21,936	\$21,936	5/8/2017	9/27/2019	
LANL-20160680PRD4	Chemical Vapor Growth of Hybrid-Perovskite Materials for Next-Generation Energy	0	\$38,987	\$38,987	10/3/2016	5/30/2019	
LANL-20160678PRD4	Additive Manufacturing of Composite Lithium Containing Neutron Scintillators	0	\$45,881	\$45,881	9/12/2016	9/11/2019	
LANL-20160677PRD4	Building Full-scale Computational Models of Viruses	0	\$25,666	\$25,666	1/30/2017	9/30/2019	
LANL-20160676PRD4	Regulation of Intercellular Signaling	0	\$7,577	\$7,577	10/24/2016	10/31/2018	
LANL-20160674PRD3	Radiation Effects and Plasma Interactions in Tungsten Based Materials	0	\$35,787	\$35,787	7/25/2016	7/24/2019	
LANL-2016064DR	Rapid Response to Future Threats	0	\$1,321,969	\$1,321,969	6/6/2016	9/30/2019	Extension approved to account for an unexpected work stoppage that delayed one of the key experiments for this LDRD project. A fire hazard at the outdoor test site resulted in further delays on the whole shot schedule. The shot in question required an additional level of caution with respect to fire hazard. This experiment was the only work remaining on the project, and it represented a culmination of the foundational application of the rapid design, iterate, and test approach.
LANL-20160655PRD2	On the Origin of Colossal Ion Conductivity	0	\$18,669	\$18,669	8/1/2016	7/31/2019	
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	\$30,109	\$30,109	5/16/2016	5/15/2019	
LANL-20160647PRD2	Coupling Kinetic to Fluid Scales in Space and Laboratory Plasmas	0	\$62,416	\$62,416	2/22/2016	2/21/2019	
LANL-20160643PRD2	Tensor Networks and Anyons: Novel Techniques for Novel Physics	0	\$165,270	\$165,270	8/29/2016	8/28/2019	
LANL-20160641PRD2	Revealing the Particle Nature of Dark Matter with Cosmic Gamma Rays	0	\$143,686	\$143,686	3/28/2016	9/30/2019	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-201606331ER	Black Carbon Interactions with Radiation, Water & Ice: Laboratory Studies to Calibrate Arctic Climate Models	0	\$327,912	\$327,912	10/1/2016	9/30/2019	
Total # of Projects for LANL: 341				Total Equipment Cost for LANL: \$0	Total Other Cost for LANL: \$130,790,088	Total Cost for LANL: \$130,790,088	
LBNL - Lawrence Berkeley National Lab							
LB18040	Developing Theory of Photosynthetic Acclimation from First Principles	0	\$342,084	\$342,084	10/1/2017	9/30/2019	
LB18039	Computational Design of Next Generation Materials for Quantum Sensing and Detection	0	\$253,297	\$253,297	8/20/2018	9/30/2020	
LB18038	Improving Bioenergy Yield Under Drought Stress from Field to Lab	0	\$224,674	\$224,674	8/6/2018	9/30/2020	
LB18037	Understanding Fundamental Scientific Challenges in Scaling New Low Power Electronic Materials and Devices	0	\$274,985	\$274,985	7/19/2018	9/30/2019	
LB18036	Post-Moore Architecture and Device Level Simulation and Exploration	0	\$321,507	\$321,507	7/19/2018	9/30/2019	
LB18035	Novel Electronic Nanostructured Materials for Low Power Electronics	0	\$318,304	\$318,304	7/19/2018	9/30/2019	
LB18034	Computational Materials Discovery and Device Simulation	0	\$310,420	\$310,420	7/19/2018	9/30/2019	
LB18033	Ultrafast Superconducting Electron Microscope	0	\$238,435	\$238,435	6/1/2018	9/30/2019	
LB18032	Precision Beam Instrumentation for Parity Violation Experiments	0	\$159,666	\$159,666	2/26/2018	9/30/2020	
LB18031	High-Resolution Ultra-Dense Seismic Array Imaging of Geological Properties for Regional Seismic Hazard and Risk Assessment	0	\$240,056	\$240,056	10/1/2017	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	\$511,215	\$511,215	12/7/2017	9/30/2020	
LB18029	Diversity-Oriented Materials from Biogenic Feedstocks	0	\$328,968	\$328,968	12/7/2017	9/30/2019	
LB18028	Efficient Desalination through Better Predictive Models	0	\$271,591	\$271,591	10/1/2017	9/30/2019	
LB18027	The AR1K Project: Engineering Agriculture through Machine Learning	0	\$308,410	\$308,410	12/7/2017	9/30/2019	
LB18026	The Chemical Universe Through the Eyes of Generative Adversarial Neural Networks	0	\$402,643	\$402,643	12/7/2017	9/30/2019	
LB18025	Unnatural Biosynthetic Pathways by Combining Biosynthetic Pathways with Artificial Metalloenzymes	0	\$360,777	\$360,777	12/7/2017	9/30/2020	
LB18024	Revealing the Organization and Dynamics of Sensorimotor Cortex by Determining Structure-Dunction Mappings Across Micro-to-Mesoscales	0	\$414,769	\$414,769	12/7/2017	9/30/2020	
LB18023	Development of a Kilohertz Laser-Plasma Beamline for Ultrafast Electron Diffraction	0	\$252,884	\$252,884	12/7/2017	9/30/2019	
LB18022	Active Learning of Ab Initio Force Fields with Applications to Large-Scale Simulations of Materials and Biophysical Systems	0	\$104,502	\$104,502	10/1/2017	9/30/2019	
LB18021	Domain-Specific Communication Runtimes for the Post-Moore's Law High Performance Computing	0	\$227,487	\$227,487	10/1/2017	9/30/2019	
LB18020	Developing High-Resolution Optical Microscopy Methods for Imaging Plants and Microbes	0	\$277,828	\$277,828	10/1/2017	9/30/2020	
LB18019	Next-Generation Data-Intensive Analysis Framework for High Energy and Nuclear Physics on High Performance Computers	0	\$140,312	\$140,312	10/1/2017	9/30/2019	
LB18018	Joining forces against the Dark Universe: From the Cosmic Microwave Background to Large Scale Structure	0	\$364,837	\$364,837	10/1/2017	9/30/2020	
LB18017	Pushing the Limits of High Purity Germanium Detector Performance: Rate and Position Resolution	0	\$229,646	\$229,646	10/1/2017	9/30/2019	
LB18014	Agile Hybrid Materials for a Sustainable Future	0	\$269,524	\$269,524	10/1/2017	9/30/2020	
LB18013	Atomic Electron Tomography of Disordered Materials	0	\$113,053	\$113,053	10/1/2017	9/30/2019	
LB18012	A New Approach to Predicting the Effect of Climate Extremes on California's Water Supply	0	\$306,626	\$306,626	10/1/2017	9/30/2019	
LB18011	Isotopic Constraints on the Chemical and Thermal Conditions of Thermogenic Methane Formation	0	\$124,970	\$124,970	10/1/2017	9/30/2020	
LB18010	Selective Ion Capture via Electrodialysis with Porous Network Polymer Architectures	0	\$100,854	\$100,854	10/1/2017	9/30/2019	
LB18009	High-Throughput Resolution of Viral-Host Linkages	0	\$146,845	\$146,845	10/1/2017	9/30/2019	
LB18008	Harnessing Microbiome Data to Uncover Patterns of Microbial Mutualism	0	\$224,783	\$224,783	10/1/2017	9/30/2019	
LB18007	A Neuroeconomics Experiment to Study Routine Transportation Decision-Making Processes and Drivers	0	\$129,679	\$129,679	10/1/2017	9/30/2019	
LB18006	Mitigating Fossil and Microbial Methane with New Materials for Distributed Energy Generation	0	\$276,756	\$276,756	10/1/2017	9/30/2019	
LB18005	Algorithms for Computationally Expensive Black-Box Optimization Under Uncertainty	0	\$253,357	\$253,357	10/1/2017	9/30/2019	
LB18004	In-situ Investigation of Chemical Precursor Transformation: Towards a Predictive Science of Synthesis	0	\$229,534	\$229,534	10/1/2017	9/30/2019	
LB18003	Bio-inspired Strategies for Enhancing Carbon Dioxide Reduction at Semiconductor-Liquid Junctions	0	\$278,141	\$278,141	10/1/2017	9/30/2020	
LB18002	Toward Accurately Predicting California Hydroclimate by Cracking the Tropical Storm King	0	\$296,737	\$296,737	10/1/2017	9/30/2020	
LB18001	Atmospheric Observation and Forecasting	0	\$278,602	\$278,602	10/1/2017	9/30/2019	
LB17037	Automated Translation of Applications to Large Scale Programming Systems	0	\$203,860	\$203,860	10/25/2016	9/30/2019	
LB17036	Femtosecond Synchronization for Small-Scale Pump-Probe Ultrafast Experiments	0	\$222,743	\$222,743	12/7/2016	9/30/2019	
LB17034	Germanium Charge Coupled Devices	0	\$223,901	\$223,901	10/1/2016	9/30/2019	
LB17033	Theoretical Challenges for Electron-Ion Collider Physics	0	\$178,335	\$178,335	10/1/2016	9/30/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
LB17030	Multimodal Imaging and Spectroscopy of Solid-Liquid Interfaces		0 \$258,788	\$258,788	10/1/2016	9/30/2019	
LB17023	Advancement of a High-Impact Desalination Technology		0 \$231,109	\$231,109	10/1/2016	9/30/2019	
LB17019	A Systems Biology Approach to Dissecting Regulatory and Metabolic Networks of Filamentous Fungi Involved in Carbon Cycling		0 \$297,812	\$297,812	10/1/2016	9/30/2019	
LB17007	Biosurfactant Production by Engineering Microbial One Carbon Conversion		0 \$122,920	\$122,920	10/1/2016	9/30/2019	
LB17004	Developing Science Based Scalable Approaches to Groundwater Banking		0 \$332,915	\$332,915	10/1/2016	9/30/2019	
LB19002	Fixed Field Magnets for Large Momentum Acceptance Ion Therapy Gantries		0 \$250,965	\$250,965	10/1/2018	9/30/2020	
LB19031	Development of Integrated Frequency Domain Multiplexed Readout System for Next Generation Cosmic Microwave Background Experiment and Light Dark Matter Search Experiment		0 \$268,931	\$268,931	10/1/2018	9/30/2020	
LB19032	Combining Data Driven and Science Based Generative Models		0 \$129,436	\$129,436	10/1/2018	9/30/2020	
LB19029	Developing New Lattice Quantum Chromodynamic Methods for Neutrinoless Double Beta Decay and Nuclear Physics		0 \$237,833	\$237,833	10/1/2018	9/30/2021	
LB19041	Machine Learning Analysis of Hadron Jet Features		0 \$109,803	\$109,803	10/1/2018	9/30/2019	
LB19030	Enabling A Ton-Scale Germanium-76 Neutrinoless Double-Beta Decay Experiment		0 \$254,225	\$254,225	10/1/2018	9/30/2020	
LB19027	Density Fourier Transform Beyond Moore's Law: Extreme Hardware Specialization for the Future of High Performance Computing		0 \$253,354	\$253,354	10/1/2018	9/30/2020	
LB19028	Ultrafast Electron Diffraction Studies of Quantum Materials		0 \$371,520	\$371,520	10/1/2018	9/30/2020	
LB19025	Design, Synthesis, and Spectroscopic Studies of Photoactive Metal-Organic Frameworks for Solar Fuel Production		0 \$131,778	\$131,778	10/1/2018	9/30/2020	
LB19024	Advanced Qubit Implementations		0 \$64,412	\$64,412	10/1/2018	9/30/2020	
LB19037	Interactive Machine Learning for Tomogram Segmentation and Annotation		0 \$162,775	\$162,775	10/1/2018	9/30/2020	
LB19022	Engineering of Highly Selective Advanced Biogenics for Detection, Binding, and Control of Metal in the Environment		0 \$225,981	\$225,981	10/1/2018	9/30/2020	
LB19023	Characterization of Biological 'Dark Matter', Communities Through Integration of Metagenomics and Cryo-Electron Tomography Imaging		0 \$309,859	\$309,859	10/1/2018	9/30/2020	
LB19021	Pore-Scale Investigation of Fracture Alteration in Multiphase Systems		0 \$283,502	\$283,502	10/1/2018	9/30/2020	
LB19020	Scanning Electron Beam Magnetic Probe		0 \$215,597	\$215,597	10/1/2018	9/30/2020	
LB19019	Enabling Scalable High Temperature Energy Conversion and Storage with Novel Optical Spectroscopy		0 \$274,640	\$274,640	10/1/2018	9/30/2020	
LB19018	Platform for Services Exchange at the Edge of Low Inertia Grids		0 \$149,794	\$149,794	10/1/2018	9/30/2021	
LB19026	Highly Efficient Advanced Thermal Energy Research for On-Demand Thermal Energy		0 \$276,652	\$276,652	10/1/2018	9/30/2021	
LB19017	Microbiology of Produced Water Recycling and Reuse		0 \$222,973	\$222,973	10/1/2018	9/30/2020	
LB19042	Developing Third Wave Machine Learning for the Biosciences		0 \$564,579	\$564,579	1/1/2019	9/30/2021	
LB19044	Breakthrough High-performance Computational Solutions to Secure a Reliable Electric Vehicle-Connected Grid Future		0 \$22,953	\$22,953	7/1/2019	9/30/2019	
LB19016	Emerging TechnoEconomic Analysis		0 \$309,738	\$309,738	10/1/2018	9/30/2021	
LB19015	Big Data Fusion for Smart and Sustainable Mobility		0 \$294,974	\$294,974	10/1/2018	9/30/2021	
LB19013	Statistical Mechanics for Interpretable Learning Algorithms		0 \$309,222	\$309,222	10/1/2018	9/30/2021	
LB19014	Network Computing for Experimental and Observational Data Management		0 \$199,445	\$199,445	10/1/2018	9/30/2020	
LB19045	Approximate Unitary Matrix Decompositions for Quantum Circuit Synthesis		0 \$9,064	\$9,064	7/29/2019	9/30/2021	
LB19012	Scalable Data Infrastructure for in-Field Experimental Instruments		0 \$177,087	\$177,087	10/1/2018	9/30/2020	
LB19011	Building and Benchmarking a Modular Deep Learning Framework for Encoding and Decoding Three-Dimensional Geometry of Atomic Systems		0 \$205,067	\$205,067	10/1/2018	9/30/2020	
LB19010	Multi-Tiered Iterative Projection Algorithms for Solving Inverse Problems for Imaging and Machine Learning		0 \$180,911	\$180,911	10/1/2018	9/30/2020	
LB19039	Preparing the Time Ordered Astrophysics Scalable Tools Cosmic Microwave Background High Performance Computing Framework for Cosmic Microwave Background-Stage 4 Data Synthesis and Reduction on National Energy Research Scientific Computing Center-9		0 \$585,597	\$585,597	10/1/2018	9/30/2021	
LB19009	Enabling Energy-Water Decision Support Using Watershed-Scale Surrogate Models		0 \$343,284	\$343,284	10/1/2018	9/30/2020	
LB19033	The Duality of f-Electron Localization and Covalency in Lanthanide and Actinide Organometallics		0 \$146,204	\$146,204	10/1/2018	9/30/2020	
LB19008	Climate and Hydrological Controls on Coastal Algal Blooms		0 \$304,840	\$304,840	10/1/2018	9/30/2020	
LB19038	Anmanned Aerial Vehicle-Mounted Passive ElectroMagnetic Sensor for Spatiotemporal Imaging of Shallow Subsurface Properties		0 \$154,545	\$154,545	10/1/2018	9/30/2021	
LB19007	Managing Water Use to Reshape Electricity Loads: A User-Oriented Approach		0 \$250,246	\$250,246	10/1/2018	9/30/2020	
LB19043	Building Science-Based Methods to Quantify and Fortify Energy Resilience in Buildings		0 \$42,628	\$42,628	4/29/2019	9/30/2021	
LB19005	Developing New Hosts to Enable Effective Electrons-to-Biomass Conversion		0 \$176,045	\$176,045	10/1/2018	9/30/2020	
LB19006	Laser-Accelerated Ion Beams: Evaluating Radiobiological Effects		0 \$280,952	\$280,952	10/1/2018	9/30/2020	
LB19036	Developing and Integrating Theoretical Modeling for Advanced Soft X-ray Spectroscopy of In-situ/Operando Electrochemistry		0 \$150,784	\$150,784	10/1/2018	9/30/2020	
LB19034	Understanding and Controlling Heterogeneity and Dynamics of Antiferromagnetic Nanostructures		0 \$154,269	\$154,269	10/1/2018	9/30/2020	
LB19004	"X-LAB": A System for Algorithmically Driven Synthesis of Semiconductors for Beyond Complementary Metal Oxide Semiconductor Technologies		0 \$265,645	\$265,645	10/1/2018	9/30/2020	
LB19035	Correlation of Structural and Chemical Processes at Interfaces Under Operating Conditions Using Multimodal Ambient Pressure X-ray Photoelectron Spectroscopy and Surface X-ray Scattering		0 \$172,850	\$172,850	10/1/2018	9/30/2020	
LB19001	Qubit Synthesis Far from Equilibrium		0 \$250,224	\$250,224	10/1/2018	9/30/2020	
LB19003	A Self-Switching Metal-Insulator Coating for the Quench Protection of High-Temperature Superconducting Magnets		0 \$189,630	\$189,630	10/1/2018	9/30/2020	
LLNL - Lawrence Livermore National Lab		Total # of Projects for LLNL: 91	Total Equipment Cost for LLNL: \$0	Total Other Cost for LLNL: \$21,915,954	Total Cost for LLNL: \$21,915,954		
18-SI-004	Unlocking the Mysteries of High-Explosive Science		0 \$2,239,730	\$2,239,730	10/1/2017	9/30/2020	
18-SI-003	A New Science-based Paradigm Enabling Microstructure-Tailored Additive Manufacturing of Metals		0 \$2,531,820	\$2,531,820	10/1/2017	9/30/2020	
18-SI-002	Learning-Based Predictive Models: A New Approach to Integrating Large-Scale Simulations and Experiments		0 \$2,983,270	\$2,983,270	10/1/2017	9/30/2020	
18-SI-001	Developing and Characterizing New Tools for Actinide Processing Science		0 \$3,032,990	\$3,032,990	10/1/2017	9/30/2020	
18-LW-078	A Machine Learning System to Guide Clinical Procedures in Real-Time Structure of Ionic Liquids Under Nanoconfinement in Energy Applications		0 \$235,620	\$235,620	10/1/2017	9/30/2019	
18-LW-064	Metallopolymers as an Emergent Class of Materials for Additive Manufacturing of Graded Density Gold Foams		0 \$281,630	\$281,630	10/1/2017	9/30/2019	
18-LW-063	Building a Predictive Fission-Rate Model		0 \$241,420	\$241,420	10/1/2017	9/30/2019	
18-LW-062	Probing Photon Fusion for New Physics at the Large Hadron Collider Using Proton Tagging		0 \$99,090	\$99,090	10/1/2017	9/30/2019	
18-LW-061	Toward Artificial Neurons: Biomimetic Signal Propagation in Synthetic Nanochannel Systems		0 \$291,230	\$291,230	10/1/2017	9/30/2020	
18-LW-057	Protein Factory on a Chip for Rapid Therapeutics		0 \$265,700	\$265,700	10/1/2017	9/30/2019	
18-LW-055	Catching Villains: Finding Single Cells Responsible for Cancer Drug Resistance and Metastasis		0 \$316,880	\$316,880	10/1/2017	9/30/2019	
18-LW-046	Rapid Detection of Candidates for Vaccines Against Biothreat Agents		0 \$275,040	\$275,040	10/1/2017	9/30/2019	
18-LW-039	Towards the World's First Nuclear Clock		0 \$282,660	\$282,660	10/1/2017	9/30/2019	
18-LW-038	Innate Persistence of Human Immune Memory T Cells		0 \$265,560	\$265,560	10/1/2017	9/30/2019	
18-LW-037	The Mechanochemical Genesis of Prebiotics		0 \$274,270	\$274,270	10/1/2017	9/30/2019	
18-LW-036	Directly Probing Spin Fluctuations in Quantum Spin Liquids with X-Ray Free Electron Lasers		0 \$274,950	\$274,950	10/1/2017	9/30/2019	
18-LW-022	Construction of Solar Cells from Colloidal Nanocrystals through Electrophoretic Deposition		0 \$199,240	\$199,240	10/1/2017	9/30/2019	
18-LW-003	Short-Pulse Laser Ablation of Energetic Materials for Threat Object Interrogation		0 \$287,360	\$287,360	10/1/2017	9/30/2019	
18-FS-039			0 \$49,270	\$49,270	2/15/2018	2/14/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
18-FS-038	Multiscale Model for Chemical Degradation of Materials	0	\$37,770	\$37,770	3/6/2018	3/5/2019	
18-FS-036	Engineering a Quantum Methuselah Using Phononic Band Gaps	0	\$22,980	\$22,980	3/14/2018	3/13/2019	
18-FS-026	Development of a Low-Cost High-Throughput Ejecta Drive	0	\$23,570	\$23,570	1/16/2018	1/15/2019	
18-FS-023	Experimental Determination of the Uranium-239 Neutron Capture Reaction by Measurement of Uranium-240 by Accelerator Mass Spectrometry	0	\$24,700	\$24,700	1/16/2018	1/15/2019	
18-FS-009	Brain Connectomics: Opportunities for High-Performance Computing	0	\$40,450	\$40,450	3/19/2018	1/31/2019	
18-FS-004	Additive Manufacturing of Post-Detonation Surrogate Debris Reference Materials	0	\$59,820	\$59,820	1/24/2018	1/23/2019	
18-ERD-063	Imaging Dynamics of Defects Far from Equilibrium	0	\$190,520	\$190,520	7/27/2018	6/30/2021	
18-ERD-062	Bioprinting Breast Cancer In Situ to Study Cell Communication in Disease Progression	0	\$198,020	\$198,020	6/6/2018	6/5/2021	
18-ERD-061	Defining the Direction of Nuclear-Plasma Interaction Research at the National Ignition Facility	0	\$29,740	\$29,740	3/27/2018	9/30/2019	
18-ERD-060	Metal Ejecta: Transport, Interaction, and Recollection	0	\$381,180	\$381,180	4/18/2018	4/17/2021	
18-ERD-059	Exploring Deuterium-Tritium Gas-Filled Hohlraums as a High-Yield Neutron Source	0	\$159,810	\$159,810	3/14/2018	9/30/2019	
18-ERD-058	Laying the Foundation for a Predictive Theory of Electroweak Nuclear Phenomena	0	\$68,480	\$68,480	1/29/2018	9/30/2019	
18-ERD-057	Influence of Process Parameters and Alloy Composition on Crack Mitigation in Selective Laser Melting	0	\$180,440	\$180,440	1/29/2018	9/30/2020	
18-ERD-054	Advancing Measurements and Understanding of the Rate and Structure of Atmospheric Warming	0	\$184,850	\$184,850	12/20/2017	9/30/2020	
18-ERD-053	The Development of High-Order Interface Tracking Schemes for the Simulation of Multiphase Flows	0	\$181,660	\$181,660	12/20/2017	9/30/2020	
18-ERD-052	Flash X-Ray Computed Tomography for Three-Dimensional Characterization of Explosive Performance	0	\$489,690	\$489,690	2/21/2018	2/20/2021	
18-ERD-049	Modeling Nuclear Cloud Rise and Fallout in Complex Environments	0	\$565,320	\$565,320	2/7/2018	2/6/2021	
18-ERD-048	High-Fidelity Kinetic Modeling of Plasmas in Z-Pinch and Pulsed-Power Configurations	0	\$180,120	\$180,120	12/14/2017	9/30/2019	
18-ERD-046	Plasma Photonics: Manipulating Light Using Plasmas	0	\$429,440	\$429,440	1/9/2018	1/8/2021	
18-ERD-045	A Handheld Medical Diagnostic Device for Harsh Environments	0	\$399,340	\$399,340	11/27/2017	9/30/2019	
18-ERD-044	Detection of Upwind Pathogens Using Aircraft and Ground Stations	0	\$202,730	\$202,730	12/14/2017	9/30/2019	
18-ERD-042	Optical Interconnect for High-Density Neural Signals	0	\$513,580	\$513,580	10/1/2017	9/30/2020	
18-ERD-041	Stable Isotope Probing and Viromics: Quantifying Virus-Host and Carbon Cycling Dynamics in Soil with Isotope-Targeted Metagenomics	0	\$412,540	\$412,540	10/1/2017	9/30/2020	
18-ERD-039	Predictive Modeling of Correlated Noise in Superconducting Circuits	0	\$407,450	\$407,450	10/1/2017	9/30/2020	
18-ERD-038	Energy Scaling of Thin-Disk Lasers	0	\$575,980	\$575,980	10/1/2017	9/30/2020	
18-ERD-035	A Computational Approach to Improve Prediction of Off-Target Drug Binding Using Membrane Bilayer Effects	0	\$515,880	\$515,880	10/1/2017	9/30/2020	
18-ERD-034	Construction of Genetic Sense-and-Respond Modules to Detect Viral Infection	0	\$535,730	\$535,730	10/1/2017	9/30/2020	
18-ERD-033	Pressure Ionization in Ultra-High-Density Plasmas	0	\$314,510	\$314,510	10/1/2017	9/30/2020	
18-ERD-032	Porous Metals via Ice Templating	0	\$485,140	\$485,140	10/1/2017	9/30/2020	
18-ERD-031	Quantum Non-Equilibrium Dynamics of Electronic Transport in Nonlinear Regimes	0	\$481,530	\$481,530	10/1/2017	9/30/2020	
18-ERD-029	Arbitrary Control and Characterization of Laser Waveforms and Interactions at Picosecond Resolution over Long Record Lengths	0	\$435,420	\$435,420	10/1/2017	9/30/2020	
18-ERD-028	The Next Breakthroughs in Neutrino Physics - We will 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	\$433,620	\$433,620	10/1/2017	9/30/2020	
18-ERD-027	Algebraic Multigrid Preconditioners for Scalable Simulation of Reservoir Geomechanics and Multiphase Flow	0	\$510,070	\$510,070	10/1/2017	9/30/2020	
18-ERD-025	Integration of Quantification of Margins and Uncertainties Methodology into Parallel Discrete Event Simulator Framework	0	\$366,980	\$366,980	10/1/2017	9/30/2020	
18-ERD-024	Selective Removal of Ions from Aqueous Solutions	0	\$500,410	\$500,410	10/1/2017	9/30/2020	
18-ERD-021	Methods for Explainable Artificial Intelligence	0	\$424,890	\$424,890	11/13/2017	11/12/2020	
18-ERD-017	Deep Multitask Learning for Predictive Oncology	0	\$663,160	\$663,160	10/1/2017	9/30/2020	
18-ERD-016	Pioneering Stable Isotope Signatures of Nuclear Proliferation	0	\$454,810	\$454,810	10/1/2017	9/30/2020	
18-ERD-015	Direct Measurement of Mass-Temperature Distributions in the Core of Implosions on the National Ignition Facility	0	\$361,940	\$361,940	10/1/2017	9/30/2020	
18-ERD-014	X-Ray Optics Solutions for Studying Mesoscale Science	0	\$798,410	\$798,410	1/4/2018	1/3/2021	
18-ERD-013	Developing Photonuclear Experimental Capabilities for Nuclear Science and Security	0	\$333,980	\$333,980	10/1/2017	9/30/2020	
18-ERD-012	Probing Liquid Phases and F-Electron Systems at the Dynamic Compression Sector	0	\$453,840	\$453,840	10/1/2017	9/30/2020	
18-ERD-011	Longitudinal Monitoring of Ribonucleic Acid Content of a Live Cell with a Nanotube Pore Interface	0	\$393,020	\$393,020	10/1/2017	9/30/2020	
18-ERD-008	Quantifying Uncertainties of Microscopic Nuclear Theories	0	\$219,740	\$219,740	10/1/2017	9/30/2020	
18-ERD-007	Simulating Magnetized Particle Dynamics in Z-Pinch Plasmas	0	\$364,390	\$364,390	10/1/2017	9/30/2020	
18-ERD-006	XPlacer: Extensible and Portable Optimizations of Data Placement in Memory	0	\$618,130	\$618,130	10/1/2017	9/30/2020	
18-ERD-005	Anti-Reflective Meta-Surfaces for High-Power Lasers	0	\$543,490	\$543,490	10/1/2017	9/30/2020	
18-ERD-004	Functional Photoresists for Energy Applications	0	\$856,250	\$856,250	10/1/2017	9/30/2020	
18-ERD-003	Next-Generation Debris Diagnostics	0	\$761,070	\$761,070	10/1/2017	9/30/2020	
18-ERD-002	High-Order Finite Elements for Thermal Radiative Transfer on Curved Meshes	0	\$547,850	\$547,850	10/1/2017	9/30/2020	
18-ERD-001	Accurate Temperature Determination from X-Ray Diffraction and Extended X-Ray Absorption Fine Structure Measurements	0	\$508,090	\$508,090	2/1/2018	1/31/2021	
17-SI-005	Computational Design Automation	0	\$2,037,490	\$2,037,490	10/1/2016	9/30/2019	
17-SI-004	Variable Precision Computing	0	\$1,851,100	\$1,851,100	10/1/2016	9/30/2019	
17-SI-003	Large-Scale Multimodal Deep Learning for Nuclear Nonproliferation Analysis	0	\$2,249,290	\$2,249,290	10/1/2016	9/30/2019	
17-SI-002	An Investigational Platform of the Human Brain for Understanding Complex Neural Function	0	\$1,768,740	\$1,768,740	10/1/2016	9/30/2019	
17-SI-001	Advanced Multilayer Systems for National Security	0	\$1,539,110	\$1,539,110	10/1/2016	9/30/2019	
17-LW-038	Investigating the Role of Innate Immunity in Viral Encephalitis Caused by Rift Valley Fever Virus	0	\$293,760	\$293,760	10/1/2016	9/30/2019	
17-ERD-120	A Search for Intermediate-Mass Black Hole Dark Matter	0	\$345,710	\$345,710	5/26/2017	5/25/2020	
17-ERD-119	Next-Generation Hohlraums for High Coupling Efficiency	0	\$680,040	\$680,040	5/26/2017	5/25/2020	
17-ERD-118	Foams in Hohlraums	0	\$572,800	\$572,800	6/22/2017	6/21/2020	
17-ERD-117	A Quantitative Methodology for Measuring Cyber Risk to Critical Infrastructure	0	\$494,290	\$494,290	6/19/2017	6/18/2020	
17-ERD-101	Robust Decentralized Signal Processing and Distributed Control of Autonomous Sensor Networks	0	\$968,400	\$968,400	2/16/2017	9/30/2019	
17-ERD-099	Laser Management to Minimize Absorption on Optical Surfaces of Diode-Pumped Adjectively Cooled Gas Lasers	0	\$226,570	\$226,570	2/16/2017	9/30/2019	
17-ERD-081	Simulations of Interpenetrating Plasmas	0	\$732,870	\$732,870	3/27/2017	3/26/2020	
17-ERD-069	New Framework to Prevent Catastrophic Damage to Laser Diodes	0	\$198,030	\$198,030	2/16/2017	9/30/2019	
17-ERD-060	Microphysics Studies of Hohlraum Dynamics	0	\$168,200	\$168,200	10/1/2016	9/30/2019	
17-ERD-059	Measuring Atmospheric Gas Using Small Satellites	0	\$480,740	\$480,740	10/1/2016	3/31/2020	The extension of 6 months to LDRD project was due to the delay of the launch of the cubesat satellite which was outside the control of this LDRD project
17-ERD-054	Three-Dimensional Bio-Printed Microenvironments for Studying Cancer Metastasis	0	\$479,790	\$479,790	10/1/2016	9/30/2019	
17-ERD-052	Integrating Climate Simulations and Paleontology Data to Constrain California Drought Risk	0	\$419,130	\$419,130	10/1/2016	9/30/2019	
17-ERD-050	A Diamond Total-Internal-Reflection Photoconductive Switch	0	\$395,190	\$395,190	10/1/2016	9/30/2019	
17-ERD-048	Film Growth Dynamics During Pulsed Sputter Deposition	0	\$347,110	\$347,110	10/1/2016	9/30/2019	
17-ERD-047	Electrodeposition of Gradient-Density Metal Films from Ionic Liquids	0	\$306,910	\$306,910	10/1/2016	9/30/2019	
17-ERD-046	Design and Optimization of Compact Multi-Mission Telescopes	0	\$370,060	\$370,060	10/1/2016	9/30/2019	
17-ERD-045	Probabilistic Predictions and Uncertainty Estimation for Radiological and Nuclear Effects Modeling	0	\$324,600	\$324,600	4/3/2017	4/2/2020	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
17-ERD-043	Computational Design of Broadly Neutralizing Vaccines for Highly Mutable Pathogens	0	\$487,650	\$487,650	10/1/2016	9/30/2019	
17-ERD-042	In Situ Diagnostics for Accelerated Fabrication and Manufacturing of Advanced Materials	0	\$555,210	\$555,210	3/20/2017	3/19/2020	
17-ERD-041	Modeling Thermal and Quantum Magnetic Fluctuations in Correlated Materials	0	\$258,490	\$258,490	10/1/2016	9/30/2019	
17-ERD-040	Quantum Levitation of Fuel Capsules for Inertial-Confinement Fusion	0	\$407,960	\$407,960	10/1/2016	9/30/2019	
17-ERD-039	A Short-Pulse, Laser-Driven Particle Beam Capability	0	\$728,950	\$728,950	10/1/2016	9/30/2019	
17-ERD-038	Investigation of Ultrahigh-Pressure Phase Transitions in Metals with a Toroidal Diamond Anvil Cell	0	\$372,970	\$372,970	10/1/2016	9/30/2019	
17-ERD-037	Rapid Closed-Loop Control of Additive Manufacturing with Machine Learning	0	\$310,490	\$310,490	11/30/2016	11/29/2019	
17-ERD-036	Learning Interactions in Complex Biological Systems	0	\$716,610	\$716,610	10/1/2016	9/30/2019	
17-ERD-035	Multiple-Rate Integrators for Differential Equations	0	\$385,570	\$385,570	10/1/2016	9/30/2019	
17-ERD-034	Optically Safer, Power-Scalable Laser Systems for Defense Applications	0	\$478,810	\$478,810	10/1/2016	9/30/2019	
17-ERD-033	Technologies for High-Energy, Short-Pulse Laser Systems Beyond the Kilowatt Barrier	0	\$1,189,000	\$1,189,000	10/1/2016	9/30/2019	
17-ERD-032	The Design of a Solid-State Streak Detector	0	\$579,320	\$579,320	10/31/2016	9/30/2019	
17-ERD-031	Microbial Characterization of Combat-Patient Wounds to Improve Healing	0	\$463,870	\$463,870	3/21/2017	3/20/2020	
17-ERD-030	Next-Generation Search for Solar Axion Dark Matter with the International Axion Observatory	0	\$201,110	\$201,110	10/1/2016	9/30/2019	
17-ERD-029	Understanding Material Strength Variabilities and Uncertainties for Component Qualification	0	\$404,440	\$404,440	3/23/2017	3/22/2020	
17-ERD-027	Effects of Magnetic Fields on Transport in Laser-Driven Nonequilibrium Plasmas	0	\$319,980	\$319,980	10/1/2016	9/30/2019	
17-ERD-026	Projection-Based Model Reduction with Applications in Transport and Hydrodynamics Simulation	0	\$425,140	\$425,140	10/1/2016	9/30/2019	
17-ERD-025	Effects of Pressure-Induced Ionization Potential Depression on Material Properties	0	\$375,880	\$375,880	10/1/2016	9/30/2019	
17-ERD-024	Simulation of Biased Random Walks in an Asynchronous Graph Framework	0	\$630,220	\$630,220	10/1/2016	9/30/2019	
17-ERD-023	Detecting Data-Races in High-Performance Computing	0	\$342,120	\$342,120	10/1/2016	9/30/2019	
17-ERD-022	Probabilistic Modeling for Nuclear Fission and Heavy-Ion Collisions	0	\$350,830	\$350,830	10/1/2016	9/30/2019	
17-ERD-020	Understanding Plasma Divertor Detachment in Fusion Power Reactors	0	\$427,180	\$427,180	10/1/2016	9/30/2019	
17-ERD-019	Synthetic Biology and Computational Modeling for Prediction of Viral Virulence	0	\$536,650	\$536,650	10/1/2016	9/30/2019	
17-ERD-017	Fullerene-Grafted Graphene as an Electrical Energy Storage Material	0	\$312,810	\$312,810	10/1/2016	9/30/2019	
17-ERD-016	An Alternative Rare-Event Detector	0	\$368,650	\$368,650	10/1/2016	9/30/2019	
17-ERD-015	Fiber-Optic Acoustic Sensors for Geophysical Applications	0	\$533,990	\$533,990	10/1/2016	9/30/2019	
17-ERD-014	Kinetics of Incipient Stages of Phase Transitions	0	\$316,460	\$316,460	10/24/2016	9/30/2019	
17-ERD-013	Engineering a Therapeutic Microbe for Infection-Site Delivery of Encapsulated Antimicrobial Peptides	0	\$356,390	\$356,390	11/15/2016	9/30/2019	
17-ERD-011	Characterizing Carbon Nucleation in Shocked Energetic Materials	0	\$279,660	\$279,660	10/1/2016	9/30/2019	
17-ERD-010	Exploring Laser-Produced Relativistic Pair Plasma Jets	0	\$446,030	\$446,030	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-009	High-Dimensional Spectral-Sampling Techniques	0	\$328,560	\$328,560	11/14/2016	9/30/2019	
17-ERD-006	Control of Superconducting Quantum Circuits	0	\$374,130	\$374,130	10/1/2016	9/30/2019	
17-ERD-005	Science of Finishing of Novel Optical Materials	0	\$439,620	\$439,620	10/1/2016	9/30/2019	
17-ERD-004	Positioning, Navigation, and Timing with High-Accuracy Astrometry	0	\$313,930	\$313,930	10/1/2016	9/30/2019	
17-ERD-003	Enhanced Surface Laser-Damage Resistance of Nonlinear Crystals	0	\$430,020	\$430,020	10/1/2016	9/30/2019	
17-ERD-002	The Origins of Matter on Near-Exascale Supercomputing	0	\$215,820	\$215,820	10/1/2016	9/30/2019	
17-ERD-001	Uncovering the Origins of the Solar System with Cosmochemical Forensics	0	\$460,560	\$460,560	10/1/2016	9/30/2019	
16-ERD-051	Optimizing Engineered Flow-Through Electrodes for Energy Applications	0	\$568,070	\$568,070	5/10/2016	5/9/2019	
16-ERD-049	Laser Beam Propagation Through Deep Turbulence	0	\$912,110	\$912,110	5/9/2016	5/8/2019	
16-ERD-047	Parallel Two-Photon Polymerization for Sub-Micrometer Additive Manufacturing	0	\$279,860	\$279,860	3/14/2016	3/13/2019	
16-ERD-045	HiRScope-The High Dynamic-Range Oscilloscope	0	\$93,260	\$93,260	2/26/2016	2/25/2019	
16-ERD-022	Nucleosynthesis for Science and Security	0	\$327,660	\$327,660	3/1/2016	2/28/2019	
16-ERD-019	Materials Informatics for Synthesis, Optimization, and Scale-Up of Advanced Materials	0	\$170,900	\$170,900	3/3/2016	3/2/2019	
16-ERD-007	Characterizing Host-Pathogen Immunity Gut-Brain Interactions	0	\$169,580	\$169,580	1/5/2016	1/4/2019	
19-SI-004	Modeling and Analysis for Data-Starved or Ambiguous Environments	0	\$1,833,790	\$1,833,790	10/1/2018	9/30/2021	
19-SI-001	Accelerating Feedstock Optimization Using Computer Vision, Machine Learning, and Data Analytic Techniques	0	\$1,766,060	\$1,766,060	10/1/2018	9/30/2021	
19-SI-002	Establishing a Laser-Driven Mega-electronvolt X-Ray and Neutron Radiographic Capability	0	\$1,978,770	\$1,978,770	10/1/2018	9/30/2021	
19-SI-005	Manufacturing Molecules for the Carbon Economy	0	\$3,626,500	\$3,626,500	10/1/2018	9/30/2021	
19-SI-003	Engineered and Instrumented Three-Dimensional Tumor-Immune Model System	0	\$2,487,290	\$2,487,290	10/1/2018	9/30/2021	
19-LW-056	Development of Additive-Manufacturing Inks with Embedded Electronics for Programmable Matter	0	\$298,540	\$298,540	10/1/2018	9/30/2020	
19-LW-048	Molecular Mechanisms of Bacterial Pathogenesis: Waging the Arms Race with Superbugs	0	\$267,360	\$267,360	10/1/2018	9/30/2020	
19-LW-046	Constraining the Origin of Earth's Water with Isotope Tracers in Astronomical Materials	0	\$255,800	\$255,800	10/1/2018	9/30/2020	
19-LW-044	Using Isotope Probing of Microbe-Microbe Interactions to Determine the Fate of Carbon and Impacts on Climate Change	0	\$273,770	\$273,770	10/1/2018	9/30/2020	
19-LW-040	Unconventional Superconductivity in a Focused-Ion-Beam-Decorated Topological Insulator	0	\$289,600	\$289,600	10/1/2018	9/30/2020	
19-LW-039	Discovering the Nature of Neutrinos: How Nuclear Theory Will Advance This Grand Endeavor	0	\$194,740	\$194,740	10/1/2018	9/30/2020	
19-LW-036	Dating Alluvial Landforms to Understand the Role of Climate in California's Water Supply	0	\$272,080	\$272,080	10/1/2018	9/30/2020	
19-LW-033	Proliferation of Interstellar Plutonium into the Solar System	0	\$275,580	\$275,580	10/1/2018	9/30/2020	
19-LW-029	Antibacterial Minerals: A Geochemical Approach to Combating Antibiotic Resistance	0	\$281,810	\$281,810	10/1/2018	9/30/2020	
19-LW-028	Metal-Phthalocyanine Superlattices: Exploring Quantum Devices as a New Paradigm for Sensing Applications and Information Storage	0	\$193,940	\$193,940	10/1/2018	9/30/2020	
19-LW-027	Using Moderately Volatile Elements to Understand the Origin of the Earth-Moon System	0	\$220,210	\$220,210	10/1/2018	9/30/2020	
19-LW-004	Connecting Nuclear Structure to Stellar Astrophysics: Neutron Skin in Tin Isotopes	0	\$270,320	\$270,320	10/1/2018	9/30/2020	
19-LW-006	Three-Dimensional Bioprinted Aneurysm for Intervention Modeling Validation	0	\$285,810	\$285,810	10/1/2018	9/30/2020	
19-FS-067	Development of Beryllium Carbide Capsules for Inertial Confinement Fusion Implosions	0	\$88,110	\$88,110	4/8/2019	3/31/2020	
19-FS-062	Heavy-Metal Ceramic Hohlraums for Magnetically Assisted Ignition Targets	0	\$156,030	\$156,030	4/8/2019	9/30/2019	
19-FS-061	New Design for Low-Mode Asymmetry Mitigation in Inertial Confinement Fusion Implosions	0	\$6,510	\$6,510	12/17/2018	12/16/2019	
19-FS-033	Modeling Hydrodynamic Instabilities and Mix in Hohlraums	0	\$38,710	\$38,710	11/20/2018	9/30/2019	
19-FS-013	Amorphous Carbon Coatings with Controlled Density and Composition	0	\$154,500	\$154,500	10/1/2018	9/30/2019	
19-FS-007	High Pressure Equation-of-State Driver at the Z Facility	0	\$153,510	\$153,510	10/1/2018	9/30/2019	
19-FS-072	Quantum Leap for Fusion Energy Sciences	0	\$117,620	\$117,620	4/15/2019	4/14/2020	
19-FS-065	Predicting Ionizing Radiation Exposure	0	\$99,920	\$99,920	4/8/2019	9/30/2019	
19-FS-056	New Experiment-Theory Capability for Atomic-Level Imaging of Interfaces in Solid-State Batteries	0	\$90,230	\$90,230	2/11/2019	2/10/2020	
19-FS-052	Using Passive Seismology to Map the Water within Critical Glacial Ice Sheets	0	\$92,600	\$92,600	2/11/2019	9/30/2019	
19-FS-050	Machine Learning for Constitutive Modeling on an Exascale Computing Platform	0	\$140,820	\$140,820	2/11/2019	9/30/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
19-FS-047	Three-Dimensional Printing of Catalytic Electrodes for Solar-Driven Water Splitting Devices	0	\$148,960	\$148,960	2/11/2019	9/30/2019	
19-FS-044	Development of Multilayer Laue Lenses for 25 Kilo-Electronvolt X-Ray Imaging	0	\$97,760	\$97,760	2/11/2019	2/10/2020	
19-FS-042	Evolution of Induced Fracture Networks Using Machine Learning Correlation Image Analysis	0	\$86,050	\$86,050	4/8/2019	9/30/2019	
19-FS-038	Imaging Macromolecular Structural Dynamics with Low-Dose, Time-Resolved Transmission Electron Microscopy	0	\$147,790	\$147,790	2/11/2019	9/30/2019	
19-FS-037	Laser Powder Bed Fusion Additive Manufacturing In-Process Monitoring and Optimization Using Thermionic Emission Detection	0	\$95,720	\$95,720	4/8/2019	3/30/2020	
19-FS-036	Microsensor Monitoring of a Direct Ink Write Process Using Electromagnetic Resonant Coupling	0	\$158,340	\$158,340	2/11/2019	9/30/2019	
19-FS-035	Elucidating Algal-Bacterial Community Interactions by Tracking Volatile Biomarkers	0	\$99,590	\$99,590	2/11/2019	2/10/2020	
19-FS-029	Instrumenting a Fleet of Small Satellites for Monitoring the Earth's Upper Atmosphere	0	\$135,540	\$135,540	2/27/2019	9/30/2019	
19-FS-028	Establishing Hands-On Astrophysics at Lawrence Livermore National Laboratory	0	\$141,040	\$141,040	2/11/2019	12/31/2019	
19-FS-027	A Simple Search for Sterile Neutrino Dark Matter	0	\$150,410	\$150,410	2/11/2019	9/30/2019	
19-FS-025	Three-Dimensional Printed Segmented Electrodes for Water Desalination	0	\$77,690	\$77,690	11/27/2018	9/30/2019	
19-FS-022	Developing an Observation-Based Transfer Function for Climate Sensitivity	0	\$41,120	\$41,120	10/19/2018	9/30/2019	
19-FS-020	Developing a Radiochemical Method to Measure Thermochemical Detector Cross Sections	0	\$152,570	\$152,570	2/11/2019	9/30/2019	
19-FS-016	Efficient, Portable Radioxenon Collection for Nuclear Test Monitoring	0	\$98,690	\$98,690	10/1/2018	9/30/2019	
19-FS-001	Rapid Laser Processing of Nuclear Debris	0	\$152,930	\$152,930	4/15/2019	9/30/2019	
19-FS-073	Time-Resolved Two-Dimensional Streak Camera	0	\$81,460	\$81,460	4/8/2019	3/30/2020	
19-FS-032	Assessment of Laser-Damage Performance of Meta-Surface Material to Enable High-Speed Laser Beam Control	0	\$151,590	\$151,590	2/11/2019	1/31/2020	
19-FS-003	Using Nanoparticle Sol Gels to Prepare Custom, High-Purity Optical-Fiber Preforms	0	\$138,950	\$138,950	10/1/2018	9/30/2019	
19-FS-002	Improving the Performance and Efficiency of Diode-Pumped, High-Power Lasers	0	\$143,590	\$143,590	10/1/2018	9/30/2019	
19-FS-070	Using Microscale Models to Enhance Predictions of Damage to Soft Tissues	0	\$86,020	\$86,020	4/15/2019	12/31/2019	
19-FS-066	Nanoscale Three-Dimensional Printing of Metallic Structures via Femtosecond Projection Two-Photon Reduction	0	\$14,820	\$14,820	4/8/2019	9/30/2019	
19-FS-064	Metamaterials for Mechanically Directing Cell Phenotype	0	\$130,010	\$130,010	4/8/2019	12/31/2019	
19-FS-059	Creating Feature Representations of Antibody-Antigen Complexes for Fast Binding Prediction with Machine Learning	0	\$152,610	\$152,610	2/11/2019	9/30/2019	
19-FS-055	Three-Dimensional Microwave Imaging of Detonation Fronts	0	\$54,220	\$54,220	4/8/2019	9/30/2019	
19-FS-053	Investigation of Computational Corrections to X-Ray Computed Tomography for Dimensional Metrology of Complex Additively Manufactured Parts	0	\$147,570	\$147,570	2/11/2019	9/30/2019	
19-FS-049	Large Volume Paste Projection Microstereolithography	0	\$112,310	\$112,310	2/11/2019	9/30/2019	
19-FS-045	Examining an On-the-Fly Movable Boundary Capability for Simulations of Unsteady High-Speed Aerothermodynamic Flows	0	\$125,740	\$125,740	2/11/2019	11/30/2019	
19-FS-041	Rational Design of Bifunctional Electrocatalysts for Rechargeable Metal-Air Batteries	0	\$125,060	\$125,060	2/11/2019	9/30/2019	
19-FS-039	Gas-Electrical Grid Coordination for Cross Infrastructure Resilience Enhancement	0	\$149,680	\$149,680	3/11/2019	9/30/2019	
19-FS-034	Short-Pulse Interrogation for Detection of Special Nuclear Materials	0	\$130,490	\$130,490	2/11/2019	12/31/2019	
19-FS-030	Enabling Optimized Charging of Electric Vehicles in Mobility Services	0	\$127,120	\$127,120	2/11/2019	12/31/2019	
19-FS-021	Laser-Based Defect Reduction in Wide Bandgap Semiconductors Used in Radiation-Voltaics Devices: Radiation Hardening and Annealing	0	\$60,470	\$60,470	11/1/2018	9/30/2019	
19-FS-018	Optical Sampler for Broad-Spectrum Sensing	0	\$138,450	\$138,450	10/1/2018	9/30/2019	
19-FS-015	Plasmonics-Enhanced Photocatalysis for Water Decontamination	0	\$146,200	\$146,200	10/1/2018	9/30/2019	
19-FS-011	Photonic-Software-Defined Radio	0	\$141,740	\$141,740	10/1/2018	9/30/2019	
19-FS-005	Hot Plasma Etching of Gallium Nitride	0	\$107,900	\$107,900	1/2/2019	12/31/2019	
19-FS-004	Advanced Parameterizations for Topology Optimization via Projection	0	\$87,710	\$87,710	10/1/2018	9/30/2019	
19-FS-023	Preparing Circulatory Modeling Code for Exascale Computing	0	\$95,140	\$95,140	10/22/2018	9/30/2019	
19-FS-017	Evaluating Field-Programmable Gate Arrays with Proxy Applications	0	\$150,720	\$150,720	10/1/2018	9/30/2019	
19-FS-014	Quantum Optimal Control Using High-Performance Computing	0	\$150,660	\$150,660	10/1/2018	9/30/2019	
19-FS-009	Prototyping Exascale Graph Analytics	0	\$151,560	\$151,560	10/1/2018	9/30/2019	
19-FS-006	Scalable Graph Motif Learning Capabilities for Operational Cyber Defense	0	\$150,830	\$150,830	10/1/2018	9/30/2019	
19-ERD-015	Scalable Computational Tools for Predicting Fluid-Structure Interactions in Laser Directed-Energy Applications	0	\$704,090	\$704,090	10/1/2018	9/30/2021	
19-ERD-002	Micro-Resonators for Compact Optical Sensors	0	\$619,500	\$619,500	10/1/2018	9/30/2021	
19-ERD-038	Laser-Plasma Interactions in Magnetized Environments	0	\$169,250	\$169,250	11/9/2018	11/8/2021	
19-ERD-037	Earthquake Predictions on the Sierra High-Performance Computing System	0	\$49,860	\$49,860	10/22/2018	9/30/2021	
19-ERD-036	Investigating the Site of the Weak Rapid Neutron Capture Process	0	\$182,200	\$182,200	10/3/2018	9/30/2021	
19-ERD-032	Interseasonal Prediction of Western United States Snowpack with Deep Learning	0	\$299,430	\$299,430	10/1/2018	9/30/2021	
19-ERD-031	Unraveling the Physics and Chemistry of Water-Rich Mixtures at Extreme Pressures and Temperatures	0	\$276,860	\$276,860	2/1/2019	1/31/2022	
19-ERD-029	Tunable Optoelectronic Materials for Next-Generation Infrared Detectors	0	\$477,650	\$477,650	10/1/2018	9/30/2021	
19-ERD-026	Exascale-Ready Modeling to Predict Recrystallization in High-Temperature Materials	0	\$525,590	\$525,590	10/1/2018	9/30/2021	
19-ERD-017	Nuclear Reaction Theory for Astrophysics and Laboratory Applications	0	\$334,630	\$334,630	10/1/2018	9/30/2021	
19-ERD-016	Deployable, Automated Chemistry-on-a-Chip Platform for Nuclear Forensics	0	\$475,170	\$475,170	10/1/2018	9/30/2021	
19-ERD-013	Expanding Control of Quantum Processor Units	0	\$1,106,420	\$1,106,420	10/1/2018	9/30/2021	
19-ERD-011	Beta Decay at the Limits of Nuclear Stability: Integrating Ab Initio Calculations and Kinematically Complete Measurements	0	\$560,300	\$560,300	10/1/2018	9/30/2021	
19-ERD-010	Deeply Rooted: Evaluating Plant Rooting Depth as a Means for Enhanced Soil Carbon Sequestration	0	\$522,160	\$522,160	10/1/2018	9/30/2021	
19-ERD-005	Transforming Living Materials into Chemical Reactors	0	\$535,220	\$535,220	10/1/2018	9/30/2021	
19-ERD-003	Development of Novel Ligand-Based Systems to Study the Chemical Properties of the Transactinides	0	\$425,890	\$425,890	10/1/2018	9/30/2021	
19-ERD-039	Photonic Transceivers for Secure Radio Frequency Communications and Radar	0	\$305,310	\$305,310	4/3/2019	12/31/2019	
19-ERD-027	The Physics of Confined Laser Ablation and Its Applications	0	\$671,960	\$671,960	10/1/2018	9/30/2021	
19-ERD-020	Glass Inks for Three-Dimensional Printed Fiber Preforms and Telescope Optics	0	\$710,770	\$710,770	10/1/2018	9/30/2021	
19-ERD-006	Gestalt Optics: Three-Dimensional Transparent Ceramics	0	\$392,280	\$392,280	10/1/2018	9/30/2021	
19-ERD-001	Germanium Photodiode Arrays for Hard X-Ray Imaging	0	\$568,010	\$568,010	10/1/2018	9/30/2021	
19-ERD-035	Automatic Design of Transport Systems Through Topology Optimization on Adaptively Refined Computational Grids	0	\$394,860	\$394,860	10/1/2018	9/30/2021	
19-ERD-022	High-Resolution Three-Dimensional Imaging via X-Ray Reflectometry and Phase-Contrast Computed Tomography	0	\$403,210	\$403,210	10/1/2018	9/30/2021	
19-ERD-018	Materials with Embedded Microstructural Logic	0	\$470,400	\$470,400	10/1/2018	9/30/2021	
19-ERD-012	Advanced Photopolymer Materials Engineering for Multiscale Additive Fabrication	0	\$715,870	\$715,870	10/1/2018	9/30/2021	
19-ERD-009	A Deep Bayesian Active Learning Framework for Temporal Multimodal Data	0	\$672,750	\$672,750	10/1/2018	9/30/2021	
19-ERD-008	Acoustic and Electromagnetic Characterization for Accelerated Development of Additive Manufacturing	0	\$435,660	\$435,660	10/1/2018	9/30/2021	
19-ERD-030	High-Performance Parallel Simulations for Whole-Cell Modeling	0	\$441,270	\$441,270	10/1/2018	9/30/2021	
19-ERD-025	Advanced Physics Models for Particle-Particle Interactions	0	\$452,990	\$452,990	10/1/2018	9/30/2021	
19-ERD-021	Industrial Control Systems Network Mapping and Data Analytics for Cybersecurity	0	\$514,630	\$514,630	10/1/2018	9/30/2021	
19-ERD-019	Scalable Multilevel Training of Large Neural Networks	0	\$314,330	\$314,330	10/1/2018	9/30/2021	
19-ERD-007	Next Generation Machine Learning	0	\$555,890	\$555,890	10/1/2018	9/30/2021	
19-ERD-004	Heterogeneous Computing Elements: A Quantitative Evaluation	0	\$554,100	\$554,100	10/1/2018	9/30/2021	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
19-DR-014	Vaccination on the Fly: The Use of Mosquitoes to Vaccinate Bat Populations That Harbor Human Pathogens	0	\$363,340	\$363,340	4/3/2019	3/30/2022	
19-DR-005	Nuclear Dynamics on a Quantum Chip	0	\$392,300	\$392,300	4/3/2019	3/30/2022	
19-DR-002	Advanced Manufacturing of Net-Shape Leading Edge Geometries for Hypersonic Flight	0	\$246,360	\$246,360	4/3/2019	3/30/2022	
19-DR-001	Climbing over Energy Barriers: A New Paradigm for Accelerating Kinetics	0	\$327,330	\$327,330	4/3/2019	3/30/2022	
19-DR-011	Plasma Amplifiers to Enable Dramatic Increases in Laser Power and Energy to Access New Physical Processes	0	\$212,270	\$212,270	4/3/2019	3/30/2022	
19-DR-015	Compact High Efficiency Electrically Tunable Amplifier	0	\$243,200	\$243,200	4/3/2019	3/30/2022	
19-DR-013	Beating Monte Carlo: The Polynomial Method in Lattice Problems	0	\$75,960	\$75,960	4/3/2019	3/30/2022	
19-DR-009	Thulium-Doped Yttrium Lithium Fluoride High-Energy Laser Demonstrator	0	\$611,730	\$611,730	4/3/2019	3/30/2022	
19-DR-003	Hypothesis Testing via Artificial Intelligence: Generating Physically Interpretable Models of Scientific Data with Machine Learning	0	\$294,360	\$294,360	4/3/2019	3/30/2022	
Total # of Projects for LLNL: 250		Total Equipment Cost for LLNL: \$0		Total Other Cost for LLNL: \$109,019,420		Total Cost for LLNL: \$109,019,420	
ORNL - Oak Ridge National Lab							
9606	Beyond Batteries Initiative Preliminary Research	0	\$92,180	\$92,180	7/17/2018	7/30/2021	
9566	Quantum Materials Initiative: Excitations and Transport in Novel Quantum Matter	0	\$1,581,515	\$1,581,515	5/11/2018	5/11/2021	
9333	Three-Dimensional strain visualization and resolution limit of deformation processes in complex metal structures with X-ray Computed Tomography	0	\$134,532	\$134,532	9/4/2018	9/4/2021	
9282	Application of Machine Learning for Performance Prediction of an Advanced Manufactured Nuclear Component	0	\$775,832	\$775,832	8/1/2018	9/30/2021	
9261	Transformational Porous Liquids for Window Insulation	0	\$142,318	\$142,318	6/20/2018	6/20/2021	
9259	Development of Scanning Electrochemical Microscopy-Inductively Coupled Plasma Mass Spectrometry to Resolve Multi-Element Electrochemical Reactions at the Interface In Situ	0	\$142,966	\$142,966	7/11/2018	7/11/2021	
9244	Design of Polymers with Intrinsic Microporosity for Clean Water	0	\$109,971	\$109,971	6/7/2018	6/7/2021	
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	\$65,465	\$65,465	3/15/2018	3/15/2021	
9207	Predicting Allosteric Drugs for Targeted Cancer Therapy through Computational Docking and Molecular Dynamics	0	\$65,643	\$65,643	1/30/2018	1/30/2021	
9206	Ceramic Encapsulated Metal Phase Change Material for High Temperature Thermal Energy Storage	0	\$104,864	\$104,864	3/12/2018	6/30/2019	
9204	Combining nonlinear electrochemical and optical spectroscopies to probe interfacial structure and reactivity	0	\$26,840	\$26,840	3/12/2018	3/12/2021	
9191	Future Urban Bus for Autonomous Research	0	\$341,377	\$341,377	12/1/2017	12/1/2020	
9188	General framework for the development of predictive atomistic force fields and its application to multicomponent alloys	0	\$59,992	\$59,992	3/5/2018	3/5/2021	
9178	Enabling of Fast Charge Via Zirconia Modified Cathode Material	0	\$507,904	\$507,904	11/30/2017	11/30/2020	
9118	Enable the capability for engineering synthetic photosynthesis in microbes	0	\$95,158	\$95,158	1/19/2018	1/19/2021	
9115	Message in a bottle -- the role of extracellular vesicles in microbial communities	0	\$51,256	\$51,256	12/12/2017	12/12/2020	
9109	Multifunctional hybrid organometal halides: Reaching new property space by designing organic-inorganic interfaces	0	\$49,968	\$49,968	11/30/2017	11/30/2020	
9101	Integrated Fuel, Chemical, and Nutrient Separations for Supporting a Circular Algal Economy	0	\$9,971	\$9,971	11/30/2017	11/30/2020	
9099	Self-Regulating Hydrogels for Controlled Amendment Release	0	\$73,366	\$73,366	3/12/2018	3/12/2021	
9098	Development of Transformative Image Reconstruction Capabilities for Radiological Source Characterization	0	\$18,021	\$18,021	11/30/2017	11/30/2020	
9091	Sculpting Silicon: Three-Dimensional fabrication of semiconductors on atomic level	0	\$81,875	\$81,875	12/6/2017	4/30/2019	
9090	Using Evolutionary Data to Model Protein-Protein Complexes in Populus trichocarpa	0	\$268,066	\$268,066	10/3/2017	9/30/2020	
9083	Controlling the Growth and Stacking of Two-Dimensional Materials by Pulsed Laser Epitaxy	0	\$141,946	\$141,946	3/5/2018	3/5/2021	
9060	Jesse Ault - Wigner Fellow - High-fidelity cardiovascular simulation for personalized medicine	0	\$122,568	\$122,568	7/24/2017	7/24/2020	
9042	Designing entropy-stabilized oxides and other chemically disordered materials: A stochastic, first principles-finite temperature approach	0	\$332,177	\$332,177	10/26/2017	9/30/2020	
9039	Post-Moore System Simulations for Codesigning Future Programming Models	0	\$246,326	\$246,326	10/26/2017	9/30/2020	
9029	Accelerating Stochastic Sampling Methods by On-Line Data Analytics and Machine Learning	0	\$353,399	\$353,399	10/26/2017	9/30/2020	
9007	High-throughput functional analysis of microbiomes using aptamer-based biosensors	0	\$344,371	\$344,371	10/26/2017	9/30/2020	
9000	Dynamic Chromatic Transforms to Arbitrate Silicon Photonic Networks	0	\$339,832	\$339,832	10/26/2017	9/30/2020	
8988	Hybrid quantum interfaces for dissipationless charge and spin transport	0	\$499,477	\$499,477	10/26/2017	9/30/2020	
8981	Scalable Non-linear Unmixing with Physical Constraints for Scientific Data	0	\$389,293	\$389,293	10/26/2017	9/30/2020	
8980	Lock and Key: Securing genomes against the Clustered Regularly Interspaced Short Palindromic Repeat Associated Protein 9 gene-editing tool	0	\$336,976	\$336,976	10/26/2017	9/30/2020	
8958	A Fully Kinetic Exascale Simulation Capability for Magnetic Fusion Energy	0	\$466,433	\$466,433	10/26/2017	9/30/2019	
8952	Interfacial Thermal Transport: Advanced First Principles Modeling and Ultrafast Thermal Spectroscopy	0	\$354,850	\$354,850	10/26/2017	9/30/2020	
8949	Leveraging Computational Structure-Function Analyses to Reveal the Hidden Complexity of Biosystems	0	\$360,642	\$360,642	10/26/2017	9/30/2020	
8947	An Innovative Integrated Pressure-Temperature-Flow Sensor for Advanced Reactor Applications (Export Controlled Information)	0	\$364,261	\$364,261	10/26/2017	9/30/2020	
8941	Scalability of Optical Using Machines for Acceleration of Exascale Applications	0	\$275,525	\$275,525	10/26/2017	9/30/2020	
8921	Switched Mode Controls for Guaranteeing Resilient Operation of the Smart Grid	0	\$365,047	\$365,047	10/26/2017	9/30/2020	
8910	Detecting Genome Modifications for Plant Biosecurity	0	\$310,134	\$310,134	10/26/2017	9/30/2020	
8898	Operando 4 Dimensional Scanning Transmission Electron Microscopy to Probe Dynamic Chemical Reactivity: Integrated Approach to Understand and Design Functional Interfacial Chemistry	0	\$413,048	\$413,048	10/26/2017	9/30/2020	
8896	Deep Modulation: An Expendable Physical Layer for Smart Grid Security	0	\$302,750	\$302,750	10/26/2017	9/30/2020	
8892	Accelerating Connected and Automated Vehicle Research with Dynamic Wireless Power Transfer	0	\$400,478	\$400,478	10/26/2017	9/30/2020	
8872	Co-evolving plant traits and hydrologic environment within watershed models	0	\$290,343	\$290,343	10/26/2017	9/30/2020	
8866	A platform to identify and model genetic and phenotypic changes in cancer at the single cell level	0	\$428,422	\$428,422	10/26/2017	9/30/2020	
8860	Accelerating end-to-end prediction of physical phenomena by interleaving analytics with multiscale simulations on Exascale architectures	0	\$381,058	\$381,058	10/26/2017	9/30/2020	
8858	Obtaining atomistic insights into flexible biomolecular systems by data-driven integration of cryo-electron microscopy, neutron scattering and molecular simulations	0	\$347,125	\$347,125	10/26/2017	9/30/2020	
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	\$240,089	\$240,089	10/26/2017	9/30/2020	
8833	Investigating the slow dynamics of materials using neutron spin Larmor labeling techniques	0	\$310,591	\$310,591	10/26/2017	9/30/2020	
8832	Microbial Quantitative Trait Locus Mapping	0	\$287,781	\$287,781	10/26/2017	9/30/2020	
8831	A quantitative, systems biology, multi-omic approach to diagnose gynecologic cancers	0	\$433,844	\$433,844	10/26/2017	9/30/2020	
8828	A streamlined strategy for integrated collimator design and sample environment	0	\$313,033	\$313,033	10/26/2017	9/30/2020	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
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 \$324,041	\$324,041	10/26/2017	9/30/2020	
8819	Accelerating the development of connected and automated vehicles through real-time traffic simulation coupled to an advanced hardware-in-the-loop system		0 \$655,043	\$655,043	10/26/2017	9/30/2020	
8817	Fundamental studies of materials degradation in molten chloride salts using targeted corrosion testing, advanced spectroscopy, and thermodynamic modeling		0 \$445,981	\$445,981	10/26/2017	9/30/2020	
8811	Smart Grid Transactive Scalable Hybrid Management System		0 \$362,040	\$362,040	10/26/2017	9/30/2020	
8799	Matrix-Free Algebraic Multigrid Preconditioner		0 \$298,775	\$298,775	10/26/2017	9/30/2020	
8794	Pre-Exascale Structural Modeling and Drug Discovery Pipeline		0 \$323,562	\$323,562	10/26/2017	9/30/2020	
8779	Enabling Advanced In-Pile Instrumentation Using Ultrasonic Additive Manufacturing		0 \$385,067	\$385,067	10/26/2017	9/30/2020	
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 \$60,498	\$60,498	10/3/2017	9/30/2020	
8776	Advanced Numerical Methods for Fracture Modeling		0 \$338,819	\$338,819	10/26/2017	9/30/2020	
8773	Social and Physical Systems in Urban Environments		0 \$167,343	\$167,343	6/23/2017	6/23/2020	
8765	Strategic Hire: Direct simulation of dynamic processes in porous geological systems with explicit pore representation		0 \$104,934	\$104,934	6/21/2017	6/21/2020	
8756	Proof of principle of acoustic-based nondestructive measurement of gas pressure and composition in sealed pressurized containers		0 \$11,889	\$11,889	6/21/2017	6/21/2020	
8755	Supercomputer-Based Cancer Vaccine Design		0 \$26,944	\$26,944	10/3/2017	9/30/2020	
8710	Investigation of Neptunium Isotope Separation by Liquid-Liquid Extraction		0 \$14,451	\$14,451	5/12/2017	8/30/2019	
8686	Computational Imaging for Neutron Bragg-Edge Tomography		0 \$136,496	\$136,496	2/24/2017	2/24/2020	
8585	Development and Application of Computational Methodologies for the Investigation of Soft Matter Molecular and Electronic Structure and Dynamics		0 \$49,656	\$49,656	3/30/2017	3/30/2020	
8541	Next Generation Multifunctional Fibers via Embedded Nanomaterials		0 \$124,704	\$124,704	11/28/2016	11/28/2019	
8522	Exploring thermal transport in nanostructured materials for thermal energy conversion and management		0 \$138,299	\$138,299	11/28/2016	11/28/2019	
8485	Carbon NanoTubes -Modified Oleophilic Surfaces for Lubricant-Starved Applications		0 \$94,538	\$94,538	1/24/2018	5/30/2021	
8475	Contributing to transportation sustainability through utilization of connected and automated vehicle technologies		0 \$49,338	\$49,338	5/23/2016	5/23/2019	
8460	Research & Development for a One-Ton Neutrinoless Double-Beta Decay Search		0 \$87,997	\$87,997	10/4/2016	9/30/2019	
8449	Data Analysis Parallel Package Maker - A Lego Set for Big Data Scientists		0 \$112,196	\$112,196	10/4/2016	9/30/2019	
8440	Challenges for Analysis and Modeling of Grazing Incidence Neutron Scattering at Pulsed Sources		0 \$75,317	\$75,317	10/4/2016	9/30/2019	
8404	Deep Learning for Automated Feature Discovery to Enhance Cyber Threat Detection		0 \$9,359	\$9,359	10/4/2016	9/30/2019	
8397	Fabricating Qubits from Low-Dimensional Materials		0 \$(1,415)	\$(1,415)	10/4/2016	9/30/2019	
8391	Functional polymers as cathodes for electric energy storage applications		0 \$109,723	\$109,723	10/4/2016	9/30/2019	
8372	Energy Routing Technology for Automated Building Control		0 \$23,784	\$23,784	10/4/2016	9/30/2019	
8360	Understanding rheology of fiber reinforced soft matter structural composites: From microscopic structures to macroscopic mechanical properties		0 \$101,776	\$101,776	10/4/2016	9/30/2019	
8350	High-Energy-Density, Organic Radical-Mediated Redox Flow Batteries		0 \$61,080	\$61,080	10/4/2016	9/30/2019	
8347	Dissipation Driven Quantum State Engineering On-Chip		0 \$12,457	\$12,457	10/4/2016	9/30/2019	
8339	Energy-Efficient Training Protocol for Scalable Deep Learning		0 \$45,310	\$45,310	10/4/2016	9/30/2019	
8321	Genome Wide Association Triome/Microbiome Analysis		0 \$100,116	\$100,116	10/4/2016	9/30/2019	
8309	Impact of Climate Change Drivers on Virome-Microbiome-Plant Host Dynamics in Relation to Nitrogen and Carbon Cycling		0 \$72,079	\$72,079	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 \$115,991	\$115,991	10/4/2016	9/30/2019	
8291	High-Fidelity Multiphysics Nuclear Reactor Core Simulations of Molten Salt Reactors		0 \$100,870	\$100,870	10/4/2016	9/30/2019	
8274	Time-of-flight Neutron Imaging of Nuclear Materials		0 \$123,034	\$123,034	10/4/2016	9/30/2019	
8272	Integrating Small-Angle Neutron Scattering with Molecular Simulation to Determine Structural Ensembles of Complex Biological Systems		0 \$50,007	\$50,007	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 \$67,463	\$67,463	10/4/2016	9/30/2019	
8264	Toward the Exceptionally Stable Anion Conducting Materials		0 \$41,053	\$41,053	10/4/2016	9/30/2019	
8253	Flexible Intelligent Real-time direct current-alternating current grid Emulator		0 \$51,512	\$51,512	10/4/2016	9/30/2019	
8251	Characterization of diazotrophs in the endosphere microbiome of bioenergy crop Sorghum		0 \$9,641	\$9,641	10/4/2016	9/30/2019	
8241	A design basis for future iron-based superalloys		0 \$87,639	\$87,639	10/4/2016	9/30/2019	
8237	Integrated Computational Environment-Modeling & Analysis for Neutrons		0 \$56,600	\$56,600	10/4/2016	9/30/2019	
8235	An Expert System for Automated Modeling of Small-Angle Neutron Scattering Data		0 \$67,099	\$67,099	10/4/2016	9/30/2019	
8215	Detector and Source Development for Fundamental Neutron Physics at the Spallation Neutron Source		0 \$96,765	\$96,765	5/23/2016	5/23/2019	
ORNL19-9928	Vapor Synthesis of Advanced Nitride-Based Ultra-High Temperature Ceramics for Extreme Operating Environments.		0 \$129,065	\$129,065	7/23/2019	7/23/2022	
ORNL19-9922	Using fundamental physicochemical descriptors to enable high-throughput screening of nanostructured materials for new energy solutions		0 \$26,667	\$26,667	7/23/2019	7/23/2022	
ORNL19-9916	Wave Physics-Integrated Machine-Learning Algorithms for Acoustic Source Characterization in Diagnostics and Prognostics		0 \$250,108	\$250,108	5/29/2019	5/29/2022	
ORNL19-9912	Creating a Realistic Model Fish Surrogate for Use in Hydropower Turbine Blade Strike Studies		0 \$16,092	\$16,092	6/6/2019	6/6/2022	
ORNL19-9910	Enhancing drug discovery via prediction of hot spots		0 \$46,811	\$46,811	6/6/2019	6/6/2022	
ORNL19-9906	Building High-Performance Scalable Geocomputation Capabilities for Global and High-Resolution Geospatial Studies		0 \$127,675	\$127,675	5/29/2019	5/29/2022	
ORNL19-9782	Efficient Process-Intensification Approach for Carbon Dioxide Absorption using Amino-Acid Solutions with a Guanidine Compound		0 \$69,506	\$69,506	6/6/2019	6/6/2022	
ORNL19-9747	The Scientific and Technical Feasibility of Helium Cooled Fusion Blanket First Walls		0 \$201,477	\$201,477	4/23/2019	4/23/2022	
ORNL19-9730	Enabling Topological Quantum Information Processing by Interfacing Quantum Materials and Quantum Computing		0 \$576,033	\$576,033	6/6/2019	6/6/2022	
ORNL19-9725	Refraction-Based Building Air Leakage Detector		0 \$21,668	\$21,668	6/6/2019	6/6/2022	
ORNL19-9723	Material identification using multi-particle radiography		0 \$178,831	\$178,831	7/24/2017	7/24/2020	
ORNL19-9722	Solid State Lithium Batteries by Roll-to-roll		0 \$230,955	\$230,955	5/23/2019	5/23/2022	
ORNL19-9721	Collaborative Operational Control for Complex Systems with Minimized Uncertainties Impact		0 \$442,895	\$442,895	2/21/2019	2/21/2022	
ORNL19-9718	High Precision Machining of Additively Manufactured Components		0 \$933,181	\$933,181	2/21/2019	2/21/2022	
ORNL19-9717	Creating Digital Discipline in Advanced Manufacturing		0 \$571,321	\$571,321	2/21/2019	2/21/2022	
ORNL19-9716	New class of (semifluorinated) proton-conducting polymers with superior properties for proton exchange membrane fuel cells.		0 \$149,383	\$149,383	5/10/2019	5/10/2022	
ORNL19-9706	Topological quantum materials: from exactly solvable models to quantum computing		0 \$227,562	\$227,562	1/22/2019	1/22/2022	
ORNL19-9697	Advanced Genetic Techniques to Identify Radiotherapy and Chemical Responses		0 \$294,175	\$294,175	11/2/2018	11/2/2021	
ORNL19-9693	Measurement of Neptunium-238 capture/fission cross section and fission yields in the High Flux Isotope Reactor		0 \$65,266	\$65,266	6/6/2019	6/6/2022	
ORNL19-9691	Learning the meaning of code to assist the human analyst in finding software vulnerabilities		0 \$411,397	\$411,397	1/18/2019	1/18/2022	
ORNL19-9689	Multimodal Detection of Adverse Cyber Events Using an Integrated Neuromorphic Processor		0 \$151,124	\$151,124	3/19/2019	3/19/2022	
ORNL19-9687	Development of Whole Core Simulation Capability for Pebble Bed Reactors		0 \$47,880	\$47,880	2/8/2019	2/8/2022	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
ORNL19-9646	A new paradigm in sensing: A quantum enabled standoff chemical and biological sensor	0	\$113,870	\$113,870	12/14/2018	12/14/2021	
ORNL19-9618	Accuracy and Stability Enhancing Techniques for Non-Linear Evolution Equations	0	\$110,429	\$110,429	5/10/2019	5/10/2022	
ORNL19-9614	Use existing metabolite-gene association networks in black cottonwood (Populus trichocarpa) as a foundation to rapidly link genotype and phenotype at the molecular level, and thereby discover novel enzymes and biochemical pathways that are relevant to biofuels, materials science, and plant secondary metabolism	0	\$221,094	\$221,094	10/19/2018	9/30/2021	
ORNL19-9613	Artificial Intelligence Initiative	0	\$2,821,820	\$2,821,820	10/9/2018	9/30/2021	
ORNL19-9612	Butanol as a value-added fuel additive to inhibit microbial degradation of fuels	0	\$118,349	\$118,349	2/8/2019	2/8/2022	
ORNL19-9584	A novel capability to support nuclear model validation and mapping of biases and uncertainties	0	\$58,109	\$58,109	3/19/2019	3/19/2022	
ORNL19-9577	Enabling Applications of Quantum Computing for Linear Algebra	0	\$188,705	\$188,705	10/19/2018	9/30/2021	
ORNL19-9574	Application of Digital Twin Techniques to Operational Assets	0	\$944,848	\$944,848	10/2/2018	9/30/2021	
ORNL19-9573	Developing Red Team Capabilities for Challenging Machine Learning-Based Defenses for Cyber-Physical Systems	0	\$715,564	\$715,564	10/3/2018	9/30/2021	
ORNL19-9555	Bridging the Gap: Modern Computational Design & Vapor Synthesis of Ultra High Temperature Structural Ceramics for Energy, Transportation & Defense	0	\$2,219,506	\$2,219,506	10/31/2018	9/30/2021	
ORNL19-9546	Semi-Automated Discovery of a Digital Twin of a Programmed Logic Controller	0	\$409,483	\$409,483	10/19/2018	9/30/2021	
ORNL19-9541	Machine Learning Based Multi-Physics Nuclear Reactor Core Simulations of Molten Salt Reactors	0	\$369,137	\$369,137	10/10/2018	9/30/2021	
ORNL19-9538	Multi-port solid-state transfer to enable extreme fast charging	0	\$538,100	\$538,100	10/19/2018	9/30/2021	
ORNL19-9533	Accelerating Discovery, Synthesis, and Control of Topological Quantum Materials	0	\$580,381	\$580,381	10/31/2018	9/30/2021	
ORNL19-9515	Three-Dimensional-Printing Shape Memory Ceramics for Complex Casting Applications	0	\$361,065	\$361,065	10/9/2018	9/30/2021	
ORNL19-9511	Implementation and Development of an Electric and Magnetic Field Diagnostic for Direct Validation of Magnetic Fusion Energy Physics and Exascale Computational Models	0	\$400,687	\$400,687	10/3/2018	9/30/2021	
ORNL19-9509	Ammonia synthesis over Two-Dimensional electrode-based catalysts at ambient pressure and low temperature	0	\$449,187	\$449,187	10/19/2018	9/30/2021	
ORNL19-9507	An Advanced Waveguide for Spatially Distributed Monitoring of In-Core Temperatures Based on Ultrasonic Guided Waves	0	\$389,246	\$389,246	10/23/2018	9/30/2021	
ORNL19-9505	Integrated Wireless Charging and Grid Interface Energy Storage Platform	0	\$339,317	\$339,317	10/12/2018	9/30/2021	
ORNL19-9502	Development of a Land Model Testbed for Rapid Assessment and Benchmarking of Multiscale Complex Biogeochemistry in Earth System Models	0	\$365,544	\$365,544	10/12/2018	9/30/2021	
ORNL19-9498	From can't to CAN: Attack prevention & in-situ detection of advanced attacks on controller area networks	0	\$421,235	\$421,235	10/19/2018	9/30/2021	
ORNL19-9494	A Semantic Graph Approach to Monitoring the Biological Literature for Biosecurity Applications	0	\$300,421	\$300,421	10/9/2018	9/30/2021	
ORNL19-9488	Data-driven Biomass Prediction Models from Multispectral Images of Nitrogen-Stressed Plants	0	\$258,795	\$258,795	10/23/2018	9/30/2021	
ORNL19-9479	Cross-kingdom mapping and functional validation of life's essential protein motifs	0	\$272,058	\$272,058	10/11/2018	9/30/2021	
ORNL19-9478	Scalable Coarse Mesh computational fluid dynamics Solver for Large Scale Nuclear System Simulations	0	\$119,941	\$119,941	10/23/2018	9/30/2021	
ORNL19-9463	A Scalable Math Library for Efficient Higher-Dimensional Hierarchical Tensor Representations and Simulations at Exascale	0	\$448,135	\$448,135	10/2/2018	9/30/2021	
ORNL19-9458	Molecular Understanding of Soft Matter Flow and Deformation with Neutrons	0	\$365,721	\$365,721	10/23/2018	9/30/2021	
ORNL19-9445	Rapid Detection and Classification of Global Positioning System Interference	0	\$391,351	\$391,351	10/11/2018	9/30/2021	
ORNL19-9442	Establishing a cross-kingdom gene regulation capability to enhance fungal nutrient uptake	0	\$347,316	\$347,316	10/11/2018	9/30/2021	
ORNL19-9438	Designing polymers with excessive free volume for enhanced molecular and ion transport	0	\$2,659,274	\$2,659,274	10/10/2018	9/30/2021	
ORNL19-9436	Establishing the High Flux Isotope Reactor as a unique nuclear data measurement facility	0	\$411,386	\$411,386	10/23/2018	9/30/2021	
ORNL19-9427	Rational clustered, regularly interspaced, short palindromic repeats design for ecological engineering of microbiomes	0	\$402,834	\$402,834	10/9/2018	9/30/2021	
ORNL19-9415	New Paradigms for Understanding Ionic Transport in Polymer Electrolytes	0	\$371,682	\$371,682	10/23/2018	9/30/2021	
ORNL19-9412	Intelligent Streaming Data and Event Analysis for Sensors	0	\$526,194	\$526,194	10/11/2018	9/30/2021	
ORNL19-9410	Probing quantum entanglement using neutron scattering and magnetic Wollaston prisms.	0	\$332,895	\$332,895	10/9/2018	9/30/2021	
ORNL19-9401	Synthesis During Flow—An Enabling Approach toward Challenging Molecules	0	\$407,222	\$407,222	10/11/2018	9/30/2021	
ORNL19-9388	A Resilient Parallel Programming Model for Heterogeneous Systems	0	\$144,614	\$144,614	10/2/2018	9/30/2021	
ORNL19-9383	A Connected Vehicle Research Environment to Decrease Energy Use and Emissions through Scalable Cooperative Control Mechanisms	0	\$449,105	\$449,105	10/10/2018	9/30/2021	
ORNL19-9376	Development and Demonstration of a Real-Time Mobility Control and Visualization System for Connected and Automated Vehicles	0	\$368,018	\$368,018	10/10/2018	9/30/2021	
ORNL19-9374	A robust and computationally efficient algorithm for fast time-to-solution Density Functional Theory calculations on Graphics Processing Unit-based parallel computers	0	\$326,067	\$326,067	10/9/2018	9/30/2021	
ORNL19-9371	Guided Whole Cell Printing of Bio-Derived Composites	0	\$410,086	\$410,086	10/9/2018	9/30/2021	
ORNL19-9370	Novel Wide Bandgap Gallium Oxide Based Power Electronic Devices	0	\$393,540	\$393,540	10/10/2018	9/30/2021	
ORNL19-9369	Chemical Kinetic Model Construction for Reacting Flow Simulations using Massively Parallel Computing	0	\$450,799	\$450,799	10/9/2018	9/30/2021	
ORNL19-9361	Next Generation Radiotherapeutics and Bioassessment Platforms	0	\$535,382	\$535,382	10/23/2018	9/30/2021	
ORNL19-9350	Distributed Agent-Based Modeling for Sensor-Limited Data in Materials	0	\$363,738	\$363,738	10/11/2018	9/30/2021	
ORNL19-9340	Advanced Dynamic Design of Catalytic Polymers Aided by Neutron Scattering	0	\$545,188	\$545,188	10/2/2018	9/30/2021	
9239	A high-order splitting strategy for solving two-phase flow model with stiff source terms	0	\$161,615	\$161,615	6/7/2018	6/7/2021	
9237	Color-Changing Paint for Natural Gas Leak Detection	0	\$98,786	\$98,786	5/9/2018	5/9/2021	
9234	Laser Stripping for a Next-Generation Muon Source at the Spallation Neutron Source	0	\$87,383	\$87,383	3/26/2018	3/26/2021	
ORNL19-9121	Computational Methods and Algorithms for Artificial Intelligence	0	\$92,019	\$92,019	11/1/2018	11/1/2021	
Total # of Projects for ORNL: 168				Total Equipment Cost for ORNL: \$0	Total Other Cost for ORNL: \$49,687,083	Total Cost for ORNL: \$49,687,083	
PNNL - Pacific Northwest National Lab							
PN17105/2995	Patterns and Mechanisms of Coastal Forest Loss in Relation to Sea-level Variability, Drought, and Heat-waves	0	\$429,698	\$429,698	8/8/2017	8/7/2020	
PN18090/3089	Protecting Research - Classified Project	0	\$162,041	\$162,041	8/29/2018	8/28/2021	
PN18087/3086	Imaging Intact Filamentous Fungi from Spore to Hyphal Tip on the Nanoscale	0	\$2,185,976	\$2,185,976	7/31/2018	7/30/2021	
PN18083/3082	Capability to Process and Characterize Uranium-Zirconium and Uranium-Zirconium-Plutonium Alloys	0	\$50,002	\$50,002	6/22/2018	6/21/2021	
PN18082/3081	New Quantum Phenomena by Combining Two-dimensional Materials with Complex Oxides	0	\$348,525	\$348,525	5/31/2018	5/30/2021	
PN18081/3080	Engineering Sequence-defined Polymers for Controlled Formation of Hybrid Materials	0	\$25,666	\$25,666	5/29/2018	5/28/2021	
PN18080/3079	On-line Optical Spectroscopy to Characterize Chemistry of the Transuranic Elements in Molten Salts	0	\$96,024	\$96,024	5/24/2018	5/23/2021	
PN18076/3075	Taxonomy and Health Assessment for Project Dryx- The focus of this project	0	\$41,352	\$41,352	5/14/2018	5/13/2021	
PN18075/3074	Pure Materials - Classified Project	0	\$86,800	\$86,800	5/11/2018	5/10/2021	
PN18074/3073	Investigation of Quantum Information System Algorithms and Software Framework for Electronic Structure Calculations	0	\$89,512	\$89,512	5/3/2018	5/2/2021	
PN18071/3070	Fabrication of Fused Deposition Mixing Extruder for Polymer Blending	0	\$73,116	\$73,116	4/9/2018	4/8/2021	
PN18070/3069	Collective Atomic Phenomena for Separations Science	0	\$37,836	\$37,836	4/2/2018	4/1/2021	
PN18066/3065	Atomic and Sub-nanoscale Engineered Multifunctional Electrocatalysts	0	\$186,866	\$186,866	3/27/2018	3/26/2021	
PN18064/3063	DeepCare: Improving Patient Care using Deep Learning on Electronic Health Records	0	\$174,963	\$174,963	3/14/2018	3/12/2021	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
PN18063/3062	Mesofluidic Separation of Large Particles in Waste Slurries	0	\$49,455	\$49,455	3/14/2018	9/30/2019	
PN18061/3060	Vehicle Emission Monitoring Applications using Internet of Things Ecosystem	0	\$47,621	\$47,621	3/6/2018	3/5/2021	
PN18060/3059	Controlled Mineral Growth for Improving Technetium-99 and Iodine-129 Retention in Cementitious Waste Forms	0	\$196,689	\$196,689	2/16/2018	2/15/2021	
PN18058/3057	Integration Infrastructure and Toolsets	0	\$196,282	\$196,282	2/12/2018	2/11/2021	
PN18057/3056	Material Modeling for Additively Manufactured Device Forensics	0	\$113,945	\$113,945	2/12/2018	2/11/2021	
PN18056/3055	Interdisciplinary Efforts Relevant to Department of Energy Biological Missions	0	\$141,072	\$141,072	2/6/2018	2/5/2021	
PN18055/3054	Performance Prediction and Process Attribution for Additive Manufacturing	0	\$849,321	\$849,321	2/6/2018	2/5/2021	
PN18054/3053	Interpretation of Trained Recurrent Neural Nets by State-Space Reconstruction	0	\$170,248	\$170,248	2/6/2018	2/5/2021	
PN18053/3052	Chemical Modeling of the Fate of Radioiodine	0	\$162,070	\$162,070	2/6/2018	2/5/2021	
PN18051/3050	Low-Temperature Electroplating of Zirconium: Ionic Mixture Methods	0	\$54,938	\$54,938	1/25/2018	1/24/2021	
PN18050/3049	Developing a Model-Experiment Integration Platform for Complex Systems in Subsurface and Terrestrial Ecosystem Sciences	0	\$106,837	\$106,837	1/9/2018	1/8/2021	
PN18048/3047	Data Assessment and Assimilation for Atmospheric Radiation Measurement Data Using Dynamic Bayesian Networks	0	\$118,148	\$118,148	1/9/2018	1/8/2021	
PN18047/3046	Redesigning a Small Laccase into a Robust Catalyst for Oxygen Reduction Reaction on Electrode Surface	0	\$262,635	\$262,635	1/5/2018	1/4/2021	
PN18045/3044	Gaining New Insights into the Drought Impacts at Finer Scales by Developing a High-spatiotemporal-resolution Solar Induced Chlorophyll Fluorescence Dataset	0	\$170,036	\$170,036	1/3/2018	1/2/2021	
PN18043/3042	Programming Metabolite Exchange to Understand and Control Plant-Microbe Interactions	0	\$99,265	\$99,265	12/19/2017	9/30/2020	
PN18037/3036	Ion Transport Process Across Reactive Solid-Liquid Interfaces	0	\$158,713	\$158,713	11/27/2017	9/30/2020	
PN18031/3030	Hydrologic Imprinting Across Terrestrial-aquatic Gradients: Unraveling the Spectrum of Ecosystem Responses to Freshwater Limitation	0	\$337,237	\$337,237	11/13/2017	9/30/2020	
PN18027/3026	Silicon Detectors for National Security Applications	0	\$239,891	\$239,891	11/1/2017	9/30/2020	
PN18026/3025	Damage Mechanisms and Defect Formation in Irradiated Model Systems	0	\$281,452	\$281,452	10/25/2017	9/30/2020	
PN18025/3024	Biomim Monk - Classified Project	0	\$276,515	\$276,515	10/17/2017	9/30/2020	
PN18022/3021	Time-Lapse Multiphysics Simulation and Joint Inversion Toolset for Large Scale Subsurface Imaging	0	\$136,761	\$136,761	10/13/2017	9/30/2020	
PN18020/3019	Fabrication of Magnesium Sheet from Shear Assisted Processing and Extrusion Extruded Tubing and Formability Testing Thereof	0	\$27,402	\$27,402	10/11/2017	9/30/2020	
PN18017/3016	Hybrid Multiscale Finite Volume Algorithm for Massively Parallel Simulation of Reactive Phenomena	0	\$65,444	\$65,444	10/10/2017	9/30/2020	
PN18015/3014	Microbial Ecology of the Plant Rhizosphere	0	\$96,088	\$96,088	10/5/2017	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	\$61,789	\$61,789	10/4/2017	9/30/2020	
PN18013/3012	Building a Virtual Plant Ecosystem	0	\$192,214	\$192,214	10/3/2017	9/30/2020	
PN18012/3011	PlantDevo: Effects of Environmental Perturbations on Plant Development	0	\$127,150	\$127,150	10/3/2017	9/30/2020	
PN18011/3010	The Physics of Ultralight Particles	0	\$500,927	\$500,927	10/2/2017	9/30/2020	
PN18010/3009	Radon Photoionization	0	\$64,996	\$64,996	10/1/2017	9/30/2020	
PN18009/3008	Focal Point Analysis for Trusting Machine Learning	0	\$143,262	\$143,262	10/1/2017	9/30/2020	
PN18008/3007	Neural Interactive Machine Learning	0	\$142,014	\$142,014	10/1/2017	9/30/2020	
PN18007/3006	DROWHUNT - Classified Project	0	\$156,802	\$156,802	10/1/2017	9/30/2020	
PN18006/3005	Molecular Phenotyping of Plants and Microbes	0	\$116,864	\$116,864	10/1/2017	9/30/2020	
PN18005/3004	Exploring Genotypic Diversity for Functional Trait Variance	0	\$125,184	\$125,184	10/1/2017	9/30/2020	
PN18004/3003	Visible and Ultraviolet - Light Mediated Photochemistry of the Actinides: Photocatalysis and Luminescence Detection	0	\$281,799	\$281,799	10/1/2017	9/30/2020	
PN18003/3002	Actinide Fluorination Science	0	\$212,752	\$212,752	10/1/2017	9/30/2020	
PN18002/3001	Topographic, Chemical, and Structural Nanoscopy of Biomineral Nucleation and Phase Transformation	0	\$108,218	\$108,218	10/1/2017	9/30/2020	
PN18001/3000	From Crystalline Nanorods to Hierarchical Structures	0	\$272,589	\$272,589	10/1/2017	9/30/2020	
PN17109/2999	Characterization of Radiation Induced Defects Across Scales	0	\$199,209	\$199,209	8/18/2017	8/17/2020	
PN17108/2998	Developing Isotachophoresis for Nuclear Safeguards	0	\$40,770	\$40,770	8/9/2017	8/8/2020	
PN17107/2997	Understanding How Saltwater Intrusion Interacts with Plant Communities to Affect Soil Greenhouse Gas Fluxes in Coastal Forests	0	\$270,770	\$270,770	8/8/2017	8/7/2020	
PN17106/2996	Process-based Understanding of Perturbation Impacts in Tidally-influenced Nearshore Terrestrial-aquatic Interfaces	0	\$302,342	\$302,342	8/8/2017	8/7/2020	
PN17104/2994	Monitoring of Terrestrial Aquatic Ecosystems with Hyperspectral Imagery	0	\$30,207	\$30,207	8/8/2017	8/7/2020	
PN17103/2993	Signatures of Warfighter Response to Pathogen-, Toxin- and Activity-Induced Stress	0	\$53,588	\$53,588	8/4/2017	8/3/2020	
PN17102/2992	Dissolution of Spent Nuclear Fuel: An In situ and Atomic Resolution Transmission Electron Microscopy Study	0	\$370,106	\$370,106	10/1/2017	9/30/2020	
PN17101/2991	Determining Radiolytic Transient Intermediates and Interfacial Species and Their Roles in Aluminum Oxide Hydroxide Reactivity	0	\$294,909	\$294,909	7/17/2017	7/16/2020	
PN17100/2990	Elemental Analysis of Rare Earths in Microfluidic Devices Capable of Employing Electrophoresis Based Separations	0	\$145,628	\$145,628	6/27/2017	6/26/2020	
PN17099/2989	Understanding Fundamental Design Principles Underlying How Biological Systems Adapt to Engineered Functions	0	\$1,110,130	\$1,110,130	6/22/2017	6/21/2020	
PN17098/2988	Development of Physics-compatible Stochastic Models for Multiphysics Systems with Nonlinear Field Variables	0	\$17,809	\$17,809	6/20/2017	6/19/2020	
PN17095/2985	PACIFIC: Proactive Adaptive Cybersecurity Framework for Control	0	\$1,034,003	\$1,034,003	6/1/2017	5/31/2020	
PN17087/2977	Nuclear Trafficking Objective: Materials Processing Characterization	0	\$55,409	\$55,409	4/18/2017	4/17/2020	
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	\$694,240	\$694,240	4/14/2017	4/13/2020	
PN17073/2963	Small Research and Development efforts that align with Department of Energy/Department of Homeland Security mission space.	0	\$274,509	\$274,509	2/13/2017	2/12/2020	
PN17072/2962	PICO-40L (40 Liter Version of the PICO Physics Collaboration Experiment) Bubble Chamber Research and Development	0	\$416,349	\$416,349	1/20/2017	1/19/2020	
PN17063/2953	Developing In situ Capabilities for Interfacial Characterization using Synchrotron Light Source	0	\$49,557	\$49,557	12/16/2016	9/30/2019	
PN17039/2929	Radiological Atomic Force Microscopy: Coupled Radiation Source/Liquid-cell Atomic Force Microscopy to Study Radiation-induced Interfacial Processes	0	\$244,850	\$244,850	10/3/2016	9/30/2019	
PN17038/2928	Deception Detection, Tracking and Factualty Assessment in Social and News Media	0	\$159,855	\$159,855	10/3/2016	9/30/2019	
PN17035/2925	Electrocatalytic Hydrogenation Process Development	0	\$469,244	\$469,244	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	\$175,549	\$175,549	10/1/2016	9/30/2019	
PN17026/2916	Theoretical Investigation of Low Temperature Electrocatalytic Hydrogen Addition	0	\$298,770	\$298,770	10/1/2016	9/30/2019	
PN17021/2911	Acid-Base Catalysis for Converting Electrocatalytic Hydrogenation Intermediates	0	\$180,101	\$180,101	10/1/2016	9/30/2019	
PN17017/2907	Embedding a Nervous System in Solid Metal Parts with Ultrasonic Three-Dimensional Printing	0	\$150,531	\$150,531	10/1/2016	9/30/2019	
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	\$162,659	\$162,659	9/6/2016	9/5/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
PN16102/2879	Low-scaling Electronic Structure Methods for Accurate Modeling Chemical Transformations in Complex Environments	0	\$174,522	\$174,522	7/18/2016	7/17/2019	
PN16062/2839	Fundamental Insights into Gamma-Radiation Effects at Complex Oxide-Water Interfaces from First Principles Simulations	0	\$53,282	\$53,282	1/25/2016	1/24/2019	
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	\$20,617	\$20,617	12/17/2015	12/16/2018	
PN19087/3176	Metal Regulation of Green House Gas Emissions from Permafrost	0	\$41,137	\$41,137	4/8/2019	4/7/2022	
PN19060/3149	Metagenogenomics Pipeline for Microbiomes	0	\$188,693	\$188,693	12/10/2018	9/30/2021	
PN19047/3136	Gut Microbiome and Host Fatigue	0	\$407,585	\$407,585	11/7/2018	9/30/2021	
PN19102/3191	Storm Surge Effects on Upland Forests as a Regulated by the Ecosystem Pore Space Continuum	0	\$227,061	\$227,061	6/21/2019	6/20/2022	
PN19070/3159	Mechanistic Modeling of Soil Biogeochemical Processes in Response to Redox Fluctuations	0	\$207,061	\$207,061	12/20/2018	9/30/2021	
PN19061/3150	Future Response of Coastal Wetlands to Environmental Stresses: Algorithm Comparison of Numerical Models	0	\$122,876	\$122,876	12/10/2018	9/30/2021	
PN19063/3152	Biomedical Resilience And Readiness in Adverse Operating Environments	0	\$1,158,047	\$1,158,047	12/10/2018	9/30/2021	
PN19100/3189	Nano-collid Facilitated Transport of Organic Carbon Release from Riparian Sediment	0	\$48,996	\$48,996	6/14/2019	6/13/2022	
PN19090/3179	Identification of Plant Host and Microbe Model System for Study of Rhizophagy Cycle	0	\$102,510	\$102,510	5/7/2019	5/6/2022	
PN19086/3175	Automated Novel Molecule Structure Determination for Discovering Pathways Critical to Soil Microbiomes at the Terrestrial-aquatic Interface	0	\$74,644	\$74,644	4/8/2019	4/7/2022	
PN19085/3174	Micro-electron Diffraction for Rapid and Comprehensive Characterization of the Unknown Small Molecule Composition of Crude Plant and Soil Extracts	0	\$54,856	\$54,856	4/3/2019	4/2/2022	
PN19065/3154	Approximate Querying of Multi-Source Heterogeneous Datasets	0	\$89,829	\$89,829	12/14/2018	9/30/2021	
PN19056/3145	Machine Learning Approaches to Streamline and Enhance the Analysis of Multiscale Imaging Data for Bioaerosol and Soil Particles	0	\$65,213	\$65,213	11/30/2018	9/30/2021	
PN19055/3144	Capturing Pathway Activity and Linking Outcomes through Multi-omic Data Integration	0	\$107,348	\$107,348	11/30/2018	9/30/2021	
PN19054/3143	Machine Learning for Rapid Biomarker Discovery via Image-Omic Fusion	0	\$34,498	\$34,498	11/30/2018	9/30/2021	
PN19053/3142	Full Integration of Lipidomics Data into Multi-omic Functional Enrichment	0	\$69,990	\$69,990	11/30/2018	9/30/2021	
PN19031/3120	Emissions of Soil Organic Particles and Biological Particles from Land-atmosphere Interactions	0	\$101,968	\$101,968	10/17/2018	9/30/2021	
PN19023/3112	Multiscale Modeling of Complex Metabolic and Regulatory Networks: from Molecules to Cells	0	\$191,919	\$191,919	10/1/2018	9/30/2021	
PN19014/3103	Developing a Simulator-based Satellite Dataset for Using Machine Learning Techniques to Derive Aerosol-cloud-precipitation Interactions in Models and Observations in a Consistent Framework	0	\$90,033	\$90,033	10/1/2018	9/30/2021	
PN19097/3186	Elucidation of the Reaction Mechanisms of Autooxidative Processes in Complex Condensed-Phase Mixtures	0	\$29,789	\$29,789	6/3/2019	6/2/2022	
PN19057/3146	Investigation of Interactions between Iodine and Adsorbent Material	0	\$100,064	\$100,064	12/3/2018	9/30/2021	
PN19045/3134	Radiotracer Atmospheric Dynamics Chamber	0	\$538,774	\$538,774	11/5/2018	9/30/2021	
PN19040/3129	Synthesis and Isolation of Functional Materials	0	\$192,058	\$192,058	10/23/2018	9/30/2021	
PN19039/3128	Physics Informed Deep Learning Models for Data Driven Prediction and Discovery	0	\$158,992	\$158,992	10/23/2018	9/30/2021	
PN19038/3127	Experimental Studies of the Dynamics of Adsorbed Iodine Species Formed in Severe Reactor Accidents	0	\$204,436	\$204,436	10/23/2018	9/30/2021	
PN19036/3125	Uncertainty Quantification for Complex Systems	0	\$162,273	\$162,273	10/22/2018	9/30/2021	
PN19030/3119	Testbed Development for Measuring Electrical Properties of Functional Materials	0	\$144,278	\$144,278	10/16/2018	9/30/2021	
PN19029/3118	Response of Functional Materials to Changing Thermo-Chemical Environments	0	\$125,093	\$125,093	10/16/2018	9/30/2021	
PN19028/3117	Dynamics of Quantum-Influenced Material Properties	0	\$882,942	\$882,942	10/15/2018	9/30/2021	
PN18089/3088	Characterizing Operations of Reactors in Data	0	\$246,001	\$246,001	10/1/2018	9/30/2021	
PN18088/3087	MineCraft: Deep Data Analytic Capability to Detect, Monitor, and Counter Proliferation Activities	0	\$214,048	\$214,048	10/1/2018	9/30/2021	
PN19050/3139	Non-Radioactive Signatures of Material Samples	0	\$36,616	\$36,616	11/15/2018	9/30/2021	
PN19051/3180	Enabling Technology for Isotope Separation Methods	0	\$163,444	\$163,444	5/13/2019	5/12/2022	
PN19068/3157	Technology Acceleration and Rapid Deployment for Innovative Solutions	0	\$91,168	\$91,168	12/19/2018	9/30/2021	
PN18085/3084	Cyber-based Contingency Analysis of Interdependent Infrastructure Networks under Uncertainty	0	\$259,112	\$259,112	10/1/2018	9/30/2021	
PN19027/3116	Detecting and Predicting Risk from Unknown Biological Threats through Open-source Data Fusion	0	\$235,263	\$235,263	10/10/2018	9/30/2021	
PN19071/3160	Quantum Algorithms, Software, and Architectures	0	\$692,514	\$692,514	12/21/2018	9/30/2021	
PN19020/3109	Low Background Methods and Science	0	\$204,957	\$204,957	10/1/2018	9/30/2021	
PN19022/3111	Noble Liquids	0	\$528,723	\$528,723	10/1/2018	9/30/2021	
PN19015/3104	Development and Validation of New Fundamental Physics Detector Materials	0	\$551,013	\$551,013	10/1/2018	9/30/2021	
PN19113/3202	Theory-Driven Reinforcement Learning: Understanding Complexity in Protein Dynamics	0	\$22,848	\$22,848	8/15/2019	8/14/2022	
PN19111/3200	Segmented Global Address Space: A Memory-Centric Programming Model and Runtime	0	\$382	\$382	8/9/2019	8/8/2022	
PN19108/3197	Computation-Flow-Architecture: Designing Non-Von-Neumann Architecture for Future Data-Centric Computing	0	\$19,372	\$19,372	8/6/2019	8/5/2022	
PN19112/3201	Fallacy Fixing Amdahl's Law within the Limits of Accelerated Systems	0	\$17,852	\$17,852	8/15/2019	8/14/2022	
PN19110/3199	Application-Algorithm-Architecture Co-Design for Large-Scale, Sparse Tensor/Matrix Methods	0	\$20,156	\$20,156	8/9/2019	8/8/2022	
PN19115/3204	Causal Inference and Machine Learning Methods for Analysis of Security Constraints in Security Constrained Unit Commitment	0	\$19,799	\$19,799	8/16/2019	8/15/2022	
PN19109/3198	Holonic Approach Towards Data Model Convergence	0	\$18,694	\$18,694	8/9/2019	8/8/2022	
PN19080/3169	Exploration of Domain-Aware Machine Learning for Grid Analytics	0	\$143,217	\$143,217	3/20/2019	3/19/2022	
PN19082/3171	Hybrid Advanced Workflows	0	\$215,968	\$215,968	3/22/2019	3/21/2022	
PN19081/3170	Software Defined Architectures for Data Analytics	0	\$187,011	\$187,011	3/22/2019	3/21/2022	
PN19083/3172	Data Model Convergence Application Flows	0	\$167,224	\$167,224	3/28/2019	3/27/2022	
PN19019/3108	Electrocatalytic Routes Towards Reductive Chemical Transformations	0	\$450,993	\$450,993	10/1/2018	9/30/2021	
PN19010/3099	Incorporation of Multifunctionality in Electrodes for Electrocatalytic Rate Enhancement	0	\$209,736	\$209,736	10/1/2018	9/30/2021	
PN19002/3091	Membranes and Analysis for Chemical Transformations	0	\$207,823	\$207,823	10/1/2018	9/30/2021	
PN19072/3161	Scalable Engineered Chalcogenide Quantum Materials	0	\$271,571	\$271,571	1/2/2019	1/1/2022	
PN19067/3156	Ion and Charge Transfer Across Complex Interfaces	0	\$123,909	\$123,909	12/18/2018	9/30/2021	
PN19114/3203	Laboratory-based X-ray Absorption Spectroscopy for In-situ Characterization of Catalytic Materials	0	\$43,808	\$43,808	8/15/2019	8/14/2022	
PN19106/3195	Optimizing Sub-Sampled Science, Technology, Engineering, and Math Imaging for Beam Sensitive Materials and Dynamic Processes	0	\$69,186	\$69,186	7/18/2019	7/17/2022	
PN19103/3192	Multimodal Instrument Platform for High-Pressure Magic Angle Spinning Nuclear Magnetic Resonance and Infrared Spectroscopic Integration	0	\$66,819	\$66,819	6/26/2019	6/25/2022	
PN19099/3188	Advancing Discoveries in Physical and Computational Sciences	0	\$29,976	\$29,976	6/11/2019	6/10/2022	
PN19064/3153	Understanding Fluid Flow at Nanoscale Interfaces	0	\$127,698	\$127,698	12/11/2018	9/30/2021	
PN19046/3135	Chemistry Molten Salt Reactors: Mastering Molten Salt Chemistry for Energy and National Security	0	\$1,234,113	\$1,234,113	11/6/2018	9/30/2021	
PN19079/3168	Phase Field + Crystal Plasticity Simulation of High Shear Events with Metastable Phases	0	\$174,730	\$174,730	3/5/2019	3/4/2022	
PN19076/3165	Discovering Solid Phase Processing Thermomechanical Pathways	0	\$236,057	\$236,057	1/16/2019	1/15/2022	
PN19075/3164	Multiscale Tribometric Shear Deformation	0	\$301,311	\$301,311	1/16/2019	1/15/2022	
PN19074/3163	Advanced Beamline Studies of Microstructural Evolution under Shear Deformation	0	\$315,018	\$315,018	1/14/2019	1/13/2022	
PN19073/3162	Exploring the Role of Severe Shear in Bulk Solid Phase Processing Systems	0	\$313,027	\$313,027	1/10/2019	1/9/2022	
PN19077/3166	Characterization of Carbonaceous Surface Deposits on Irradiated Iron Aluminate (FeAl3) Coatings	0	\$185,936	\$185,936	1/18/2019	1/17/2022	
PN19051/3140	Particle Size and Density Measurement	0	\$173,544	\$173,544	11/26/2018	9/30/2021	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
PN19049/3138	Liquid: Extraction Characterization	0	\$157,745	\$157,745	11/13/2018	9/30/2021	
PN19104/3193	GridSandbox: End-to-End Analytics for Grid Architectural Design and All-Hazard Assessment	0	\$178,770	\$178,770	7/1/2019	6/30/2022	
PN19101/3190	Process-Structure-Property-Performance of Friction-Deformation Processing: Sparse Data Machine Learning Integration with Theory, Experiment and Uncertainty Quantification	0	\$57,413	\$57,413	6/17/2019	6/16/2022	
PN19096/3185	Pacific Northwest Supply Chain Model for Selected Bioproducts	0	\$113,931	\$113,931	5/14/2019	5/13/2022	
PN19094/3183	Co-electrolysis of Carbon Dioxide and Water in Support of Hydrogen at Scale Vision	0	\$22,716	\$22,716	5/14/2019	5/13/2022	
PN19095/3184	Integrated Capture and Electrocatalytic Conversion of Carbon Dioxide to Alcohols	0	\$19,628	\$19,628	5/14/2019	5/13/2022	
PN19093/3182	Deep Electrification Analysis	0	\$93,097	\$93,097	5/13/2019	5/12/2022	
PN19089/3178	Polymer and Composite Recycle and Upcycling	0	\$175,743	\$175,743	4/26/2019	4/25/2022	
PN19088/3177	Tagging a Smaller Size Class of Fish: Can it be Done?	0	\$65,293	\$65,293	4/9/2019	4/8/2022	
PN19084/3173	Agile Research and Technology Transitions	0	\$140,692	\$140,692	4/1/2019	3/31/2022	
PN19059/3148	Cosmetic Microbeads and Silver Nanoparticles in Wastewater, Biosolids, and Soil	0	\$47,158	\$47,158	12/10/2018	9/30/2021	
PN19048/3137	Multi-Formalism Modeling for Disaster Resilience, Forecasting and Response	0	\$193,659	\$193,659	11/13/2018	9/30/2021	
PN19044/3133	Framework to Quantify Cybersecurity Risks and Consequences for Critical Infrastructure	0	\$157,152	\$157,152	10/31/2018	9/30/2021	
PN19043/3132	The Storage of Marine Hydrokinetic Power through Hydrogen Production and Carbon Extraction	0	\$129,093	\$129,093	10/29/2018	9/30/2021	
PN19042/3131	Physics-informed Machine Learning with Application to Solid Oxide Fuel Cell System Modeling and Optimization	0	\$109,372	\$109,372	10/29/2018	9/30/2021	
PN19041/3130	Optimal Control by Transfer-Learning	0	\$124,627	\$124,627	10/26/2018	9/30/2021	
PN19034/3123	Optical Window Materials for Spectroscopic Characterization of Chemically Corrosive Molten Salts	0	\$74,041	\$74,041	10/22/2018	9/30/2021	
PN19026/3115	New Class of Catalysts for Biomass Conversion via Condensation	0	\$149,463	\$149,463	10/9/2018	9/30/2021	
PN19025/3114	Development of a Scalable, Modular High-resolution Water Velocity Measurement Instrument using Actuated Acoustic Scanning	0	\$137,036	\$137,036	10/9/2018	9/30/2021	
PN19017/3106	Multiplexed Probing for Functional Capacity Measurements in Complex and Limited-Size Samples	0	\$130,136	\$130,136	10/1/2018	9/30/2021	
PN19018/2107	Nanoliter-scale Autosampler for Seamless Integration of Nanodroplet Processing in One-pot for Trace Sample Platform with Liquid Chromatography-Mass Spectrometry	0	\$124,392	\$124,392	10/1/2018	9/30/2021	
PN19020/3096	Pushing the Limiting of Microbattery Capacity and Energy	0	\$79,923	\$79,923	10/1/2018	9/30/2021	
PN19066/3155	Small Molecule Design using Deep Learning for Novel High-Affinity Ligands	0	\$118,733	\$118,733	12/14/2018	9/30/2021	
PN19037/3126	Functional Biomimetic Polymers with Antimicrobial Activity	0	\$133,932	\$133,932	10/23/2018	9/30/2021	
PN19035/3124	Improved Atom Counting through Neural Network Discrimination	0	\$150,881	\$150,881	10/22/2018	9/30/2021	
PN19116/3205	Mass Selective Axial Ion Ejection for Improved Tandem Mass Spectrometry	0	\$12,819	\$12,819	8/27/2019	8/26/2022	
PN19098/3187	Manufacturing Dissolvable Alloy Components using Shear Assisted Processing and Extrusion	0	\$52,756	\$52,756	6/11/2019	6/10/2022	
PN19069/3158	Combined Atomic-Molecular Ion Source - Glow Discharge (GD) "Chip" Design & Development	0	\$98,635	\$98,635	12/19/2018	9/30/2021	
PN19033/3122	Biomimetic Antibiotics Based on Amphiphilic Peptoids and Their Self-assembly	0	\$125,287	\$125,287	10/18/2018	9/30/2021	
PN19107/3196	Land Use Change, Atmospheric Composition, and Clouds: An Application of Deep Learning Surrogate Models	0	\$17,563	\$17,563	8/6/2019	8/5/2022	
PN19105/3194	Microfluidics for Characterizing and Optimizing the Production of Rhizosphere Metabolites	0	\$35,470	\$35,470	7/18/2019	7/17/2022	
PN19092/3181	Understanding the Electrical Double Layer Structure and Electron Probing the Mechanism of Carbon Dioxide Hydrogenation Over Cobalt and Iron Single Nanoparticles	0	\$10,678	\$10,678	9/1/2019	8/31/2022	
PN19013/3102	Design of Clean, High Rate, and Long Cycling Dual-Ion Batteries for Large Scale Energy Storage Applications	0	\$248,281	\$248,281	10/1/2018	9/30/2021	
PN19003/3092	Understanding the Dynamic Riparian Redox Environment through Novel Field and Laboratory Tools	0	\$332,735	\$332,735	10/1/2018	9/30/2021	
PN19004/3093	Artificial Photosynthesis with Next Generation Molecular Catalysts	0	\$253,622	\$253,622	10/1/2018	9/30/2021	
PN19005/3094	A Critical Gap in our Ability to Quantify and Model Earth System Interactions—Development of a Global, Mechanistic Understanding of Methane Emissions from Trees	0	\$136,128	\$136,128	10/1/2018	9/30/2021	
PN19006/3095	Betavoltaics from Commercial Off-The-Shelf: Power for Years	0	\$152,769	\$152,769	10/1/2018	9/30/2021	
PN19009/3098	Mapping Nutrient Flow through a Plant-Microbe Symbiont System using Stable Isotope Probing under Drought and Salinity Stress	0	\$145,007	\$145,007	10/1/2018	9/30/2021	
PN19021/3110	Ambient Ion Confinement and Manipulation to Enable High Throughput Structurally Selective Material Deposition	0	\$144,484	\$144,484	10/1/2018	9/30/2021	
PN19012/3101	Correlated Multimodal In-situ Gas-Metal Alloy Surface Reaction Studies	0	\$161,445	\$161,445	10/1/2018	9/30/2021	
PN19024/3113	De Novo Design of Molecular Recognition for Sequence Defined Polymers	0	\$151,811	\$151,811	10/1/2018	9/30/2021	
PN19011/3100	Advancement of the Molecular Microscope to Enable High-resolution Dynamic Imaging and Unprecedented Spatial Metabolic Information of Living Systems	0	\$128,214	\$128,214	10/1/2018	9/30/2021	
PN19016/3105	Improving Ductility of Hydride Embrittled Zirconium	0	\$129,904	\$129,904	10/1/2018	9/30/2021	
PN19008/3097	Improving Ductility of Hydride Embrittled Zirconium	0	\$126,099	\$126,099	10/1/2018	9/30/2021	
Total # of Projects for PNNL: 193 Total Equipment Cost for PNNL: \$0 Total Other Cost for PNNL: \$38,164,450 Total Cost for PNNL: \$38,164,450							
Pantex Plant							
PX186430	Develop a post processor that will be used with the recently purchased Mazak Hybrid Additive Manufacturing machine	0	\$1,061	\$1,061	10/1/2017	9/30/2019	
PX186267	Rapid Response Electronic Hold Point Q-Forms	0	\$13,493	\$13,493	10/1/2017	9/30/2020	
PX185228	Evaluation of Polymer Crystallinity in High Explosives	0	\$100,976	\$100,976	10/1/2017	9/30/2019	
PX185211	Use of Pycnometry for Density of Explosives and Powders	0	\$76,262	\$76,262	10/1/2017	9/30/2020	
PX185210	Evaluation of Particle Characterization Techniques for Consistency	0	\$118,349	\$118,349	10/1/2017	9/30/2019	
PX185209	Online Monitoring and Remote Sensing During High Explosive Aging	0	\$935,453	\$935,453	10/1/2017	9/30/2020	
PX185206	Photon Doppler Velocimetry System Upgrades and Improvements	0	\$903,055	\$903,055	10/1/2017	9/30/2020	
PX185205	Ignition Mechanisms of Explosives during Drilling and Slidding	0	\$617,880	\$617,880	10/1/2017	9/30/2020	
PX185202	Evaluating Sensitivity of Detonators to Insults	0	\$43,836	\$43,836	10/1/2017	9/30/2019	
PX185201	Comprehensive Polymer Analyses for Explosives Use	0	\$226,350	\$226,350	10/1/2017	9/30/2020	
PX185200	Improved Characterization of Critical Electrical Props and Hazards for Lightning	0	\$777,137	\$777,137	10/1/2017	9/30/2020	
PX174519	Projectile Impact System Upgrade	0	\$936,456	\$936,456	10/1/2016	9/30/2019	
PX174510	Port Glass Replacement Suitability Study	0	\$45,907	\$45,907	10/1/2016	9/30/2019	
PX174504	Air Driven Wet Sieving of Explosives	0	\$238,702	\$238,702	10/1/2016	9/30/2019	
PX196553	Texas Agricultural and Mechanical University Research Network	0	\$50,931	\$50,931	10/1/2018	9/30/2021	
PX196517	Seismo-Acoustic Study	0	\$54,753	\$54,753	10/1/2018	9/30/2021	
PX196254	Tandem Gas Analysis Workstation for Multicomponent Samples	0	\$162,955	\$162,955	10/1/2018	9/30/2021	
PX196253	Facility Management Technology/Data Integration Initiative	0	\$320,761	\$320,761	10/1/2018	9/30/2021	
PX196183	Physical Security Tactical Network	0	\$534,887	\$534,887	10/1/2018	9/30/2021	
PX196142	Blending Improvements of Non-Flow Sylgards Used on Production Potting Operations	0	\$255,146	\$255,146	10/1/2018	9/30/2021	
PX195972	Additive Material Characterization Study	0	\$207,066	\$207,066	10/1/2018	9/30/2021	
PX195958	Scratch Depth Measurement Enhancement	0	\$39,062	\$39,062	10/1/2018	9/30/2021	
PX195950	Microreactor Synthesis of Explosive 2,6-diamino-3,5-dinitropyrazine-1-oxide (LLM-109)	0	\$326,779	\$326,779	10/1/2018	9/30/2021	
PX195942	Wireless Property Tracking	0	\$111,927	\$111,927	10/1/2018	9/30/2021	
PX195932	Test Fire High Voltage Monitoring	0	\$156,537	\$156,537	10/1/2018	9/30/2021	
PX195931	Plant Supervisory Control and Data Acquisition	0	\$49,545	\$49,545	10/1/2018	9/30/2019	
PX195927	In-situ Inspection of Metal Laser Additive Manufacturing Processes	0	\$189,958	\$189,958	10/1/2018	9/30/2021	
PX195926	Additive Manufacturing for Test Assemblies	0	\$29,623	\$29,623	10/1/2018	9/30/2019	
PX195914	Custom Lenses for High Speed Diagnostic Cameras	0	\$74,337	\$74,337	10/1/2018	9/30/2021	
PX195843	Replacement of Hexanitrostilbene Insoluble Testing	0	\$124,276	\$124,276	10/1/2018	9/30/2021	
PX190726	Rapid Response (RR) Additive Manufacturing for High Explosives	0	\$1,192	\$1,192	10/1/2018	9/30/2019	
PX190691	Rapid Response Planning for Unmanned Aircraft Systems Usage at Consolidated Nuclear Security Sites Study	0	\$25,900	\$25,900	10/1/2018	9/30/2021	
PX190688	Rapid Response Use of Cavity Ring Down Spectroscopy for Dew Point and Contaminants in Gases	0	\$65,395	\$65,395	10/1/2018	9/30/2021	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months	
PX190686	Performance Management Program Usability and Functionality Enhancement	0	\$5,953	\$5,953	10/1/2018	9/30/2021		
PX190421	Rapid Response Use of Fourier Transform Infrared to Eliminate Torsion Block Test	0	\$36,502	\$36,502	10/1/2018	9/30/2021		
PX190309	Rapid Response Authorization Basis Unreviewed Safety Question Automated Document Collection Feasibility	0	\$45,986	\$45,986	10/1/2018	9/30/2021		
PX190299	Autonomous Mobile Bay Equipment Retriever Demonstration	0	\$107,551	\$107,551	10/1/2018	9/30/2021		
Total # of Projects for Pantex: 37		Total Equipment Cost for Pantex: \$0	Total Other Cost for Pantex: \$8,011,939	Total Cost for Pantex: \$8,011,939				
SNL - Sandia National Labs								
200201	Mechanistic Origins of Stochastic Rupture in Metals	0	\$531,784	\$531,784	10/1/2016	9/20/2019		
200200	Predicting the Friction Behavior of Body-Centered Cubic Metal and Alloys	0	\$562,015	\$562,015	10/1/2016	9/20/2019		
200114	Clandestine Facility Detection and Characterization with a Compact Low-Power Chemical Detector	0	\$206,327	\$206,327	10/1/2016	9/20/2019		
212430	Distributed Computational Algorithms Focusing on Modeling and Demonstration of Transformer Cyber Resilience	0	\$506,900	\$506,900	5/23/2018	9/20/2019		
212413	Development of Alternative Lattice-Matched Buffer Layers and Optimization of Metalorganic Chemical Vapor Deposition Growth for III-Nitride Power Electronics	0	\$188,653	\$188,653	5/22/2018	9/18/2020		
212091	Multi-Fidelity Toolkit	0	\$359,662	\$359,662	5/1/2018	9/20/2019		
212081	Synthetic Aperture Radar for Autonomous Hypersonics Mission Terminal Guidance	0	\$353,870	\$353,870	4/30/2018	9/20/2019		
212080	Optimal Elevon Control Allocation and Fault Detection/Recovery for Hypersonic Flight Vehicles	0	\$376,104	\$376,104	4/30/2018	9/20/2019		
212042	Convex Optimization using Geometric Programming on Field-Programmable Gate Arrays	0	\$290,612	\$290,612	4/26/2018	9/20/2019		
212040	Synthetic High Forward Squint Synthetic Aperture Radar Images Using Generative Adversarial Networks	0	\$211,816	\$211,816	4/26/2018	9/20/2019		
212018	Using Generative Models to Generate Hypersonic Boost-Glide Vehicle Trajectories	0	\$383,789	\$383,789	4/25/2018	9/20/2019		
211884	Rapid Estimation for Hypersonic Engagements	0	\$347,907	\$347,907	4/18/2018	9/20/2019		
211826	Robust, Rapid, Autonomous Mission Planning for Hypersonic Flight Vehicles	0	\$719,415	\$719,415	4/12/2018	9/20/2019		
211148	Autonomy-Enabled, Real-Time, Rapid Trajectory Generation for Highly Dynamic Hypersonic Missions	0	\$376,047	\$376,047	2/22/2018	9/20/2019		
210403	Cost-Competitive, Scalable and Safe Grid Storage: Sandia's Radical Ion Flow Battery Technology	0	\$469,185	\$469,185	12/12/2017	9/18/2020		
209652	Modeling Energy Transfer and Melting Efficiencies in Fusion Metal Additive	0	\$120,989	\$120,989	10/19/2017	9/20/2019		
209298	Creating Automatic Information Theoretic Analysis to Assist in Reverse Engineering Binary Image Formats	0	\$365,381	\$365,381	10/1/2017	9/20/2019		
209290	Testing Effects of 14 Mega Electron Volt Neutrons on Materials and Devices at the Sandia Ion Beam Laboratory	0	\$417,526	\$417,526	10/1/2017	9/20/2019		
209289	Advancing the Understanding of Laser-Plasma Interactions in High-Energy Density Plasmas	0	\$233,310	\$233,310	10/1/2017	9/18/2020		
209287	Modeling Low Density Plasma in Electrode/Target Systems for High Current Pulsed Power	0	\$776,893	\$776,893	10/1/2017	9/18/2020		
209286	Sandia Heterogeneous Architecture of Disaggregated Electronics: Advanced Packaging to Increase Radiation-Hardened Capabilities and Trust	0	\$512,224	\$512,224	10/1/2017	9/20/2019		
209285	Slurry-Processing Enabled Development of Thin, Large Surface Area, Non-Cylindrical Thermal Batteries for High Power Applications	0	\$523,989	\$523,989	10/1/2017	9/18/2020		
209284	Fuse Positional Awareness and Jammer Resistance from Radar-Based Terrain Aiding	0	\$577,200	\$577,200	10/1/2017	9/18/2020		
209283	Fabricating Bilayer Resistive Random-Access Memory for a Radiation-Hard Non-Volatile Memory	0	\$387,644	\$387,644	10/1/2017	9/20/2019		
209282	Modular Optical Bus Fabrication by Additive Manufacturing and Heterogeneous Integration	0	\$484,614	\$484,614	10/1/2017	9/18/2020		
209281	Intrinsically Radiation-Hard, High-Voltage, Solid-State Switch	0	\$564,337	\$564,337	10/1/2017	9/18/2020		
209280	Miniature Accelerometers with Sub-Microsecond Timescales for Characterization of Structural Dynamics	0	\$536,018	\$536,018	10/1/2017	9/18/2020		
209279	Microwave Doppler Charge Velocimetry for Narrow and Wide Bandgap Semiconductors	0	\$167,077	\$167,077	10/1/2017	9/20/2019		
209278	Two-Dimensional and Three-Dimensional Real-Time Visualization of Magnetic Fields using Quantum Optics	0	\$249,869	\$249,869	10/1/2017	9/20/2019		
209277	Phonon Blockade of the Superconducting Transition	0	\$95,176	\$95,176	10/1/2017	9/20/2019		
209275	Enhance Substrate Binding of Organophosphorus Hydrolase via Unnatural Amino Acids Utilizing Advanced Transition State and Allosteric Modeling	0	\$291,846	\$291,846	10/1/2017	9/20/2019		
209274	Autonomous Sensor Tasking and Scheduling Across Multiple Platforms	0	\$527,267	\$527,267	10/1/2017	9/18/2020		
209273	Automated Threat Modeling for Cyber Security Analytics and Emulation	0	\$640,210	\$640,210	10/1/2017	9/18/2020		
209272	Blockchain Derived Secure Computing	0	\$388,991	\$388,991	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	\$322,938	\$322,938	10/1/2017	9/18/2020		
209270	Predictable Lifetime Devices	0	\$246,550	\$246,550	10/1/2017	9/18/2020		
209269	Language-Independent Software Analysis	0	\$421,519	\$421,519	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	\$814,247	\$814,247	10/1/2017	9/18/2020		
209266	Diagnosing and Destroying Non-Markovian Noise in Qubits	0	\$393,347	\$393,347	10/1/2017	9/18/2020		
209265	Unpowered, Stackable, Large Area Semiconductor Neutron Detector	0	\$403,658	\$403,658	10/1/2017	9/20/2019		
209264	Single Chip Micro Electro Mechanical Systems Ultrasonic Imaging System	0	\$482,100	\$482,100	10/1/2017	9/18/2020		
209263	Microelectronics-Based Neutron and Spectroscopic Gamma Detectors Using Compound Semiconductors	0	\$454,882	\$454,882	10/1/2017	9/18/2020		
209262	Semi-Autonomous Methods for Rapid Prototyping of Software Defined Radiofrequency Counter-Unmanned Aerial System Techniques	0	\$528,058	\$528,058	10/1/2017	9/18/2020		
209261	Activity Waveforms: Measuring and Comparing the Rhythms of Complex Behaviors	0	\$278,622	\$278,622	10/1/2017	9/18/2020		
209260	Modeling Complex Relationships in Large-Scale Data using Hypergraphs	0	\$240,292	\$240,292	10/1/2017	9/20/2019		
209259	Suitability of Advanced Antenna Window Materials for Extreme Re-entry Environments	0	\$293,000	\$293,000	10/1/2017	9/18/2020		
209258	Micro-Detonics Effects on Single Crystalline Materials	0	\$344,791	\$344,791	10/1/2017	9/20/2019		
209257	Network-based Cyber Analysis using Deep Packet Inspection for High-Speed Networks	0	\$316,972	\$316,972	10/1/2017	9/20/2019		
209256	Convolutional Scattering Networks for Autonomy	0	\$191,177	\$191,177	10/1/2017	9/18/2020		
209255	Wide-Range Solid-State Tuning for Acoustoelectronics	0	\$578,056	\$578,056	10/1/2017	9/18/2020		
209254	Demonstrating Robustness of Analogue Quantum Simulators	0	\$395,912	\$395,912	10/1/2017	9/18/2020		
209253	High-Voltage Power-Transistors Enabled by Selective Area Regrowth of positive type/negative type Junctions Using Ultra-wide Bandgap Nitride Semiconductors	0	\$672,237	\$672,237	10/1/2017	9/18/2020		
209251	Low-Power High-Speed Transistors Enabled by Ferroelectric Hafnium Oxide	0	\$628,248	\$628,248	10/1/2017	9/18/2020		
209250	Asynchronous Ballistic Reversible Computation with Superconducting Josephson Junctions	0	\$667,887	\$667,887	10/1/2017	9/18/2020		
209249	An Interfacial Synaptic Transistor for Fast Neuromorphic Computing	0	\$256,405	\$256,405	10/5/2017	9/18/2020		
209248	Mitigation of Point Defects in Wide-Bandgap Semiconductors by Photo-Modification of Fermi Level during Growth	0	\$554,235	\$554,235	10/1/2017	9/18/2020		
209246	High Entropy Alloys: A Materials Solution to Metals Additive Manufacturing	0	\$614,778	\$614,778	10/1/2017	9/18/2020		
209245	Nanomaterial Ink Development for Smart Manufacturing	0	\$255,164	\$255,164	10/1/2017	9/18/2020		
209244	Identifying Rare, Disqualifying Flaws in Additively Manufactured Components	0	\$722,695	\$722,695	10/1/2017	9/18/2020		
209243	Describing the Chemical Steps of Hydrogen Incorporation in Metal Hydrides using Time-Resolved Environmental X-ray Photoelectron Spectroscopy	0	\$629,456	\$629,456	10/1/2017	9/18/2020		
209242	Designer Quantum Materials	0	\$162,567	\$162,567	10/1/2017	9/20/2019		
209241	Advanced Models of the Physics and Phenomena of Electrical Discharge	0	\$1,785,276	\$1,785,276	10/1/2017	9/18/2020		

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
209240	Towards Predictive Plasma Science and Engineering through Revolutionary Multi-Scale Algorithms and Models		0 \$5,120,787	\$5,120,787	10/1/2017	9/18/2020	
209239	Electro Magnetic Pulse-Resilient Electric Grid for National Security		0 \$2,574,602	\$2,574,602	10/1/2017	9/18/2020	
209238	Strategic Inertial Guidance with Matterwaves		0 \$5,288,317	\$5,288,317	10/1/2017	9/18/2020	
209237	Real-Time Subsurface Event Assessment and Detection		0 \$1,092,291	\$1,092,291	10/1/2017	9/18/2020	
209234	Characterization and Sampling of Ultralow Permeability Geomaterials using Electrokinetics		0 \$254,643	\$254,643	10/1/2017	9/18/2020	
209231	Unlocking Real Time Infrasound Event Classification Abilities using Machine Learning		0 \$121,654	\$121,654	10/1/2017	9/20/2019	
209230	Arctic Tipping Points Triggering Global Change		0 \$466,862	\$466,862	10/1/2017	9/18/2020	
209225	An Agile Design-to-Simulation Workflow Using a New Conforming Moving Least Squares Method		0 \$443,372	\$443,372	10/1/2017	9/20/2019	
209224	Role of Phonon-to-Vibration Energy Transfer in Initiation of Energetic Materials		0 \$487,005	\$487,005	10/1/2017	9/18/2020	
209223	Connecting Polymer Physics and Microstructure With Large-Deformation Polymer Foam Mechanics		0 \$755,786	\$755,786	10/1/2017	9/18/2020	
209222	Explosive Challenge: Revolutionizing Spatial and Temporal Blast Characterization		0 \$834,036	\$834,036	10/1/2017	9/18/2020	
209220	A Unified Framework for Quantification of Margin and Uncertainty		0 \$183,162	\$183,162	10/1/2017	9/20/2019	
209219	Coupling of Laminar-Turbulent Transition Modeling with Reynolds-averaged Navier-Stokes Computational Fluid Dynamics		0 \$548,853	\$548,853	10/1/2017	9/18/2020	
209218	Probiotic, Optimized Strains of Specifically Engineered Bacteria		0 \$592,927	\$592,927	10/1/2017	9/18/2020	
209217	A Predictive Model for Arctic Coastal Erosion		0 \$837,998	\$837,998	10/1/2017	9/18/2020	
209215	Rapid Assessment of Autoignition Propensity in Novel Fuels and Blends		0 \$398,359	\$398,359	10/1/2017	9/18/2020	
209212	Data Enrichment for Improved Intelligence Value and Situational Awareness		0 \$406,155	\$406,155	10/1/2017	9/18/2020	
209210	Autonomous Detection and Assessment with Moving Sensors: A Foundation for Future Physical Security Systems		0 \$725,302	\$725,302	10/1/2017	9/18/2020	
209209	Intelligent Customized Spot Shielding for Microelectronics in Space Applications		0 \$251,403	\$251,403	10/1/2017	9/18/2020	
209208	Efficient Real-Time Cognition at the Point of Sensing		0 \$331,656	\$331,656	10/1/2017	9/18/2020	
209207	Quantum-Enhanced Imaging System with Unprecedented Resolution		0 \$221,455	\$221,455	10/1/2017	9/20/2019	
209206	Three-Dimensional Printed Waveguide Optics for Transformative Sensors		0 \$345,828	\$345,828	10/1/2017	9/18/2020	
209205	Chip-Scale Nano-Optomechanical Platform for High-Bandwidth, High-Efficiency Radio Frequency Signal Processing		0 \$228,112	\$228,112	10/1/2017	9/18/2020	
209204	Miniaturized Explosive Test for Optical Emission Diagnostics		0 \$458,435	\$458,435	10/1/2017	9/18/2020	
209203	Finite Set Statistics Based Distributed Optimal Control for Space Surveillance		0 \$330,147	\$330,147	10/1/2017	9/20/2019	
209202	Ultra-Efficient Sensing System through Holistic Design		0 \$479,398	\$479,398	10/1/2017	9/18/2020	
209201	Shock Tube Measurements of Hot Dense Gas Luminescence and Opacity for Constructing Opacity Tables		0 \$524,333	\$524,333	10/1/2017	9/18/2020	
209200	Building the World's First Laser Refrigerated Sensor		0 \$448,435	\$448,435	10/1/2017	9/18/2020	
209199	A Parallel Optics Approach to Snapshot Hyperspectral Imaging		0 \$309,116	\$309,116	10/1/2017	9/20/2019	
209198	Information-Theoretic Algorithms to Quantify Genomic Information for Genomic Security		0 \$379,565	\$379,565	10/1/2017	9/20/2019	
209197	Efficient, Scalable Tomography of Many-Qubit Quantum Processors		0 \$352,390	\$352,390	10/1/2017	9/18/2020	
209196	Mixed-Integer Partial-Differential-Equation-Constrained Optimization		0 \$431,580	\$431,580	10/1/2017	9/18/2020	
209195	Distributed-in-Time Techniques for Optimization at Extreme Scales		0 \$629,429	\$629,429	10/1/2017	9/18/2020	
209194	Linear Programming in Strongly Polynomial Time		0 \$339,456	\$339,456	10/1/2017	9/18/2020	
209193	Statistical Uncertainty Quantification for Multivariate Physical Parameter Estimation with Multivariate Outputs		0 \$250,596	\$250,596	10/1/2017	9/20/2019	
209191	Diversified Therapeutic Phage Cocktails from Close Relatives of the Target Bacterium		0 \$914,180	\$914,180	10/1/2017	9/18/2020	
209190	Engineering Cells for Personalized Antimicrobial Therapy		0 \$684,346	\$684,346	10/1/2017	9/18/2020	
206861	Improved Industrial Control Systems Resilience Through Automated Detection and Response		0 \$485,275	\$485,275	6/7/2017	9/20/2019	
204977	Examination of Dual Use Concerns of Gene Editing		0 \$949,698	\$949,698	3/21/2017	9/20/2019	
203537	An Exascale Computational Simulation Capability for Pervasive Fracture & Failure of Structures		0 \$235,376	\$235,376	1/30/2017	9/20/2019	
203433	A Domain-Specific Language for High-Consequence Control Software		0 \$260,259	\$260,259	1/26/2017	9/20/2019	
203429	Topological Quantum Material for Quantum Computation		0 \$1,187,322	\$1,187,322	1/26/2017	9/20/2019	
203202	Nano-Engineering of Detector Surfaces to Offer Unprecedented Imager Sensitivity to Soft X-rays and Low Energy Electrons		0 \$233,266	\$233,266	1/19/2017	9/20/2019	
201939	Tools and Techniques for Practical Evaluation and Synthesis of Trust in Government systems		0 \$1,732,601	\$1,732,601	11/14/2016	9/20/2019	
201545	Mechanical Communication using Piezoelectric-Magnetoelastic Transducers		0 \$795,693	\$795,693	10/27/2016	9/20/2019	
200276	Towards Multi-Fluid Multi-Physics Continuum Plasma Simulation for Modeling Magnetically-Driven Experiments on Z Pulsed Power Facility		0 \$627,040	\$627,040	10/1/2016	9/20/2019	
200275	Prediction and Design of Nonlinear Systems and their Emergent Behavior		0 \$393,191	\$393,191	10/1/2016	9/20/2019	
200271	High-Energy X-Ray Detectors using Fast, High-atomic number Semiconductors		0 \$366,965	\$366,965	10/1/2016	9/20/2019	
200269	Three-Dimensional-Magnetohydrodynamic Simulations of Electrothermal Instability Growth		0 \$664,053	\$664,053	10/1/2016	9/20/2019	
200268	Stochastic Shock in Advanced Materials		0 \$963,053	\$963,053	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 \$451,458	\$451,458	10/1/2016	9/20/2019	
200265	Polynomial Chaos methods in Xyce for Embedded Uncertainty Quantification Circuit Analysis		0 \$525,417	\$525,417	10/1/2016	9/20/2019	
200264	Single Event Effects in Sandia's Semiconductor Devices and Acceptance Testing in Integrated Circuits		0 \$488,425	\$488,425	10/1/2016	9/20/2019	
200260	Investigation of Commercial Integrated Circuits for use in Radiation Environments		0 \$446,178	\$446,178	10/1/2016	9/20/2019	
200257	A Silicon/III-V Photonics Platform for Optical Data Communications and High Functionality Photonics		0 \$799,319	\$799,319	10/1/2016	9/20/2019	
200256	Advanced Positional Awareness Employing Extremely Cold Atoms		0 \$564,562	\$564,562	10/1/2016	9/20/2019	
200254	Non-Destructive Evaluation for Encapsulated Component Qualification		0 \$738,390	\$738,390	10/1/2016	9/20/2019	
200253	Novel Materials to Enable Future Weapon Architectures		0 \$666,693	\$666,693	10/1/2016	9/20/2019	
200248	Dynamic Strain Aging in Additive Manufactured Alloys and Components		0 \$1,165,535	\$1,165,535	10/1/2016	9/20/2019	
200245	Rectenna Thermal Power Supply		0 \$596,215	\$596,215	10/1/2016	9/20/2019	
200243	Agile Component Design Through Integrated Diagnostics and Computational Optimization		0 \$669,160	\$669,160	10/1/2016	9/20/2019	
200241	Nanocomposite Films with Tunable Physical Properties as Robust Corrosion Barriers		0 \$569,044	\$569,044	10/1/2016	9/20/2019	
200237	Understanding Si-Decorated Nanoporous-Carbon Anodes for High-Performance Li-Ion Energy Storage		0 \$244,332	\$244,332	10/1/2016	9/20/2019	
200231	A Truly Micro-scale Low Cost, Size, Weight, and Power Gyroscope based on Optomechanical Oscillation		0 \$557,965	\$557,965	10/1/2016	9/20/2019	
200229	Active and Nonreciprocal Radio-Frequency Acoustic Microsystems		0 \$613,221	\$613,221	10/1/2016	9/20/2019	
200228	Near Infrared Nanophotonics through Dynamic Control of Carrier Density in Conducting Ceramics		0 \$535,733	\$535,733	10/1/2016	9/20/2019	
200226	Rad Hard Devices Science Using Quasi-Electric Fields		0 \$484,374	\$484,374	10/1/2016	9/20/2019	
200204	Investigating Phase Evolution in Chemical Wavefronts Subject to High Heating Rates		0 \$579,518	\$579,518	10/1/2016	9/20/2019	
200203	Magnetic Nanocomposites for High Performance Inductor Materials		0 \$553,167	\$553,167	10/1/2016	9/20/2019	
200202	Making Density Functional Theory Work for all Materials		0 \$216,088	\$216,088	10/1/2016	9/20/2019	
200199	Engineering Next-Generation Zero Thermal Expansion Composite Materials for Additive Manufacturing Technologies		0 \$182,006	\$182,006	10/1/2016	9/20/2019	
200197	Enabling Hydrogen Infrastructure through Surface Passivation of Structural Materials		0 \$804,201	\$804,201	10/1/2016	9/20/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
200196	Engineered Materials for Deactivation of Chemical Agents in Non-Aqueous, Non-Corrosive Environments	0	\$522,820	\$522,820	10/1/2016	9/20/2019	
200195	Xenon Atom Trap Trace Analysis Enabled by Optical Isotopic Enrichment	0	\$505,639	\$505,639	10/1/2016	9/20/2019	
200194	Highly Sensitive Atomic Electrometry for Non-Invasively Detecting and Diagnosing Electronics	0	\$392,255	\$392,255	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	\$548,731	\$548,731	10/1/2016	9/20/2019	
200191	Quantifying Uncertainty in Emulations	0	\$403,826	\$403,826	10/1/2016	9/20/2019	
200190	Polarized Radar for Detection and Automatic Non-Visual Assessment of Unmanned Aerial Systems	0	\$284,278	\$284,278	10/1/2016	9/20/2019	
200189	Efficient and Scalable Modeling of Non-Traditional Devices for Emulatics Cognitive Information Environments for International Safeguards	0	\$656,166	\$656,166	10/1/2016	9/20/2019	
200188	Inspections	0	\$301,188	\$301,188	10/1/2016	9/20/2019	
200186	Controlling the Activity of Gene Editing Tools	0	\$784,237	\$784,237	10/1/2016	9/20/2019	
200185	Inferring Proliferation from Supply Chain Signals	0	\$469,143	\$469,143	10/1/2016	9/20/2019	
200184	Enabling Modular Architectures with Radiation-Hard Bus-Based Power Delivery	0	\$5,085,294	\$5,085,294	10/1/2016	9/20/2019	
200183	Prediction and Inference of Multi-scale Electrical Properties of Geomaterials	0	\$619,955	\$619,955	10/1/2016	9/20/2019	
200182	Attribution of Methane Emissions in the Arctic and Continental United States	0	\$385,956	\$385,956	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	\$653,007	\$653,007	10/1/2016	9/20/2019	
200180	Integrated Geomechanics and Geophysics in Induced Seismicity: Mechanisms and Monitoring	0	\$834,567	\$834,567	10/1/2016	9/20/2019	
200177	Pushing Continuum Reactive Capabilities through Novel Sub-Grid and Statistical Methods	0	\$574,952	\$574,952	10/1/2016	9/20/2019	
200176	Uncertainty Quantification of Microstructural Material Variability Effects	0	\$674,899	\$674,899	10/1/2016	9/20/2019	
200175	Residual Stress Inversion using Ultrasonic Surface Waves, X-Ray Diffraction, and Sacrificial Material	0	\$589,161	\$589,161	10/1/2016	9/20/2019	
200174	Illumination of Damage with High-Strength Alloys in Abnormal Mechanical Environments	0	\$241,349	\$241,349	10/1/2016	9/20/2019	
200172	Physics of Discharge Initiation from Complex Surfaces	0	\$479,795	\$479,795	10/1/2016	9/20/2019	
200171	Design of Acoustic Metamaterials for Shock and Vibration Control in Weapon Systems	0	\$555,661	\$555,661	10/1/2016	9/20/2019	
200170	Discovering the Physics of Blast and Fluid Structure Interactions: A Novel Experimental-Computational Approach	0	\$787,694	\$787,694	10/1/2016	9/20/2019	
200169	Passive Magnetoelastic Smart Sensors for a Resilient Energy Infrastructure	0	\$277,558	\$277,558	10/1/2016	9/20/2019	
200168	Exploring Fundamental Limitations of Manganese Oxide Cathodes for Reversible zinc/manganese dioxide Batteries	0	\$458,935	\$458,935	10/1/2016	9/20/2019	
200167	Bio-Inspired Ion-Selective Electrodialysis Membranes	0	\$883,352	\$883,352	10/1/2016	9/20/2019	
200165	A New Method to Contain Molten Corium in Catastrophic Nuclear Reactor Accidents	0	\$488,151	\$488,151	10/1/2016	9/20/2019	
200151	Novel Zoned Wasteforms for High-Priority Radionuclide Waste Streams	0	\$454,803	\$454,803	10/1/2016	9/20/2019	
200150	Developing Process-Microstructure-Property Correlation of Radiation-Tolerant Nanoporous and Nanostructured Materials for High Irradiation Environments	0	\$615,784	\$615,784	10/1/2016	9/20/2019	
200149	Deciphering Atmospheric Ice Nucleation using Molecular-Scale Microscopy	0	\$607,621	\$607,621	10/1/2016	9/20/2019	
200138	Extreme Power Radio-Frequency Amplifiers	0	\$391,799	\$391,799	10/1/2016	9/20/2019	
200137	Avalanche Photodiode Arrays for High Dynamic Range Infrared Detection	0	\$277,326	\$277,326	10/1/2016	9/20/2019	
200135	Spiking/Processing Array for Wide Dynamic Range and High Resolution Photonic Sensing	0	\$398,920	\$398,920	10/1/2016	9/20/2019	
200134	A 1 volt, 1 watt, 100 gigahertz Electro-optic Modulator on Silicon for Space Applications	0	\$291,878	\$291,878	10/1/2016	9/20/2019	
200133	Waveform-Agile Multi-Channel Cognitive Digital Radar for Multi-Mission Intelligence Surveillance and Reconnaissance and Radio-Frequency-Enabled Cyber	0	\$677,720	\$677,720	10/1/2016	9/20/2019	
200106	Neural Inspired Computation Remote Sensing Platform	0	\$303,256	\$303,256	10/1/2016	9/20/2019	
200070	Rapid Abstraction in Confined Environments	0	\$465,865	\$465,865	10/1/2016	9/20/2019	
200069	Ultra Low Level Security Interception of Computer Operating Systems	0	\$267,090	\$267,090	10/1/2016	9/20/2019	
200067	Broadband Extremely Low-Profile Antennas	0	\$194,813	\$194,813	10/1/2016	9/20/2019	
200065	Persistent Tracking of Dismounts by Multichannel Radar	0	\$249,346	\$249,346	10/1/2016	9/20/2019	
200063	Additively Manufactured, Athermal, Broadband, and Light-Weight Optical Telescope	0	\$175,938	\$175,938	10/1/2016	9/20/2019	
200061	Ionospheric Impacts on Space-Based Radars: Characterization and Mitigation	0	\$274,259	\$274,259	10/1/2016	9/20/2019	
200060	Enabling Novel, Game-Changing Radar Sensing via Ultra-Wideband Polarimetry	0	\$194,976	\$194,976	10/1/2016	9/20/2019	
200022	Advanced Synthetic Aperture Radar Exploitation	0	\$145,214	\$145,214	10/1/2016	9/20/2019	
200020	Improved Mobile Device Positioning via Contextual Awareness	0	\$350,138	\$350,138	10/1/2016	9/20/2019	
199988	Stochastic Optimization to Enhance Resiliency and Response Strategies in Critical Infrastructure	0	\$510,867	\$510,867	10/1/2016	9/20/2019	
199986	Parallel Tensor Decompositions for Massive, Heterogeneous, Incomplete Data	0	\$714,379	\$714,379	10/1/2016	9/20/2019	
199983	Fast and Robust Linear Solvers Based on Hierarchical Matrices	0	\$572,827	\$572,827	10/1/2016	9/20/2019	
199982	Multi-Level Memory Algorithms for Large, Sparse Problems	0	\$768,561	\$768,561	10/1/2016	9/20/2019	
199981	Compatible Particle Methods: a New Paradigm for Structure-Preserving Discretization Without a Mesh	0	\$679,207	\$679,207	10/1/2016	9/20/2019	
199977	A Disaggregated Memory Architecture for Future High-Performance Computing	0	\$287,362	\$287,362	10/1/2016	9/20/2019	
199975	Big Data, Machine Learning and Dynamic Complex System Modeling to Improve Algae Cultivation	0	\$415,337	\$415,337	10/1/2016	9/20/2019	
199974	Diagnostic Tool for Measuring Early Chemical Signatures of Pond Crash	0	\$526,380	\$526,380	10/1/2016	9/20/2019	
199973	Selection of Ribosomes from Infected Mammalian Cells to Identify Viral Pathogens	0	\$458,865	\$458,865	10/1/2016	9/20/2019	
199972	Three-Dimensional Multicolor Superresolution Microscopy for Imaging the Machinery of Cells and Capturing Biochemical Interfaces	0	\$220,018	\$220,018	10/1/2016	11/13/2019	
217154	Effects of Irradiation of Flash Memory During Computed Tomography X-ray Imaging	0	\$136,489	\$136,489	7/16/2019	9/20/2019	
217050	Ion Imaging Near a Reactive Surface	0	\$88,647	\$88,647	6/10/2019	9/20/2019	
216987	Ultrafast Electron Microscopy for Spatial-Temporal Mapping of Charge Carriers in Gallium Nitride Devices	0	\$93,291	\$93,291	6/4/2019	9/17/2021	
216885	Real-Time Patch-Clamp Sensing of Transport across a Blood-Brain Barrier	0	\$95,577	\$95,577	5/28/2019	9/20/2019	
216851	Accurate High-Speed Raman Spectroscopy for Use in High-Enthalpy Environments	0	\$94,093	\$94,093	5/23/2019	9/20/2019	
216843	Assessing the Vulnerability of Unmanned Aircraft Systems to Directed Acoustic Energy	0	\$92,012	\$92,012	5/23/2019	9/20/2019	
216840	Enabling Modular Quantum Information Processing via Spin-Photon Coupling with Silicon Triple Quantum Dots	0	\$76,882	\$76,882	5/28/2019	9/20/2019	
216839	Development and use of an Ultra High Resolution Electron Scattering Apparatus	0	\$141,123	\$141,123	6/17/2019	9/17/2021	
216837	Quantum Unit Tests: Testing Quantum Processors	0	\$98,632	\$98,632	5/23/2019	9/20/2019	
216836	On-line Generation and Error Handling for Surrogate Models within Multifidelity Uncertainty Quantification	0	\$80,914	\$80,914	5/23/2019	9/20/2019	
216835	Bridging the Gap: Thermal Properties in Composites from Microscale Constituents to Macroscale Performance	0	\$97,871	\$97,871	5/23/2019	9/20/2019	
216712	Detailed Statistical Models of Host-Based Data to Detect Malignous Activities	0	\$132,918	\$132,918	5/15/2019	9/20/2019	
216630	Data Analysis for Novel Wargaming Approaches	0	\$164,482	\$164,482	5/13/2019	9/20/2019	
216395	Noisy, Intermediate-Scale Quantum Applications on a Pathfinder System	0	\$68,873	\$68,873	4/25/2019	9/18/2020	
216221	Conception and Preliminary Technical Analysis of Unique Signal Pattern Discriminating Microsystems	0	\$282,305	\$282,305	4/15/2019	9/17/2021	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
216153	Fabrication of Non-Contact Temperature Two-Dimensional Temperature Sensors Using Aerosol Deposition		\$88,763	\$88,763	4/10/2019	9/20/2019	
216149	In Vacuum Heating Experiments on Mykonos: A Path Forward to Improving Power Flow on Z machine		\$116,884	\$116,884	4/10/2019	9/18/2020	
216090	New Pulsed Power Architectures		\$61,006	\$61,006	4/4/2019	9/20/2019	
216063	Tailored Multi-Principal Element Alloys Toward Improved Functional Properties		\$101,512	\$101,512	4/1/2019	9/18/2020	
216061	Obtaining Operational Semantic Vectors for Networks		\$74,769	\$74,769	4/1/2019	9/18/2020	
216060	Establishing X-Ray Computed Tomography Methods For Advanced Barrier Materials		\$101,604	\$101,604	4/1/2019	9/20/2019	
216059	Theory-Driven Adversary Anticipation		\$278,057	\$278,057	4/1/2019	9/20/2019	
216057	Response of Gallium Nitride-based Semiconductor Devices to Ion and Neutron Irradiation		\$122,906	\$122,906	4/1/2019	9/18/2020	
216000	A New Paradigm for Substantially Increasing Mechanical Energy Absorption in Flexible Foams		\$76,459	\$76,459	3/29/2019	9/20/2019	
215998	Screening for Dimerization Inhibitors for Bacterial Acetyl Coenzyme A Carboxylase		\$142,707	\$142,707	3/29/2019	9/20/2019	
215996	Developing And Evaluating Malliavin Estimators For Intrusive Sensitivity Analysis Of Monte Carlo Radiation Transport		\$71,955	\$71,955	3/29/2019	9/20/2019	
215995	Utilizing Optical Modal Methods and Optimized Embedded Sensors to Support "Design for Qualification" and Rapid Mechanical Diagnostics/Qualification Testing of Advanced Barriers		\$97,427	\$97,427	3/29/2019	9/20/2019	
215994	Radiation-Driven Structural Transition Of Grain Boundries In Model High Entropy Alloys		\$57,156	\$57,156	3/29/2019	9/20/2019	
215990	Investigating Machine Learning Based X-Ray Computed Tomography Reconstruction Methods To Enhance The Accuracy Of Computed Tomography Scans		\$48,417	\$48,417	3/29/2019	9/20/2019	
215989	High Entropy Oxide Coatings for Highly Tunable Shielding		\$41,803	\$41,803	3/28/2019	9/20/2019	
215988	Non-Newtonian Flexible Barrier		\$71,718	\$71,718	3/28/2019	9/20/2019	
215987	Towards Agile Qualification: Leveraging Uncertainty Quantification from Past CompSim Analyses to Support New Applications		\$40,842	\$40,842	3/28/2019	9/20/2019	
215984	Polymer-Spray Coating Interfaces		\$113,811	\$113,811	3/28/2019	9/20/2019	
215983	Large-Scale Acoustic Wave Simulation in Barrier Enclosures		\$73,505	\$73,505	3/28/2019	9/20/2019	
215982	Nondestructive Stress Imaging of Polymeric Barrier Materials		\$118,357	\$118,357	3/28/2019	9/20/2019	
215981	Experimental Capability Development For Anisotropic Thermal Conductivity Measurements Of Advanced Barriers		\$65,340	\$65,340	3/28/2019	9/20/2019	
215980	Advanced Processing Of High Entropy Alloy Coatings		\$115,059	\$115,059	5/13/2019	9/20/2019	
215964	Depolymerization of Highly Crosslinked Polymers by Latent Olefin Metathesis		\$101,110	\$101,110	3/27/2019	9/20/2019	
215963	A Fast Linear Solver for Fractional Equations		\$59,991	\$59,991	3/27/2019	9/20/2019	
215961	Experimental Demonstration of Electromechanical Conversion on Silicon for Enabling Distributed Quantum Information		\$85,937	\$85,937	3/27/2019	9/20/2019	
215959	High-Fidelity Calibration and Characterization of Hyperstretal Computed Tomography System		\$99,067	\$99,067	3/27/2019	9/20/2019	
215958	Materials, Devices, and Optical Systems for Energy Rejection		\$138,381	\$138,381	3/27/2019	9/20/2019	
215957	Anomaly Detection for Physical Security: Nonlinear Dimension Reduction for Heterogeneous Temporal Data		\$75,251	\$75,251	3/27/2019	9/18/2020	
215952	Rapid Exploration Of Refractory High Entropy Alloy Phase Space Via Additive Manufacturing		\$150,941	\$150,941	3/27/2019	9/20/2019	
215947	Coupled Experiment and Theory to Explore the Limits of Material Strength at High Strain Rates		\$87,451	\$87,451	3/27/2019	9/20/2019	
215944	Engineered Reliability via Intrinsic Thermomechanical Stability of an Electrodeposited Au-Pt Nanocrystalline Alloy		\$94,264	\$94,264	3/27/2019	9/20/2019	
215941	Engineered Reliability via Electroplated Pure Refractory Metals as Diffusion Barriers		\$97,534	\$97,534	3/27/2019	9/20/2019	
215939	Simulations of Aluminum Nitride Based Nuclear Batteries		\$52,078	\$52,078	3/27/2019	9/20/2019	
215864	A Novel Processing Method to Achieve Latch-Up Immunity in Advanced Complementary Metal-Oxide Semiconductor Technologies		\$186,676	\$186,676	3/20/2019	9/17/2021	
215863	Moving Target Defense for Space Systems		\$100,147	\$100,147	3/20/2019	9/17/2021	
215861	Development of Cognitive Analytics for Improved Satellite Security		\$129,434	\$129,434	3/20/2019	9/17/2021	
215718	Domain Wall Dynamics in Spin-Orbit Transfer Devices		\$33,172	\$33,172	3/11/2019	9/20/2019	
215596	Corrosion Chemistry at Buried Interfaces		\$132,342	\$132,342	2/28/2019	9/18/2020	
215348	Local Limits of Detection for Anthropogenic Aerosol-Cloud Interactions		\$147,586	\$147,586	2/21/2019	9/17/2021	
215205	The Engineered Single Guide Ribonucleic acid Structure as a Biomarker for Gene-editing Reagent Exposure		\$104,995	\$104,995	2/5/2019	9/17/2021	
214973	Dual Light Source Microscopy		\$279,342	\$279,342	1/9/2019	9/18/2020	
214955	Supporting Reflectance Simulation Through Uranium Crystal Growth		\$103,793	\$103,793	1/3/2019	9/20/2019	
214954	Enhanced Light-Matter Interaction with Non-Resonant, Broadband Electric Field Enhancement		\$100,358	\$100,358	1/3/2019	9/20/2019	
214953	An Anisotropic Adaptive Voronoi Meshing Method		\$99,378	\$99,378	1/3/2019	9/20/2019	
214921	Clustered Regularly Interspaced Short Palindromic Repeats associated protein 9 Post-translational Modifications: A Potential Biomarker of Gene editing		\$88,777	\$88,777	12/20/2018	9/20/2019	
214918	Biologically Realized Artificial Intelligence Neuromorphic Systems		\$93,659	\$93,659	12/20/2018	9/20/2019	
214915	Laser-Diagnostic Platform for Multi-Parameter Hypersonics Measurements		\$104,542	\$104,542	12/20/2018	9/20/2019	
214914	Low Dark Current Extended Short-Wave Infrared Detectors on Indium Phosphide		\$95,812	\$95,812	12/20/2018	9/20/2019	
214907	Applying Experimental Boundary Conditions in Computational Structural Dynamics		\$92,656	\$92,656	12/20/2018	9/20/2019	
214906	Investigation of Resistance-Curve Behavior in Glass Ceramic Materials		\$85,960	\$85,960	12/20/2018	9/20/2019	
214905	Microstructural Modification and Healing of Additively Manufactured Parts by Electrospinning		\$102,771	\$102,771	12/20/2018	9/20/2019	
214903	Incremental Interval Assignment for Scalable Mesh Preparation		\$76,873	\$76,873	12/20/2018	9/20/2019	
214802	Measuring Aging Related Degradation in Integrated Circuits		\$329,289	\$329,289	12/12/2018	9/17/2021	
214573	Development of Clustered Regularly Interspaced Short Palindromic Repeats associated protein 9 based Transcriptional Inhibitors and Non-Integrative Delivery Vehicles as Medical Countermeasures against Burkholderia Respiratory Infection		\$619,483	\$619,483	11/26/2018	9/20/2019	
214546	Modeling a High-Performance, Low Power Onboard Analog Neural Algorithm Processing Unit		\$89,626	\$89,626	10/1/2018	9/17/2021	
214539	Functionally Graded Energetic Materials for Detonation Wave Shaping		\$128,139	\$128,139	11/20/2018	9/19/2019	
214502	Polyhedral Elements for Automatic Mesh Generation		\$118,158	\$118,158	10/1/2018	9/20/2019	
214489	Towards Quantum-Limited Cryogenic Amplification for Multi-Qubit Platforms		\$122,823	\$122,823	11/14/2018	9/20/2019	
214488	Brain-inspired solutions - Robust Autonomous Navigation in Sensor-Deprived Contexts		\$103,413	\$103,413	11/14/2018	9/17/2021	
214441	Scalable Firmware Emulation		\$388,285	\$388,285	11/13/2018	9/17/2021	
214391	Improved Sensor-Based Navigation via Integrated Autonomous Map Construction, Localization and Target/Feature Recognition		\$94,756	\$94,756	10/1/2018	9/17/2021	
214290	Dynamic Heterogeneity through Nanostructure: Tough, High Glass Transition Temperature Thermosets Cured under Mild Conditions		\$394,219	\$394,219	10/1/2018	9/17/2021	
214286	Location-Specific Mechanical Property Enhancement of Soft Magnetic Alloys		\$53,207	\$53,207	10/30/2018	9/20/2019	
214285	Testing Percolated Pathways to Enhance Ion Transport in Polymer Electrolytes		\$110,969	\$110,969	10/30/2018	9/20/2019	
214284	Photonic Field-Programmable Gate Array Enabled by Liquid Crystal Waveguides		\$91,124	\$91,124	10/30/2018	9/20/2019	
214283	Nondestructive, Inexpensive, Optical Method to Detect Defects (Measure Residual Stress), Particularly in Additive Manufacturing		\$91,549	\$91,549	10/30/2018	9/20/2019	
214279	Automated Measurements for a Nine Quantum Dot Device Toward the Realization of a Few Qubit Quantum Simulator		\$99,794	\$99,794	10/30/2018	9/20/2019	
214278	Active Dopant Optical Spectroscopy via Laser Ablation for High Resolution Spectral Measurements on Z machine		\$84,037	\$84,037	10/30/2018	9/20/2019	
214277	Augmenting Neural Network Language Models with Explicit Domain Structure		\$100,340	\$100,340	10/30/2018	9/20/2019	
214276	Understanding High Strain Rate Cracking of a Refractory Alloy		\$103,662	\$103,662	10/30/2018	9/20/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
214237	Nanoscale Ion Intercalation Physics in Metal Oxide Materials for Ultra-Low Voltage Memory and Logic Applications	0	\$302,817	\$302,817	10/25/2018	9/18/2020	
214188	Integrated Photonics for Enhanced Dynamic Range Radio Frequency Systems	0	\$348,415	\$348,415	10/23/2018	9/20/2019	
214187	Birthing Stress: Novel Diagnostics and Disruptive Material Models for Solidifying/Percolating Systems	0	\$102,494	\$102,494	10/1/2018	9/20/2019	
214186	Wearable Micro-Needle Array Based Sensor for BioAgent Exposure	0	\$103,556	\$103,556	10/23/2018	9/20/2019	
214185	Molecular-Level Investigation of Shock-Vortex Interaction	0	\$98,519	\$98,519	10/23/2018	9/20/2019	
214183	Utilizing Highly Scattered Light for Intelligence through Aerosols	0	\$134,686	\$134,686	10/23/2018	9/20/2019	
214182	Detectors for Agile Imaging in Spectrally-diverse Environments	0	\$402,922	\$402,922	10/1/2018	9/18/2020	
214158	Novel Chemistry to Support the Detection of Advanced Chemical Agents	0	\$95,547	\$95,547	10/23/2018	9/20/2019	
214155	Elastomeric Photonic Metamaterial Film for Chameleon-Like Radio Frequency Tunability	0	\$73,768	\$73,768	10/23/2018	9/20/2019	
214149	Hybridizing Classifiers and Collection Systems to Maximize Intelligence and Minimize Uncertainty in National Security Data Analytics Applications	0	\$164,188	\$164,188	10/1/2018	9/20/2019	
214148	Rigorous Data Fusion for Computationally Expensive Simulations	0	\$130,019	\$130,019	10/1/2018	9/20/2019	
214104	Toward Tailored Performance in Additive Manufactured Energetic Materials by Controlling the Characteristic Length Scales of Mixing	0	\$117,890	\$117,890	10/1/2018	9/20/2019	
214103	Multiscale Modeling High-Order Methods, and Data-Driven Modeling	0	\$100,027	\$100,027	10/15/2018	9/18/2020	
214101	Development of Radiation Resistant Copper/Copper Alloys for Electronic Applications	0	\$288,716	\$288,716	10/15/2018	9/20/2019	
214057	Optical Property Sculpting with Phonon Laminates	0	\$292,213	\$292,213	10/1/2018	9/18/2020	
213941	Anion-Imprinted Porous Polymers for Water Purification and Chemical Detection	0	\$262,604	\$262,604	10/1/2018	9/17/2021	
213872	Secure Extreme Environment Embedded Computing	0	\$2,698,572	\$2,698,572	10/1/2018	9/17/2021	
213871	Science and Engineering of Cybersecurity by Uncertainty quantification and Rigorous Experimentation: An Evidence-Based Approach for Cybersecurity	0	\$2,278,415	\$2,278,415	10/1/2018	9/17/2021	
213859	Imaging Microwave Fields with Sub-Micron Resolution using Nitrogen-Vacancy Centers in Diamond	0	\$270,991	\$270,991	1/17/2019	9/17/2021	
213858	Tunable Thermal Transport across Interfaces via Phonon Engineering	0	\$117,808	\$117,808	1/7/2019	9/20/2019	
213857	Modeling the Nonlinear Rheology of Additive Manufacturing	0	\$255,822	\$255,822	10/1/2018	9/17/2021	
213856	The Evolution of Complex Surfaces Examined Molecule by Molecule	0	\$268,926	\$268,926	10/1/2018	9/17/2021	
213855	Remote Radiation Detection using Spectral Measurement of Inelastically Backscattered Laser Pulses	0	\$75,186	\$75,186	10/1/2018	9/20/2019	
213092	A New Route to Quantum-Scale Structures through a Novel Enhanced Germanium Diffusion Mechanism	0	\$371,637	\$371,637	10/1/2018	9/17/2021	
213091	Advanced Cryogenic Fuel Configurations for Inertial Confinement Fusion Target Concepts	0	\$518,923	\$518,923	10/1/2018	9/17/2021	
213090	Developing Inductively Driven Diagnostic X-ray Sources to Enable Transformative Radiography and Diffraction Capabilities on Z machine	0	\$406,741	\$406,741	10/1/2018	9/18/2020	
213089	An X-ray Intensity Operations Monitor for In Situ, Temporally-Resolved Spectral Characterization of Saturn Sources	0	\$583,320	\$583,320	10/1/2018	9/17/2021	
213088	A Platform-Independent X-ray Diffraction Diagnostic for Phase Transition Kinetics in Traditional and Synthetic Microstructure Materials	0	\$754,944	\$754,944	10/1/2018	9/17/2021	
213087	Data-Driven, Radiation-Aware, Agile Modeling Approach for Rapid Nuclear Deterrence Design Assessment	0	\$524,825	\$524,825	10/1/2018	9/17/2021	
213086	Multiple Hypothesis Navigation	0	\$275,556	\$275,556	10/1/2018	9/18/2020	
213085	Inverse Design of Acoustic Metamaterials for Achieving Chameleon Technologies	0	\$395,304	\$395,304	10/1/2018	9/18/2020	
213084	Developing Better Batteries	0	\$208,599	\$208,599	10/1/2018	9/18/2020	
213083	Temporally-Informed Graph Representations	0	\$350,054	\$350,054	10/1/2018	9/17/2021	
213081	Bandwidth Limited Incremental Firmware Update For Improved Quick Responsiveness	0	\$191,517	\$191,517	10/1/2018	9/18/2020	
213080	Establishing a Methodology for the Optimal Use of Machine Learning to Identify Radioisotopes from Gamma Spectra for Nuclear Security Applications	0	\$303,510	\$303,510	10/1/2018	9/18/2020	
213079	Cascade Communications	0	\$380,538	\$380,538	10/1/2018	9/18/2020	
213077	Machine Learning for Correlated Intelligence	0	\$303,028	\$303,028	10/1/2018	9/17/2021	
213076	Ophrys: Using Low Rank Decompositions to Improve Fuzzing Capabilities	0	\$322,390	\$322,390	10/1/2018	9/18/2020	
213075	Quantifying Uncertainty in Graphs ? A Step in Graph Noise Characterization	0	\$330,490	\$330,490	10/1/2018	9/18/2020	
213074	Localized Electromagnetic Probing for Failure Analysis in Noisy Environments	0	\$221,042	\$221,042	10/1/2018	9/20/2019	
213071	Explicit Uncertainty for Binary Analysis	0	\$389,503	\$389,503	10/1/2018	9/17/2021	
213070	Propagating Uncertainties for an Evidence-Based Approach for Cybersecurity	0	\$283,297	\$283,297	10/1/2018	9/17/2021	
213069	Characterization and Optimization of Building Blocks for Specialized Computing Platforms	0	\$290,983	\$290,983	10/1/2018	9/17/2021	
213068	Joint Analysis of Program Data Representations using Machine Learning for Improved Software Assurance and Development Capabilities	0	\$312,074	\$312,074	10/1/2018	9/18/2020	
213067	Novel Applications of Scanning Ultrafast Electron Microscopy	0	\$353,746	\$353,746	10/1/2018	9/20/2019	
213066	Digital Logic Gates for Extreme Environment Applications	0	\$769,080	\$769,080	10/1/2018	9/17/2021	
213065	A Miniaturized Optical Atomic Clock for High Performance Navigation, Communication, and Radar Applications	0	\$663,145	\$663,145	10/1/2018	9/17/2021	
213064	High-Brightness, Ultraviolet Lasers for Leap-Ahead National Security Applications	0	\$609,710	\$609,710	10/1/2018	9/17/2021	
213062	Leveraging Spin-Orbit Coupling in Germanium/Silicon-Germanium Heterostructures for Quantum Information Transfer	0	\$491,141	\$491,141	10/1/2018	9/17/2021	
213061	Gallium Nitride Vacuum Nanoelectronics: A New Platform for Radiation-Hard Devices and Beyond	0	\$561,582	\$561,582	10/1/2018	9/17/2021	
213060	Nanoantenna-Based Chip-Scale Spectroscopy for Massive Size, Weight, and Power Reduction	0	\$455,437	\$455,437	10/1/2018	9/18/2020	
213059	Radiation Hard Nonvolatile Memory and Logic Based on Magnetic Tunnel Junctions	0	\$495,124	\$495,124	10/1/2018	9/17/2021	
213057	Novel Optical Coupling For Heterogeneous Photonics	0	\$133,382	\$133,382	10/1/2018	9/20/2019	
213055	Exploring Concepts of Radiation Science and Materials for a Strategically Radiation Hardened 90-nm Complementary metal-oxide-semiconductor Technology	0	\$847,625	\$847,625	10/1/2018	9/17/2021	
213054	Enhance Coherence Time in Intensely Driven Quantum Systems	0	\$220,294	\$220,294	10/1/2018	9/18/2020	
213050	Instantaneous Three-Dimensional Temperature Measurements via Ultrafast Laser Spectroscopy with Structured Light	0	\$195,031	\$195,031	10/1/2018	9/17/2021	
213048	A Quantum Analog Coprocessor for Correlated Electron Systems Simulation	0	\$215,015	\$215,015	10/1/2018	9/18/2020	
213047	Aerial Crosspolarized Nuclear Quadrupole Resonance-Nuclear Magnetic Resonance: Buried Explosive Detection From a Safe Distance	0	\$218,557	\$218,557	10/1/2018	9/18/2020	
213043	Optimization-Based Design for Manufacturing	0	\$682,266	\$682,266	10/1/2018	9/17/2021	
213038	Heterogeneous Integration of Compound Semiconductor Technology with Silicon Electronics for Radio Frequency Photonics	0	\$590,299	\$590,299	10/1/2018	9/17/2021	
213036	Revolutionizing Weapons-Component Design via Advanced Uncertainty Quantification and Reduced-Order Modeling	0	\$485,223	\$485,223	10/1/2018	9/17/2021	
213035	Enabling Embedded Sensing in Composites through Damage Tolerance	0	\$579,118	\$579,118	10/1/2018	9/17/2021	
213034	Survivable Location System for Post Flight Test Asset Recovery	0	\$571,056	\$571,056	10/1/2018	9/17/2021	
213032	Enhanced Nuclear Deterrence Through Trusted Fully Integrated Transceiver Architectures and Alternative Data Processing Techniques	0	\$441,202	\$441,202	10/1/2018	9/17/2021	
213031	Automated Algorithms for Predicting Trends and Identifying Subpopulations in Neutron Generator Production Data	0	\$334,753	\$334,753	10/1/2018	9/17/2021	
213030	Fundamental Mechanisms of Friction Evolution in Lamellar Solids	0	\$593,752	\$593,752	10/1/2018	9/17/2021	
213027	High-Z Nanometal-Filled Hybrid Materials for Three-Dimensional-Printed Modular Shields	0	\$603,108	\$603,108	10/1/2018	9/17/2021	
213026	Magnetic Field Synthesis at the Nanoscale for Engineered Quantum Materials	0	\$270,294	\$270,294	10/1/2018	9/17/2021	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
213025	Multimode Metastructures: Novel Hybrid Three-Dimensional Lattice Topologies		0	\$509,628	10/1/2018	9/17/2021	
213023	Achieving High Detectivity Thermal Sensors using Ultrafast Electron Microscopy		0	\$525,532	10/1/2018	9/17/2021	
213022	Influence of Displacement Damage on Aluminum Gallium Nitride Electronic Properties		0	\$510,918	10/1/2018	9/20/2019	
213020	Improved Battery Performance, Safety, and Cycle Lifetime through Engineering Stress at Electrode-Electrolyte Interfaces		0	\$622,642	10/1/2018	9/18/2020	
213019	Forecasting Marine Sediment Properties On and Near the Arctic Shelf with Geospatial Machine Learning		0	\$525,338	10/1/2018	9/17/2021	
213018	Direct Subsurface Measurements through Precise Micro Drilling		0	\$490,574	10/1/2018	9/17/2021	
213017	Far-Reaching Application, Implication, and Realization of Digital Electronics at the Atomic Limit		0	\$5,610,839	10/1/2018	9/17/2021	
213016	Credible Computational Meshes from Ill-Defined Geometries using Deep Machine Learning		0	\$695,294	10/1/2018	9/17/2021	
213015	Spatially and Temporally Resolved Velocimetry for Hypersonic Flows		0	\$546,432	10/1/2018	9/17/2021	
213014	Agile "Lego-Like" Full-System Design with Domain-Decomposition Uncertainty Quantification and Reduced-Order Modeling		0	\$174,267	10/1/2018	9/17/2021	
213013	Automated and Optimal Design of Nonlinear Structures in Contact		0	\$378,935	10/1/2018	9/17/2021	
213012	An Error Estimation Driven Adaptive Tetrahedral Workflow for Full Engineering Models		0	\$148,122	10/1/2018	9/17/2021	
213011	Rapid Three-Dimensional Imaging of Non-Nuclear Components		0	\$580,518	10/1/2018	9/17/2021	
213010	Enabling Particulate Materials Processing Science for High-Consequence, Small-Lot Precision Manufacturing		0	\$507,234	10/1/2018	9/17/2021	
213009	Neural Networks to Model Nonlinear and Multi-Physics Phenomena		0	\$231,082	10/1/2018	9/17/2021	
213008	Predictive Data-Driven Platform for Subsurface Energy Production		0	\$508,315	10/1/2018	9/17/2021	
213007	Integrated Multiphysics Modeling of Environmentally Assisted Brittle Fracture		0	\$386,538	10/1/2018	9/17/2021	
213006	Multi-Resolution Characterization of the Coupling Effects of Molten Salts, High Temperature and Irradiation on Intergranular Fracture		0	\$510,821	10/1/2018	9/17/2021	
213005	Advanced Detection of Wellbore Failure for Safe and Secure Utilization of Subsurface Infrastructure		0	\$514,665	10/1/2018	9/17/2021	
213004	A Synthetic Opioid Detector Technology		0	\$450,799	10/1/2018	9/17/2021	
213003	Building Foundational Capabilities and Understanding for a Sustained Thermal Barrier Coating Research and Development Program for Internal Combustion Engine Applications		0	\$472,957	10/1/2018	9/17/2021	
213002	Metrology for Distributed Sensing Formations		0	\$383,311	10/1/2018	9/17/2021	
213001	Robust Scalable Detection and Tracking for Wide Area Surveillance		0	\$388,928	10/1/2018	9/17/2021	
213000	Attack Inference for Threat Awareness and Threat Identification Using Attack Graphs and Game Theory		0	\$262,477	10/1/2018	9/17/2021	
212999	Optical Spectroscopy of Plutonium		0	\$403,965	10/1/2018	9/18/2020	
212998	Radio Frequency Feature Extraction using Wireless Protocol Informatics, Pattern Matching, and Natural Language Processing		0	\$391,935	10/1/2018	9/17/2021	
212997	High Performance Metasurface Optics for Aberration Control		0	\$325,381	10/1/2018	9/20/2019	
212996	Coherent Intensity Fluctuation Interferometry		0	\$218,058	10/1/2018	9/18/2020	
212995	Metasurface-Based Tunable Optical Filters		0	\$120,654	10/1/2018	9/20/2019	
212994	Assessing Seismic Analysis and Analysis Performance Using the Normalized Compression Distance Metric		0	\$276,282	10/1/2018	9/18/2020	
212993	Continuous Full-Resolution Two-Color Infrared Detector		0	\$340,753	10/1/2018	9/17/2021	
212992	Longwave Infrared Hyperspectral Imager for Unmanned Aerial Systems		0	\$261,399	10/1/2018	9/18/2020	
212991	Broadband Differential Absorption Lidar for Proliferation Detection		0	\$352,657	10/1/2018	9/18/2020	
212989	Simulation of a Molten Salt Reactor Facility		0	\$372,056	10/1/2018	9/17/2021	
212988	Quantum-Secure Optical Fence for Physical Security		0	\$343,991	10/1/2018	9/17/2021	
212987	Application of High Energy Particle Beams to Disable Nuclear Devices		0	\$419,570	10/1/2018	9/18/2020	
212986	Developing Advanced Neutron Imaging Technology to Determine the State of Shielded Electronics		0	\$496,607	10/1/2018	9/17/2021	
212984	Single Particle Aerosol Mass Spectrometry for In-field Characterization of Weapons Production Effluents and Nuclear Detonation Debris		0	\$425,448	10/1/2018	9/17/2021	
212982	Realistic Emulation of Automated Synthetic Biology Facilities to Prevent Risk of Unintended Manufacture		0	\$546,804	10/1/2018	9/18/2020	
212980	Utilizing a Single Particle Aerosol Mass Spectrometer as a Chemical, Biological, Radiological, Nuclear, and high yield Explosives Forensic Tool and Detector		0	\$409,943	10/1/2018	9/17/2021	
212979	Asymptotically Compatible strong form foundations for Nonlocal Discretization		0	\$592,027	10/1/2018	9/17/2021	
212978	Emergent Recursive Multiscale Interaction		0	\$605,597	10/1/2018	9/17/2021	
212976	Risk-Adaptive Experimental Design for High-Consequence Systems		0	\$386,900	10/1/2018	9/17/2021	
212974	High Precision Sparse and Dense Analog Matrix Multiplication		0	\$377,764	10/1/2018	9/17/2021	
212973	Resilient Computing using Dynamical Systems		0	\$228,258	10/1/2018	9/20/2019	
212971	Neuromorphic Graph Algorithms		0	\$378,766	10/1/2018	9/17/2021	
212970	Quantum Manifold Learning		0	\$351,391	10/1/2018	9/17/2021	
212968	Information-Theoretically-Secure Distributed Machine Learning		0	\$159,006	10/1/2018	9/20/2019	
212967	Energy-Efficient Implementation of Partial Differential Equations by Stochastic and Deterministic Neuromorphic Algorithms		0	\$512,064	10/1/2018	9/18/2020	
212965	Data Science for Detection of Genome Editing		0	\$437,536	10/1/2018	9/17/2021	
212963	Optomechanical Ultrasound for Cellular Imaging and Tagless Selection		0	\$389,652	10/1/2018	9/17/2021	
212960	Phycoviruses: Virus Discovery and Engineering for Advanced Biofuels		0	\$551,534	10/1/2018	9/17/2021	
212959	Detection of Clustered Regularly Interspaced Short Palindromic Repeats associated protein 9 Expression in Single, Living Mammalian Cells		0	\$462,242	10/1/2018	9/17/2021	
212957	Clustered regularly interspaced short palindromic repeats Engineering for Rapid Enhancement of Strains		0	\$533,984	10/1/2018	9/17/2021	
212955	Quantum-Based Electron Spin Resonance Platform for Nanomaterials		0	\$436,627	10/1/2018	9/17/2021	
212954	Universal Probing of Short-Lived Intermediates Using Table-Top extreme ultraviolet and vacuum ultraviolet Radiation		0	\$546,726	10/1/2018	9/17/2021	
212952	Incorporating Physical Constraints into Gaussian Process Surrogate Models		0	\$448,239	10/1/2018	9/18/2020	
212950	Isotopic Fractionation as In Situ Sensor of Subsurface Reactive Flow and Precursor for Rock Failure		0	\$461,272	10/1/2018	9/17/2021	
212947	An Optimization and Robust Control Technique for use in Flight Control Design for Hypersonic Vehicles		0	\$454,643	10/1/2018	9/18/2020	
212946	Neural-Inspired Approaches and Implementations for Automatic Target Recognition		0	\$697,901	10/1/2018	9/17/2021	
212943	Rapid High-Fidelity Aerothermal Responses with Quantified Uncertainties via Reduced-Order Modeling		0	\$508,631	10/1/2018	9/17/2021	
212942	Dragonfly-Inspired Algorithms for Intercept-Trajectory Planning		0	\$237,970	10/1/2018	9/20/2019	
212941	Magnetometer-Aided Navigation for Hypersonic Strike Vehicles		0	\$295,077	10/1/2018	9/18/2020	
Total # of Projects for SNL: 404 Total Equipment Cost for SNL: \$0 Total Other Cost for SNL: \$177,660,707 Total Cost for SNL: \$177,660,707							
SRS- Savannah River Site							
SR19039	All Metal Vacuum Scroll Pump Development for Tritium		0	\$72,793	10/1/2018	9/30/2021	
SR19036	Improve Target Rod Preparation Cutter Head Performance		0	\$70,757	10/1/2018	9/30/2021	
SR19031	Evaluation of Inorganic and Organic Tritium Behavior in Forest Vegetation at Savannah River Site		0	\$183,586	10/1/2018	9/30/2021	
SR19025	Advance Options for High-Resolution-Low-Mass Mass Spectroscopy and Tritium Instrumentation Demonstration Station Applications		0	\$270,188	10/1/2018	9/30/2021	
SR19021	Tritium Aging of Regenerated Lanthanum-Nickel-Aluminum-75		0	\$388,842	10/1/2018	9/30/2021	
SR19016	Characterization of Additive Manufacturing Materials for Savannah River Tritium Enterprise Service		0	\$254,995	10/1/2018	9/30/2021	
SR19012	Alternative Characterization Methods for Q-Passivated Components		0	\$265,309	10/1/2018	9/30/2021	
SR19009	Future Recovered Gas Dryer Development		0	\$211,262	10/1/2018	9/30/2021	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
SR19007	Future Thermal Cycling Absorption Process Implementation Issues	0	\$326,408	\$326,408	10/1/2018	9/30/2021	
SR17024	Characterization and Tritium Aging of Lanthanum Nickel Aluminum.85 for Regenerative Testing	0	\$94,708	\$94,708	10/1/2016	9/30/2019	
SR18001	Induction Heating of Metals for Storage Beds	0	\$119,226	\$119,226	10/1/2017	9/30/2020	
SR17007	Comprehensive Automated Pinch Weld System	0	\$48,098	\$48,098	10/1/2016	9/30/2019	
SR18024	Molecular Sieves for Humidity Probe Protection	0	\$149,011	\$149,011	10/1/2017	9/30/2020	
SR18010	Photo-cleaned Backgroundless Ion Chambers	0	\$179,886	\$179,886	10/1/2017	9/30/2020	
Total # of Projects for SRP: 14		Total Equipment Cost for SRP: 50		Total Other Cost for SRP: \$2,635,069		Total Cost for SRP: \$2,635,069	
Y-12 National Security Complex							
PD18W870	Explosive Barrier Testing and Data Collection	0	\$209,378	\$209,378	10/1/2017	9/30/2020	
PD18W500	Standoff gamma imaging evaluation and applications	0	\$143,606	\$143,606	10/1/2017	9/30/2020	
PD18W060	Mesh Radio Replacement Demonstration	0	\$137,767	\$137,767	10/1/2017	9/30/2020	
PD18U650	Microwave Casting Process Margin Study	0	\$1,164,819	\$1,164,819	10/1/2017	9/30/2020	
PD18U410	Recycle of Binary Machine Turnings	0	\$741	\$741	10/1/2017	9/30/2020	
PD18S620	Modern Lithium Crusher	0	\$62,935	\$62,935	10/1/2017	9/30/2020	
PD18S440	Machine Dust Oxygen Reduction	0	\$161,158	\$161,158	10/1/2017	9/30/2020	
PD18S310	Modernization of the Insider Quantification and Ranking Process	0	\$295,786	\$295,786	10/1/2017	9/30/2020	
PD18S150	Pilot Scale Lithium Purification	0	\$399,586	\$399,586	10/1/2017	9/30/2020	
PD18Q760	Programmable Logic Controller for Mass Spectrometers	0	\$427,890	\$427,890	10/1/2017	9/30/2020	
PD18N710	Uranium Coating and Plating Process Development	0	\$245,666	\$245,666	10/1/2017	9/30/2020	
PD18N630	Nuclear Fuel Development	0	\$661,902	\$661,902	10/1/2017	9/30/2020	
PD18A590	AM Process Control and Repeatability, Defect Detection, and Material Behavior	0	\$1,112,181	\$1,112,181	10/1/2017	9/30/2020	
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	\$571,889	\$571,889	10/1/2016	9/30/2019	
PD17W160	Predictive Analytics and Interactive Dashboard	0	\$579,930	\$579,930	10/1/2016	9/30/2019	
PD17W150	Maintenance Advanced Technology Initiative	0	\$1,299,278	\$1,299,278	10/1/2016	9/30/2019	
PD17U250	Lab-scale Vacuum Arc Remelt for Uranium Alloy Development	0	\$2,567,873	\$2,567,873	10/1/2016	9/30/2019	
PD17U240	Direct Electrolytic Reduction and Electrorefining	0	\$2,202,270	\$2,202,270	10/1/2016	9/30/2019	
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	\$2,108,053	\$2,108,053	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	\$674,750	\$674,750	10/1/2016	9/30/2019	
PD17A020	Dual Use Electron Beam Welder	0	\$1,069,586	\$1,069,586	10/1/2016	9/30/2019	
PD19Q910	Canned Sub-Assembly Computed Tomography	0	\$83,860	\$83,860	10/1/2018	9/30/2021	
PD19Q030	Uncertainty Quantification for Metrology in Computed Tomography	0	\$134,994	\$134,994	10/1/2018	9/30/2021	
PD19N570	Supply Chain Secure Collaboration	0	\$67,929	\$67,929	10/1/2018	9/30/2021	
PD19N340	Radio Frequency Readout of Radiation Sensing Graphitic Based Inks	0	\$68,094	\$68,094	10/1/2018	9/30/2021	
PD19N260	Manufacturing Innovation Network /Industrial Base Cybersecurity Initiative Collaboration	0	\$750,637	\$750,637	10/1/2018	9/30/2021	
PD19N180	Texas A&M Technology Suite	0	\$82,830	\$82,830	10/1/2018	9/30/2021	
PD19N140	Nuclear Detection Sensor Testing Center Non-Destructive Testing	0	\$190,253	\$190,253	10/1/2018	9/30/2021	
PD19U970	Electron Beam furnace support	0	\$153,842	\$153,842	10/1/2018	9/30/2021	
PD19U950	Measurement of C and other elements in microwave castings using hand-held laser induced breakdown spectroscopy	0	\$403,203	\$403,203	10/1/2018	9/30/2021	
PD19U930	Direct Chip Melt Optimization Studies	0	\$86,738	\$86,738	10/1/2018	9/30/2021	
PD19U750	Calmer Testing	0	\$1,324,149	\$1,324,149	10/1/2018	9/30/2021	
PD19S940	Evacuation and Accountability through biometrics	0	\$28,795	\$28,795	10/1/2018	9/30/2021	
PD19S860	Radar as a tactical sensor	0	\$309,759	\$309,759	10/1/2018	9/30/2021	
PD19S450	Ultra-Wide Band as a Perimeter Intrusion System	0	\$27,050	\$27,050	10/1/2018	9/30/2021	
PD19R880	High Temperature Generated Oxide with Quench	0	\$48,893	\$48,893	10/1/2018	9/30/2021	
PD19R840	Lithium Isotope Separation	0	\$131,353	\$131,353	10/1/2018	9/30/2021	
PD19L800	Lithium Electrolysis Cell	0	\$999,987	\$999,987	10/1/2018	9/30/2021	
PD19L660	Near Net Shape Lithium Hydride	0	\$222,673	\$222,673	10/1/2018	9/30/2021	
PD19L610	Lithium Plug Detection and Removal	0	\$284,081	\$284,081	10/1/2018	9/30/2021	
PD19I790	Development of a Mobile Worker System	0	\$564,501	\$564,501	10/1/2018	9/30/2021	
PD19I740	Digitization of Maintenance Round Sheets for Trending Analysis & Analytics	0	\$90,961	\$90,961	10/1/2018	9/30/2021	
PD19F440	Finish Machining Modulated Tool Path	0	\$354,029	\$354,029	10/1/2018	9/30/2021	
PD19E190	Eco-Friendly Quantum Dot Coating for Radiation Contamination Indication	0	\$302,831	\$302,831	10/1/2018	9/30/2021	
PD19C880	Supervisory Control and Data Acquisition Test Bed	0	\$13,747	\$13,747	10/1/2018	9/30/2021	
PD19C470	Machine Learning Implementation for Y-12 Deliverables	0	\$63,743	\$63,743	10/1/2018	9/30/2021	
PD19C290	Virtual Reality Training Environments	0	\$744,422	\$744,422	10/1/2018	9/30/2021	
Total # of Projects for Y-12: 47		Total Equipment Cost for Y-12: 50		Total Other Cost for Y-12: \$23,630,398		Total Cost for Y-12: \$23,630,398	
INL - Idaho National Lab							
I18P38-004FP	Feasibility Assessment of a Molten Salt Loop in the ATR (Deslonde DeBoschian Postdoctoral Award)	0	\$145,008	\$145,008	5/16/2018	4/15/2020	
I18P38-002FP	In-Situ Investigation of Bond-Structure and Local Chemistry in Molten Salts using Optical and Electrochemical Techniques	0	\$156,436	\$156,436	2/20/2018	1/31/2020	
I18P38-001FP	Radiation Chemical Kinetics of Actinide Redox Speciation	0	\$164,744	\$164,744	2/21/2018	9/30/2020	
I18P37-036FP	Industrial Control System Vulnerability Analysis	0	\$127,344	\$127,344	5/14/2018	9/30/2019	
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 phosphatation and oxidation cleaning of a ship's and yacht's 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 pre-coating 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	\$314,050	\$314,050	5/16/2018	9/30/2020	
I18P37-033FP	Robust Insulation For Resilient Transformers Against an Electromagnetic Pulse or Geomagnetic Disturbance	0	\$502,372	\$502,372	5/16/2018	9/30/2020	
I18P37-031FP	Expanding photo-nuclear data via high-energy Linear Accelerator coupled with real time gaseous mass separation	0	\$482,463	\$482,463	5/16/2018	9/30/2020	
I18P37-030FP	Intelligent Additive Manufacturing	0	\$390,441	\$390,441	5/16/2018	9/30/2019	
I18P37-028FP	Exploration of Advanced Partitioning Methods	0	\$88,315	\$88,315	5/16/2018	9/30/2019	
I18P37-027FP	A reactive molecular dynamics simulation approach to understand interfacial interactions of lithium and graphite under extreme high rate conditions	0	\$291,997	\$291,997	5/16/2018	9/30/2019	
I18P37-023FP	Robust Algorithm Development for Mechanical Contact	0	\$51,675	\$51,675	5/16/2018	9/30/2019	
I18P37-019FP	Modeling and Simulation of Advanced Manufacturing Techniques: Additive Manufacturing and Laser Welding	0	\$64,046	\$64,046	5/16/2018	9/30/2019	
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	\$280,897	\$280,897	5/16/2018	4/15/2021	
I18P37-007FP	Neutron Diffraction of Irradiated Nuclear Fuel	0	\$428,001	\$428,001	5/16/2018	9/30/2020	
I18P37-001FP	In-File Investigation of Transient Boiling in the Transient Reactor Test Facility	0	\$1,045,494	\$1,045,494	5/16/2018	9/30/2020	
I18A40-049FP	Deep-learning approaches for the analysis of synchrotron data of materials used in energy and environmental applications	0	\$118,648	\$118,648	7/17/2018	9/30/2019	
I18A40-029FP	Advanced Probabilistic Risk Assessment through Continuous Fault Trees using R Functions	0	\$65,922	\$65,922	7/18/2018	9/30/2019	
I18A40-023FP	Neutron Spectrum Generator	0	\$29,376	\$29,376	7/30/2018	9/30/2019	
I18A40-021FP	Investigation of Dual Material Shaped-Charge Liners	0	\$41,708	\$41,708	7/9/2018	9/30/2019	
I18A40-020FP	Separation of Fragile Chemical Species using Carbon Nanotube Emitters at Very Low Electrical Potential	0	\$81,289	\$81,289	8/13/2018	9/30/2019	
I18A40-014FP	Accelerating irradiated fuel studies by advanced surrogate samples	0	\$37,800	\$37,800	7/23/2018	9/30/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
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 \$70,931	\$70,931	7/17/2018	9/30/2019	
I18A40-001FP	Rapid Field Chemical Detection and Determination of Actinides		0 \$111,339	\$111,339	7/9/2018	9/30/2019	
I18A12-212FP	High Performance Computing-based Dynamically Adaptive Protection Schemes for Electric Grid		0 \$332,261	\$332,261	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 \$246,762	\$246,762	10/2/2017	9/30/2020	
I18A12-206FP	Development of an Advanced Method for Transient Reactor Test Facility Modeling and Simulation with Thermal Graphite Model Validation		0 \$265,797	\$265,797	10/2/2017	9/30/2020	
I18A12-201FP	Development of structural elements in Multiphysics Object-Oriented Simulation Environment		0 \$213,460	\$213,460	10/2/2017	9/30/2020	
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 \$241,034	\$241,034	10/2/2017	9/30/2020	
I18A12-150FP	Small scale tensile testing technique for measuring grain boundary strength of neutron-irradiated materials in focused ion beam systems		0 \$322,202	\$322,202	10/2/2017	9/30/2019	
I18A12-133FP	Community of Learning for Cyber Adversary Activity		0 \$41,364	\$41,364	10/2/2017	9/30/2019	
I18A12-132FP	Dynamics of Multi-layer Complex Infrastructure Networks		0 \$146,472	\$146,472	10/2/2017	9/30/2020	
I18A12-131FP	Cyber-Secure Physical Layer Security in Millimeter Wave Communications		0 \$268,349	\$268,349	10/2/2017	9/30/2020	
I18A12-130FP	Development of Advanced Three-Dimensional Printing Technologies for Cutting Edge Materials		0 \$221,945	\$221,945	10/2/2017	9/30/2020	
I18A12-116FP	Boron Suboxide & Refractory Transition Metal Boride Fabrication by Spark Plasma Sintering		0 \$505,451	\$505,451	10/2/2017	9/30/2020	
I18A12-112FP	Production of ethane to ethylene using carbon dioxide as a soft oxidant		0 \$195,067	\$195,067	10/2/2017	9/30/2020	
I18A12-107FP	Novel Synthesis of Neptunium Irradiation Targets Through Advanced Electrochemical Techniques		0 \$285,620	\$285,620	10/23/2017	9/30/2020	
I18A12-105FP	Advanced manufacturing for novel nuclear fuel and structural components		0 \$409,102	\$409,102	10/2/2017	9/30/2020	
I18A12-088FP	Thermomechanical Processing of Titanium Alloys for Improved Ballistic Performance		0 \$205,085	\$205,085	10/2/2017	9/30/2020	
I18A12-082FP	Solvent Radiolysis Product Production using Preparative High Performance Liquid Chromatography		0 \$88,627	\$88,627	10/2/2017	9/30/2020	
I18A12-080FP	Enabling Highly Scalable Multiphysics Simulation of Particulate Systems on Exascale Computing Architectures		0 \$253,467	\$253,467	10/2/2017	9/30/2020	
I18A12-076FP	Novel Methods to Produce an Argon-37 Standard		0 \$266,758	\$266,758	10/2/2017	9/30/2020	
I18A12-070FP	Electric Vehicle Wireless Charging Security		0 \$247,801	\$247,801	10/2/2017	9/30/2020	
I18A12-059FP	Modeling and Simulation for Nuclear Fuel Cycle Separations Using Modular Coupling		0 \$190,656	\$190,656	10/2/2017	9/30/2020	
I18A12-029FP	Realizing Multidimensional Imaging and Machine Learning on the Scanning Transmission Electron Microscope		0 \$296,476	\$296,476	10/2/2017	9/30/2020	
I18A12-020FP	Real Time Transient Heating Measurements for Advanced Experiment Design and Model Validation		0 \$232,843	\$232,843	10/2/2017	9/30/2020	
I17P11-030FP	Investigation of Exciton Delocalization and Exciton Coherence in Chromophores and Acoustic Nanostructures		0 \$373,084	\$373,084	6/2/2017	5/30/2020	
I17P11-018FP	Advanced Manufacturing of Uranium Dioxide Fuel Pellets with radially and axially zoned burnable poisons and hour-glassing control features		0 \$301,636	\$301,636	5/25/2017	9/30/2019	
I17P11-014FP	The influence of irradiation on the corrosion kinetics and hydrogen pickup of zirconium alloys		0 \$237,903	\$237,903	5/25/2017	4/30/2020	
I17P11-007FP	Coupling of Modeling and Experiment to Develop Predictive Models of the Mechanical Behavior of Nuclear Fuels and Materials		0 \$260,227	\$260,227	5/25/2017	4/30/2020	
I17P11-005FP	Improved Industrial Control System Resilience through Automated Detection and Response		0 \$218,239	\$218,239	5/18/2017	9/30/2019	
I17P11-001FP	Enabling Material Discovery for Waste Heat Recovery Systems using a Multimode Optical Sensor		0 \$165,751	\$165,751	2/9/2017	9/30/2019	
I17P10-010FP	Quantification of Reactor Kinetics Parameters in the Transient Reactor Test Facility during Temperature Limited Transients		0 \$100,732	\$100,732	10/9/2017	9/30/2019	
I17A1-227FP	Multi-Physics, Multi-Scale Coupled Simulation of Power Impulse Experiments		0 \$350,282	\$350,282	10/1/2016	9/30/2019	
I17A1-223FP	New Approach for Post Irradiation Examination Using Modular Transportable Instrumentation		0 \$411,952	\$411,952	10/1/2016	9/30/2019	
I17A1-206FP	Large Scale Log Analysis for Control System Networks		0 \$77,239	\$77,239	10/1/2016	9/30/2019	
I17A1-201FP	Human Reliability Analysis for Advanced Reactor Technologies and Systems		0 \$272,937	\$272,937	10/1/2016	9/30/2019	
I17A1-183FP	Vehicle-to-Vehicle, Infrastructure, and People Communication Security		0 \$189,262	\$189,262	10/1/2016	9/30/2019	
I17A1-178FP	Forensics of Embedded Devices		0 \$206,970	\$206,970	10/1/2016	9/30/2019	
I17A1-164FP	Application of Traditional Risk Assessment Methods to Cyber Manipulation Scenarios		0 \$244,369	\$244,369	10/1/2016	9/30/2019	
I17A1-152FP	Building Systems: Access, Management, & Automation		0 \$149,740	\$149,740	10/1/2016	9/30/2019	
I17A1-150FP	Advanced manufacturing of metallic fuels and cladding by equal-channel angular pressing		0 \$182,478	\$182,478	10/1/2016	9/30/2019	
I17A1-142FP	Modeling and Spatial-Temporal Analysis of Cyber-Physical Impacts		0 \$222,597	\$222,597	10/1/2016	9/30/2019	
I17A1-124FP	Systematic Error Control in Cross Section Library Generation for Novel Reactors		0 \$278,852	\$278,852	10/1/2016	9/30/2019	
I17A1-114FP	Resilient, Scalable Cyber State Awareness of Industrial Control System Networks to Threats		0 \$275,764	\$275,764	10/1/2016	9/30/2019	
I17A1-111FP	Design of Low Activation Retrievable Sample Holder for Transient Test Reactor Irradiation of Science-Based Specimens		0 \$137,561	\$137,561	10/1/2016	9/30/2019	
I17A1-109FP	Big Data Binary Reverse Engineering		0 \$328,611	\$328,611	10/1/2016	9/30/2019	
I17A1-106FP	A Study of Fission Modes to Improve Nuclear Forensics		0 \$180,373	\$180,373	10/1/2016	9/30/2019	
I17A1-101FP	Nuclear Instrumentation and Methods for Emergency Response		0 \$252,343	\$252,343	10/1/2016	9/30/2019	
I17A1-093FP	Digital Neutron Imaging of Irradiated Fuel Using a Gamma-Discriminating Scintillation System		0 \$291,226	\$291,226	10/1/2016	9/30/2019	
I17A1-086FP	Development of a complete kinetic model for free-radical-induced degradation of formic and oxalic acids.		0 \$379,626	\$379,626	10/1/2016	9/30/2019	
I17A1-070FP	Multi-Purpose Non-Destructive Examination Station in the Advanced Test Reactor Canal		0 \$221,070	\$221,070	10/1/2016	9/29/2019	
I17A1-055FP	Electro-reduction of metals in supercritical fluid-room temperature ionic liquids		0 \$257,737	\$257,737	10/1/2016	9/30/2019	
I17A1-024FP	Design to Enable Narrow Pulse Width in Transient Tests		0 \$227,686	\$227,686	10/1/2016	9/30/2019	
I19P43-013FP	Electronic and thermodynamic properties of selected uranium compounds at high magnetic fields		0 \$50,454	\$50,454	5/1/2019	9/30/2019	
I19P43-012FP	Probing Microstructure-induced Swelling and Thermal Property Changes in Ion-irradiated Oxide Fuels using Laser Generated Surface Acoustic Waves		0 \$46,390	\$46,390	5/1/2019	9/30/2021	
I19P45-027FP	Early Demonstration of Combinatorial Alloy Fabrication and FAST Irradiation Testing		0 \$299,692	\$299,692	5/7/2019	9/30/2019	
I19P45-028FP	Production of Scandium-47 for Potential Use as a Radiotheragnostic		0 \$102,554	\$102,554	5/1/2019	9/30/2020	
I19P45-031FP	Coupling of Spark Plasma Sintering with Advanced Modeling to Enable Process Scale-Up		0 \$150,180	\$150,180	5/7/2019	9/30/2021	
I19P43-009FP	Evaluating thermal properties of advanced materials		0 \$77,570	\$77,570	4/25/2019	9/30/2021	
I19A1045-017FP	Implementation of novel analytical procedures for quantification of fission products and impurities in nuclear fuels using a High Resolution Inductively Coupled Plasma Mass Spectrometer		0 \$48,121	\$48,121	4/25/2019	9/30/2020	
I19A42-015FP	Multi-Wire Arc Additive Manufacturing		0 \$78,732	\$78,732	4/22/2019	9/30/2020	
I19P45-020FP	Risk and Resilience Assessment of Cyberattacks on Electric Grids: Informing Risk Characterization using Dynamic Probabilistic Risk Assessment		0 \$433,869	\$433,869	3/25/2019	9/30/2021	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
I19P45-019FP	Beyond Nuclear Energy Materials: Utilizing Strong Spin Orbit Coupling and Topology in Actinides	0	\$30,114	\$30,114	3/26/2019	3/25/2022	
I19P45-013FP	Intensified characterization and analysis of energy storage system to support integrated energy systems	0	\$500,626	\$500,626	3/7/2019	9/30/2021	
I19P45-017FP	Opportunities for Center for Space Nuclear Research	0	\$166,917	\$166,917	2/19/2019	9/30/2019	
I19P43-007FP	Optical Fiber-based Fabry-Perot Interferometry for Fission Gas Detection	0	\$50,689	\$50,689	2/18/2019	1/31/2021	
I19A42-024FP	Ontology for the Design of Innovative Nuclear Technologies	0	\$77,481	\$77,481	2/18/2019	9/30/2020	
I19A42-017FP	Development of a quantitative measurement technique for fission gas bubble pressure at nanoscale using advanced characterization and modeling techniques	0	\$39,422	\$39,422	2/18/2019	9/30/2020	
I19A42-013FP	A Novel Three-Dimensional Quasi-Static Discrete Element Model for Complex Fracturing of Tight Rocks and Polycrystalline Solids	0	\$108,195	\$108,195	2/18/2019	9/30/2019	
I19P43-006FP	Spectroscopic Studies of Covalency in Minor Actinide-Soft Donor Ligand Complexes	0	\$89,963	\$89,963	2/18/2019	9/30/2020	
I19P43-004FP	Studies of solubility and reactivity of fission products (Cesium, Iodine, Tellurium, and Barium) in primary sodium	0	\$108,132	\$108,132	2/18/2019	9/30/2020	
I19A41-025FP	Light Element Analysis of Nuclear Fuels by Electron Probe Micro Analysis	0	\$63,493	\$63,493	2/18/2019	9/30/2020	
I19A41-011FP	Generation and Radiolysis of Exotic Actinyl Oxidation States of Berkelium, Californium, and Einsteinium	0	\$55,475	\$55,475	2/18/2019	9/30/2020	
I19A41-005FP	Treatment of Ammonia Wastewater using Flowing Electrode Capacitive Deionization	0	\$80,342	\$80,342	2/14/2019	9/30/2019	
I19A41-004FP	Chemical-Mediated Rare Earth Metallization	0	\$121,934	\$121,934	2/18/2019	9/30/2019	
I19A39-137FP	Orthogonal frequency-division multiplexing - Compatible Underlay Communication Channel for Massive Machine-type Communications in fifth generation and Beyond	0	\$226,505	\$226,505	10/16/2018	9/30/2021	
I19A39-139FP	Carbon: Interfaces, structure and the impacts on performance	0	\$467,882	\$467,882	10/1/2018	9/30/2020	
I19A39-096FP	Effect of strong-coupled defects, structure, compositions and morphology of advanced energy materials on electrochemical performance: a case study of co-production of ethylene and specialty chemicals	0	\$295,763	\$295,763	10/1/2018	9/30/2021	
I19A39-056FP	Establishing Metrics for Measuring Firmware Construction Quality	0	\$256,848	\$256,848	10/1/2018	9/30/2020	
I19A39-146FP	Design and Evaluation of a Nuclear Pumped Laser Detector for Reactor Power Indication	0	\$36,533	\$36,533	10/1/2018	9/30/2021	
I19A39-130FP	Three-Dimensional Electrochemical Manufacturing and Sensing	0	\$361,507	\$361,507	10/1/2018	9/30/2021	
I19A39-126FP	Electrochemical Co-Production of Ammonia and Ethylene using Ethane and Nitrogen at intermediate temperature (300-450 degrees Celsius)	0	\$325,224	\$325,224	10/1/2018	9/30/2020	
I19A39-067FP	Multi-scale Modeling and Optimization of Additive Manufacturing Process for Nuclear Fuels	0	\$105,491	\$105,491	10/1/2018	9/30/2020	
I19A39-061FP	Determining the role of fission gas bubble pressure in fuel fragmentation during off-normal conditions: A separate effect study.	0	\$323,711	\$323,711	10/1/2018	9/30/2021	
I19A39-024FP	Developing Multi-Scale, Rapid and Comprehensive Post-Irradiation Examination using the Focused Ion Beam Microscope	0	\$293,275	\$293,275	10/1/2018	9/30/2021	
I19A39-023FP	An Innovative Secure millimeter wave Machine to Machine Communication Network for Operating Drones	0	\$376,638	\$376,638	10/1/2018	9/30/2021	
I19A39-070FP	Moving beyond Displacements Per Atom: A new approach for rapidly quantifying radiation damage	0	\$365,425	\$365,425	10/1/2018	9/30/2021	
I19A39-099FP	A hyphenated separation technique for fuel analysis utilizing Gas Pressurized Extraction Chromatograph-Quadrupole-Inductively Coupled Plasma-Mass Spectrometer	0	\$265,815	\$265,815	10/1/2018	9/30/2020	
I19A39-103FP	Archiving Experimental Breeder Reactor-II Metallic Fuel Test Data Using Nuclear Data Management and Analysis System to Accelerate Fast Reactor Fuel Qualification	0	\$186,803	\$186,803	10/1/2018	9/30/2021	
I19A39-071FP	Mitigating irradiation assisted stress corrosion cracking by rapid alloy design	0	\$456,678	\$456,678	10/1/2018	9/30/2021	
I19A39-100FP	Constituent Redistribution in Nuclear Fuels	0	\$258,914	\$258,914	10/1/2018	9/30/2021	
I19A39-020FP	Liquid Scintillation Alpha Spectrometry for Nuclear Nonproliferation and Nuclear Forensics	0	\$239,564	\$239,564	10/1/2018	9/30/2021	
I19A39-029FP	Seismic and Cost Assessment of Deeply Embedded or Buried Advanced Reactors with Seismic Isolation Strategies	0	\$365,013	\$365,013	10/1/2018	9/30/2021	
I19A39-059FP	Dissolution Phenomena of Used Nuclear Oxide Fuel in Molten Salt Systems	0	\$320,043	\$320,043	10/1/2018	9/30/2021	
I19A39-165FP	Task-Specific Ionic Compounds for In-Field Sample Preparation	0	\$178,420	\$178,420	10/1/2018	9/30/2020	
I19A39-012FP	Accelerated Nuclear Materials and Fuel Qualification by Adopting a First to Failure Approach	0	\$580,862	\$580,862	10/1/2018	9/30/2021	
Total # of Projects for INL: 116		Total Equipment Cost for INL: \$0		Total Other Cost for INL: \$26,430,401		Total Cost for INL: \$26,430,401	
INNS - Nevada National Security Site							
J1701B37	K-Ray Phase Contrast Imaging for Dynamic Material Mix Experiments - University Subcontracts	0	\$25,895	\$25,895	10/1/2018	9/30/2019	
J1705429	Using coherent anti-Raman Stokes to determine the dynamic temperature of ejecta particles reacting with surrounding gas in a shock compression experiment	0	\$293,967	\$293,967	10/1/2018	9/30/2019	
J1701130	Strength of shock-induced instabilities	0	\$319,449	\$319,449	10/1/2018	9/30/2021	
J1705008	Site Directed Research and Development Special Technologies Laboratory Management Fiscal Year 2018	0	(\$96)	(\$96)	10/1/2017	9/30/2018	
J1705009	Site Directed Research and Development Special Technologies Laboratory Management Fiscal Year 2019	0	\$93,426	\$93,426	10/1/2018	9/30/2019	
J1705PC0	Site Directed Research and Development Special Technologies Laboratory Fiscal Year 2020 Proposals	0	\$42,587	\$42,587	5/27/2019	9/30/2019	
J1704PC0	Site Directed Research and Development Remote Sensing Laboratory Andrews Fiscal Year 2020 Proposals	0	\$3,365	\$3,365	5/27/2019	9/30/2019	
J1704009	Site Directed Research and Development Remote Sensing Laboratory Management Fiscal Year 2019	0	\$98,051	\$98,051	10/1/2018	9/30/2019	
J1704008	Site Directed Research and Development Remote Sensing Laboratory Management Fiscal Year 2018	0	(\$1,495)	(\$1,495)	10/1/2017	9/30/2018	
J1706PC0	Site Directed Research and Development Remote Sensing Laboratory Fiscal Year 2020 Proposals	0	\$29,250	\$29,250	5/27/2019	9/30/2019	
J1700999	Site Directed Research and Development Reserve Fiscal Year 2019	0	\$7,675	\$7,675	10/1/2018	9/30/2019	
J1700998	Site Directed Research and Development Reserve Fiscal Year 2018	0	\$4,657	\$4,657	10/1/2017	9/30/2018	
J1701009	Site Directed Research and Development New Mexico Operations Management Fiscal Year 2019	0	\$71,407	\$71,407	10/1/2018	9/30/2019	
J1701PC0	Site Directed Research and Development New Mexico Operations Fiscal Year 2020 Proposals	0	\$17,830	\$17,830	5/26/2019	9/30/2019	
J1703009	Site Directed Research and Development North Las Vegas Management Fiscal Year 2019	0	\$38,157	\$38,157	10/1/2018	9/30/2019	
J1703PC0	Site Directed Research and Development North Las Vegas Fiscal Year 2020 Proposals	0	\$24,128	\$24,128	5/27/2019	9/30/2019	
J170MPO9	Site Directed Research and Development Manuscript Preparation	0	\$44,307	\$44,307	10/1/2018	9/30/2019	
J1700009	Site Directed Research and Development Management Fiscal Year 2019	0	\$1,041,595	\$1,041,595	10/1/2018	9/30/2019	
J1700008	Site Directed Research and Development Management Fiscal Year 2018	0	\$192,226	\$192,226	10/1/2017	9/30/2018	
J1700007	Site Directed Research and Development Management Fiscal Year 2017	0	(\$131)	(\$131)	10/1/2016	9/30/2017	
J1702009	Site Directed Research & Development Livermore Operations Management Fiscal Year 2019	0	\$40,181	\$40,181	10/1/2018	9/30/2019	
J1702PC0	Site Directed Research & Development Livermore Operations Fiscal Year 2020 Proposal	0	\$8,272	\$8,272	5/27/2019	9/30/2019	
J1702059	Portable Neutron Imaging System	0	\$598,392	\$598,392	10/1/2018	9/30/2019	
J1705169	Phenomenology and node-level processing of sensor data across distributed sensor networks	0	\$403,574	\$403,574	10/1/2018	9/30/2021	
J170C059	Neutron radiography comparison simulation and modeling	0	\$180,712	\$180,712	1/9/2019	9/30/2019	
J170A059	Neutron imaging and radiographic development	0	\$404	\$404	1/9/2019	5/7/2019	
J1706BC9	Multi-modal, multi-energy approach for neutron interrogation of spent fuel	0	\$2,908	\$2,908	10/1/2018	9/30/2021	
J1706229	Multi-modal, multi-energy approach for neutron interrogation of spent fuel	0	\$346,809	\$346,809	10/1/2018	9/30/2021	
J1705119	Millimeter wave imaging diagnostic for high-explosive fireball characterization	0	\$255,285	\$255,285	10/1/2018	9/30/2019	
J1705369	Measurement of second shock ejecta with asymmetric groove shapes and sweeping shock waves	0	\$191,155	\$191,155	10/1/2018	9/30/2019	
J1703A97	Man-portable dense plasma focus for neutron interrogation applications	0	\$155,250	\$155,250	10/1/2018	9/30/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
J1703897	Man-portable dense plasma focus for neutron interrogation applications	0	\$114,497	\$114,497	10/1/2018	9/30/2019	
J1701129	Lattice dynamics of shock-induced phase transformations	0	\$191,889	\$191,889	1/9/2019	9/30/2021	
J1706829	Improved topographic and altitude corrections for aerial measurement systems data	0	\$51,800	\$51,800	10/1/2018	9/30/2020	
J1706029	Improved topographic and altitude corrections for aerial measurement systems data	0	\$339,709	\$339,709	10/1/2018	9/30/2020	
J1705179	Imaging of bubble collapse effects in optically transparent high explosive as a method to study the detonation process	0	\$268,521	\$268,521	10/1/2018	9/30/2019	
J1703159	High-performance computational modeling of strong ground motion for seismic response analysis with implications for high-hazard and/or nuclear facilities and critical infrastructure	0	\$101,944	\$101,944	10/1/2018	9/30/2020	
J1702A59	High-fidelity neutron radiography source development	0	\$56,774	\$56,774	10/1/2018	9/30/2020	
J1708059	High-fidelity neutron radiography source development	0	\$593,972	\$593,972	1/9/2019	9/30/2019	
J170F559	Feasibility Study - Video/Image Process Techniques	0	\$7,741	\$7,741	5/20/2019	10/1/2019	
J170F539	Feasibility Study - Non-Linear Mid-Infrared Detection	0	\$70,679	\$70,679	11/5/2018	9/30/2019	
J170F529	Feasibility Study - Fielding High-Speed Photonic Doppler Velocimetry at the Omega laser	0	\$100,011	\$100,011	10/1/2018	9/30/2019	
J170F519	Feasibility study - Enhanced system for source localization using augmented reality	0	\$46,436	\$46,436	10/1/2018	9/30/2019	
J170F549	Feasibility study - Betavoltaic Laboratory Directed Research and Development study with Pacific Northwest National Laboratory	0	\$40,115	\$40,115	3/26/2019	9/30/2019	
J1705129	Fast temperature measurements using dispersive time-domain spectroscopy	0	\$258,539	\$258,539	10/1/2018	9/30/2019	
J1703099	Equation of state properties of additively manufactured metals	0	\$195,524	\$195,524	1/2/2019	9/30/2020	
J1703867	Dynamic test prediction & characterization - University Subcontracts	0	\$293	\$293	10/1/2018	9/30/2019	
J1703819	Dynamic measurements of the structural evolution - University Subcontracts	0	\$64,997	\$64,997	10/1/2018	9/30/2021	
J1703019	Dynamic measurements of the structural evolution	0	\$280,632	\$280,632	10/1/2018	9/30/2021	
J1705069	Dual comb spectroscopy for definitive identification of gas	0	\$366,523	\$366,523	10/1/2018	9/30/2021	
J1705897	Drone video platform - University subcontracts	0	\$15,813	\$15,813	10/1/2018	9/30/2019	
J1705039	Compact heterodyne spectrometer for long-wavelength infrared detection	0	\$210,970	\$210,970	10/1/2018	9/30/2020	
J1705839	Cognitive hybrid radio waveforms - University Subcontracts	0	\$86,250	\$86,250	10/1/2018	9/30/2020	
J1705139	Cognitive hybrid radio waveforms	0	\$301,641	\$301,641	10/1/2018	9/30/2020	
J1703849	Advanced characterization of spatial aspects - University Subcontracts	0	\$40,149	\$40,149	10/1/2018	9/30/2020	
J1703049	Advanced characterization of spatial aspects	0	\$337,910	\$337,910	10/1/2018	9/30/2020	
J1703279	Advanced Imaging Analysis for field and home team support	0	\$136,747	\$136,747	10/1/2018	9/30/2021	
J1703859	High-Performance Computational Modeling - University Subcontracts	0	\$136,771	\$136,771	10/1/2018	9/30/2020	
J1706155	Unmanned Aircraft System for Remote Contour Mapping	0	(\$1,009)	(\$1,009)	10/1/2014	9/30/2017	
J1705247	Transient Radio Frequency and Optical Plasma Signatures	0	\$1,248	\$1,248	10/1/2016	9/30/2018	
J1705117	Dynamic Measurement of Chemical Composition/Reaction	0	\$13,670	\$13,670	10/1/2016	9/30/2018	
J170F528	Feasibility Study - Unmanned Aerial System Autonomous Mission and Detector Response	0	(\$1,042)	(\$1,042)	10/1/2017	9/30/2018	
J1706248	Adaptive source localization	0	\$2,428	\$2,428	10/1/2017	9/30/2018	
J1706158	Real-time modification of a modulated wireless digital bit stream	0	\$2,144	\$2,144	10/1/2017	9/30/2018	
J1705448	Triggerable mode-locked laser for synchronization with dynamic compression experiments	0	\$799	\$799	10/1/2017	9/30/2018	
J1705388	Improved chemical device source term determinations	0	\$453,089	\$453,089	10/1/2017	9/30/2019	
J1705318	Fast Raman spectroscopy measurements	0	\$7,206	\$7,206	10/1/2017	9/30/2018	
J1705188	Dynamic algorithms for aerial measurements	0	\$8,010	\$8,010	10/1/2017	9/30/2018	
J1705138	Dark-fringe velocimeter for measuring fast transient features in shock waves	0	(\$3,176)	(\$3,176)	10/1/2017	9/30/2018	
J1705108	A spectral evaluation of the application of super-resolution imagery	0	\$233,589	\$233,589	10/1/2017	9/30/2019	
J1701158	Strategic studies in dynamic material response	0	\$764,409	\$764,409	10/1/2017	9/30/2020	
J1701038	Single-crystal x-ray spectro-polarimeter	0	\$338,713	\$338,713	10/1/2017	9/30/2019	
J1701028	Quasielastic plastic flow	0	\$5,213	\$5,213	10/1/2017	9/30/2018	
J1705397	Drone Video Platform	0	\$572,389	\$572,389	4/1/2016	9/30/2018	
J1706186	Silicon Strip Cosmic Muon Detectors for Homeland Security	0	(\$7,767)	(\$7,767)	10/1/2015	9/30/2018	
J1705097	Simultaneous Raman and Pyrometric Temperature Measurements	0	(\$495)	(\$495)	10/1/2016	9/30/2018	
J1705027	Gas-Phased Ion-Neutral Interactions of Cerium Ions with Deuterium	0	\$317,113	\$317,113	10/1/2016	9/30/2019	
J1704027	Algorithm Development for Targeted Isotopes	0	\$255,076	\$255,076	10/1/2016	9/30/2019	
J1703496	Next-Generation Photo-Multiplier Detectors	0	\$2,105	\$2,105	10/1/2015	9/30/2018	
J1703356	Correlation between hot spots and three-dimensional defect structure	0	(\$9,245)	(\$9,245)	10/1/2015	9/30/2018	
J1703097	Man-Portable Dense Plasma Focus	0	\$566,552	\$566,552	10/1/2016	9/30/2019	
J1703067	Dynamic Test Prediction and Characterization	0	\$255,513	\$255,513	10/1/2016	9/30/2019	
J1702077	Semiconductor-Based High-Yield X-Ray Photocathode	0	\$63,806	\$63,806	10/1/2016	9/30/2019	
J1702046	X-ray Doppler Velocimetry	0	(\$266)	(\$266)	10/1/2015	9/30/2018	
J1702016	A multi-axial time resolved spectroscopic technique	0	(\$39,483)	(\$39,483)	10/1/2015	9/30/2018	
J1701086	Multi-Frame X-Ray imaging using Streak Camera with Patterned Photocathode	0	(\$2,494)	(\$2,494)	10/1/2015	9/30/2018	
J1701037	X-Ray Phase Contrast Imaging	0	\$308,760	\$308,760	10/1/2016	9/30/2019	
Total # of Projects for NNS: 87				Total Equipment Cost for NNS: \$0	Total Other Cost for NNS: \$13,052,894	Total Cost for NNS: \$13,052,894	
SRNL - Savannah River National Lab							
LDRD-2019-00258	Attachment to purging autosampler to allow for mercury analyte trapping on microcolumns	0	\$4,676	\$4,676	10/1/2018	9/30/2019	
LDRD-2019-00257	Low Energy X-ray Incorporation into FDM Three-Dimensional Printing	0	\$24,755	\$24,755	10/1/2018	9/30/2019	
LDRD-2019-00256	To measure the energy barrier for tritium through graphene and related Two-Dimensional materials	0	\$18,097	\$18,097	10/1/2018	9/30/2019	
LDRD-2019-00254	Development of biography-compatible fluorescent sensor	0	\$21,446	\$21,446	10/1/2018	9/30/2019	
LDRD-2019-00253	Exploring the Suitability of Mxenes for Sensing Applications	0	\$24,716	\$24,716	10/1/2018	9/30/2019	
LDRD-2019-00252	Three-Dimensional Printed Energy Discriminating X-Ray Panels	0	\$68,693	\$68,693	10/1/2018	9/30/2019	
LDRD-2019-00251	Novel Perovskite Semiconductors for the Detection of Special Nuclear Material	0	\$22,646	\$22,646	10/1/2018	9/30/2019	
LDRD-2019-00250	Concrete Inspection in Remote Areas with Robotic Arms	0	\$100,433	\$100,433	10/1/2018	9/30/2019	
LDRD-2019-00217	Toward Nano-Additive Manufacturing	0	\$58,540	\$58,540	10/1/2018	9/30/2019	
LDRD-2019-00215	Electrolytic Generation of Transportation Fuels in Molten Hydride Eutectic Electrolytes	0	\$67,247	\$67,247	10/1/2018	9/30/2019	
LDRD-2019-00203	Infrared Radiation Spectroscopic Investigation of Solidified Uranium Hexafluoride Gas Samples	0	\$4,658	\$4,658	10/1/2018	9/30/2019	
LDRD-2019-00202	Electric Field Imager	0	\$85,888	\$85,888	10/1/2018	9/30/2019	
LDRD-2019-00194	Electronic Structure Calculations for Improving Catalyst Design for Use in the Hybrid Sulfur Cycle	0	\$37,368	\$37,368	10/1/2018	9/30/2019	
LDRD-2019-00176	Next Generation of an Advanced High Efficiency Particle Collector	0	\$79,219	\$79,219	10/1/2018	9/30/2019	
LDRD-2019-00145	Imaging of Liquid-Liquid Separation in a Centrifugal Contactor	0	\$370,240	\$370,240	10/1/2018	9/30/2019	
LDRD-2019-00144	Large Area Airborne Contamination Monitoring	0	\$230,488	\$230,488	10/1/2018	9/30/2019	
LDRD-2019-00122	Metal Hydride Fuel Cell Powered Unmanned Aerial Vehicle	0	\$338,161	\$338,161	1/17/2018	9/30/2020	
LDRD-2019-00117	Development of a Simple, Robust Plutonium Waste Form	0	\$337,153	\$337,153	10/1/2018	9/30/2019	
LDRD-2019-00116	Development of Novel Solid-State Storage System for Plutonium Oxide using Excess Department of Energy Nickel	0	\$76,069	\$76,069	10/1/2018	9/30/2020	
LDRD-2019-00106	Collaboration with USA Cyber-physical Systems for Signals Manipulation	0	\$240,476	\$240,476	10/1/2018	9/30/2020	
LDRD-2019-00101	Process Image Analysis Using Big Data, Machine Learning, and Computer Vision	0	\$240,031	\$240,031	10/1/2018	9/30/2020	
LDRD-2019-00090	Geospatial Intelligence Ground Truth and Trade Craft Development	0	\$241,718	\$241,718	10/1/2018	9/30/2020	
LDRD-2019-00088	Novel Complex Hydride Flow Batteries for Grid Storage Applications	0	\$301,794	\$301,794	10/1/2018	9/30/2020	
LDRD-2019-00087	An Improved Technique for Characterization of Actinide Isotopic Composition	0	\$69,523	\$69,523	10/1/2018	9/30/2019	
LDRD-2019-00076	Time Domain Thermoreflectance and Photodeflection Signatures of He Bubbles in Metals	0	\$370,341	\$370,341	10/1/2018	9/30/2020	
LDRD-2019-00066	Hydrogen Process Imaging Using Magnetic Fields	0	\$341,258	\$341,258	10/1/2018	9/30/2020	
LDRD-2019-00063	Development of Poison Resistant Palladium Alloys for Hydrogen Processing	0	\$243,426	\$243,426	10/1/2018	9/30/2019	
LDRD-2019-00058	Heat and Mass Transfer Study to Understand Thermal Cycling Absorption Process Scale Up Issues	0	\$306,219	\$306,219	10/1/2018	9/30/2020	
LDRD-2019-00020	Purple "X" Gas Collection / Analysis	0	\$307,920	\$307,920	10/1/2018	9/30/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
LDRD-2019-00017	High Altitude Electromagnetic Pulse Transformer Defense through Power Electronics	0	\$386,840	\$386,840	10/1/2018	9/30/2020	
LDRD-2019-00001	Extraction of Mercury Utilizing Three-Dimensional Printed Media - Mercury Extraction Coalescer	0	\$188,241	\$188,241	10/1/2018	9/30/2019	
LDRD-2018-00140	Robot Deployable Air Sampling Development Suite	0	\$628	\$628	8/21/2018	9/30/2018	
LDRD-2018-00139	Robotic Arm Development Platform	0	\$586	\$586	8/21/2018	9/30/2018	
LDRD-2018-00134	Use of Process Imaging to Improve the Performance of a Filter	0	\$4,291	\$4,291	1/17/2018	9/30/2018	
LDRD-2018-00131	Augmented Reality Rendering of Computed Tomography Three-Dimensional Density Data	0	\$45	\$45	11/20/2017	9/30/2018	
LDRD-2018-00130	Limited-view 3-dimensional Imaging Technology	0	\$190	\$190	11/20/2017	9/30/2018	
LDRD-2018-00129	Investigations into Environmental Radiation Protection & Radioactive Waste Transport	0	\$59,732	\$59,732	11/20/2017	9/30/2018	
LDRD-2018-00126	Embedded Hardware Solution to Ensure Cyber Security of Industrial Control Systems	0	\$326,549	\$326,549	10/1/2017	9/30/2019	
LDRD-2018-00125	Controllable Electromagnetic Pulse Test Bed for Extra High Voltage Transformers	0	\$32,036	\$32,036	10/1/2017	9/30/2018	
LDRD-2018-00110	Quaternary Amine-Based Sodalite Sorbent for Selective Removal of technetium-99 and iodine-129	0	\$15,841	\$15,841	10/1/2017	9/30/2018	
LDRD-2018-00105	Atmospheric Tritium Signature Collection and Concentration by Catalytic Exchange Column	0	\$6,684	\$6,684	10/1/2017	9/30/2018	
LDRD-2018-00103	Kelvin Probe Force Microscopy for High-Resolution Imaging of Hydrogen in Steel Alloys	0	\$293,403	\$293,403	10/1/2017	9/30/2019	
LDRD-2018-00098	Hyperspectral Raman Imaging using a Spatial Heterodyne Spectrometer	0	\$344,077	\$344,077	10/1/2017	9/30/2020	
LDRD-2018-00095	Semi-automated change detection workflow for overhead imagery	0	\$135,852	\$135,852	9/30/2018	9/30/2019	
LDRD-2018-00087	Innovative Plutonium Waste Forms: Acceptability to Ship to Waste Isolation Pilot Plant	0	\$605	\$605	10/1/2017	9/30/2018	
LDRD-2018-00082	Gamma-Ray Raster Imaging with Robotic Data Collection	0	\$54,005	\$54,005	10/1/2017	9/30/2019	
LDRD-2018-00077	Synthesis and Characterization of Environmentally Relevant Actinide Compounds to Aid in the Development of Novel Remediation Tactics	0	\$126,776	\$126,776	10/1/2017	9/30/2019	
LDRD-2018-00060	Big Data, Machine Learning, and Computer Vision for Analysis of Large Data Sets	0	\$2,343	\$2,343	11/20/2017	9/30/2018	
LDRD-2018-00057	Surface Plasmon Assisted Catalysis for Methane Conversion and Hydrogen Production	0	\$67	\$67	10/1/2017	9/30/2018	
LDRD-2018-00055	Metal-Organic-Framework Glasses as Rad Contaminant Sequesters and Nuclear Waste Forms	0	\$308,792	\$308,792	10/1/2017	9/30/2020	
LDRD-2018-00049	Demonstration of Chemical Decladding and Disposition Options for Non-Aluminum Clad Fuels in H-Canyon	0	\$6,545	\$6,545	10/1/2017	9/30/2018	
LDRD-2018-00045	Development of Novel Foaming Solutions for High Level Waste Processing	0	\$2,394	\$2,394	10/1/2017	9/30/2018	
LDRD-2018-00044	Gamma Imaging and Mapping Advancements	0	\$9,987	\$9,987	10/1/2017	9/30/2018	
LDRD-2018-00034	Thermomechanical Modeling of Hydride Materials for Tritium Storage Beds	0	\$12,889	\$12,889	10/1/2017	9/30/2018	
LDRD-2018-00032	Oxyhydroxides on Aluminum Spent Nuclear Fuel: Formation Studies and Removal Practices to Prevent Radiolytic Gas Production	0	\$401,000	\$401,000	10/1/2017	9/30/2019	
LDRD-2018-00024	Develop Savannah River National Lab's code for use as national response asset	0	\$207,127	\$207,127	10/1/2017	9/30/2019	
LDRD-2018-00021	Hybrid Thermochemical Hydrogen Production	0	\$365,179	\$365,179	10/1/2017	9/30/2019	
LDRD-2018-00012	Smart Particle Collector with Real Time Spectroscopic Analysis	0	\$7,044	\$7,044	10/1/2017	9/30/2018	
LDRD-2018-00004	Development of Direct Injection/Ionization Mass Spectrometry Methods for Whole Molecule Characterization	0	\$386,443	\$386,443	10/1/2017	9/30/2020	
LDRD-2017-00103	Process Imaging Techniques for Improving Coalescer Performance	0	\$2,496	\$2,496	8/1/2017	9/30/2018	
LDRD-2017-00102	Use of Process Imaging to Improve the Performance of Centrifugal Contactors	0	\$15,799	\$15,799	8/1/2017	9/30/2018	
LDRD-2017-00076	Synchrotron-Based Microstructural Characterization Method Development for Plutonium Oxides	0	\$66,765	\$66,765	10/3/2016	9/30/2019	
LDRD-2017-00070	Optimization of Handheld Gas Samplers	0	\$5,813	\$5,813	10/3/2016	9/30/2018	
LDRD-2017-00037	Wire Arc Additive Manufacturing	0	\$14,880	\$14,880	10/3/2016	9/30/2018	
LDRD-2017-00028	Room Temperature Sieving of Hydrogen Isotopes Using two-dimensional Materials	0	\$5,955	\$5,955	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	\$9,719	\$9,719	10/3/2016	9/30/2018	
LDRD-2017-00017	Dissolution of Used Nuclear Fuel using a tributyl phosphate/n-paraffin Solvent	0	\$8,230	\$8,230	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	\$33,194	\$33,194	10/3/2016	9/30/2018	
LDRD-2017-00005	Silver-iodine Secondary Waste Stabilization: Multiscale Evaluation	0	\$5,609	\$5,609	10/3/2016	9/30/2018	
LDRD-2016-00031	Characterization of the Environmentally Induced Chemical Transformation of Uranium Tetrafluoride	0	\$2,821	\$2,821	10/23/2015	9/30/2017	
Total # of Projects for SRNL: 70				Total Equipment Cost for SRNL: \$0	Total Other Cost for SRNL: \$8,490,671	Total Cost for SRNL: \$8,490,671	
PPPL - Princeton Plasma Physics Lab							
PPPL-079	Mapping of Magnetic Field Lines in the Earth's Magnetosphere Using and Electron Beam	0	\$84,223	\$84,223	1/2/2018	9/30/2019	
PPPL-086	Scoping of Facilities in Support of Long-Term Princeton Plasma Physics Laboratory Initiatives	0	\$315,344	\$315,344	1/1/2019	12/31/2019	
PPPL-077	Investigation of Commercial Cloud Services for Research Computing	0	\$16,070	\$16,070	7/11/2018	3/31/2019	
PPPL-076	Development of Magnetic Enhancement Coils for a Fast Time Response Electromagnetic Disruption Mitigation System	0	\$21,037	\$21,037	10/1/2017	9/30/2019	
PPPL-065	Development of New Initiatives for Space Instrumentation and Space Plasma Physics Research at Princeton Plasma Physics Lab	0	\$115,901	\$115,901	8/15/2016	8/14/2019	
PPPL-069	Global numerical studies of magnetic reconnection in rotating plasmas with magnetic and flow shear	0	\$73,743	\$73,743	2/1/2017	1/31/2020	
PPPL-090	Microplasma Propulsion System for Space Science Missions with Cubesats	0	\$29,297	\$29,297	4/1/2019	3/31/2022	
PPPL-089	A Laser-Assisted Plasma-Based Method for Selective Synthesis of Complex Nanomaterials	0	\$34,759	\$34,759	4/1/2019	3/31/2022	
PPPL-088	Arc-Produced Superhard Materials	0	\$11,000	\$11,000	4/1/2019	3/31/2020	
PPPL-087	Integration of Deep Learning Disruption Predictor with Advanced Plasma Control System	0	\$51,400	\$51,400	4/1/2019	3/31/2022	
PPPL-085	Adaptive Near-Real Time Networked Analysis of Big Fusion Data	0	\$89,753	\$89,753	1/23/2019	1/22/2022	
PPPL-084	Prototype Development for an Electromagnetic Particle Injector	0	\$5,758	\$5,758	1/23/2019	1/22/2021	
PPPL-083	Prototyping and Testing of 10 kA Level Superconducting Cables for Fusion Nuclear Spherical Tokamak and Stellarator Pilot Plants	0	\$42,743	\$42,743	1/23/2019	1/22/2022	
PPPL-082	Lithium Vapor Box Test and Concept Development for Application in Toroidal Devices	0	\$217,438	\$217,438	1/23/2019	1/22/2022	
PPPL-081	Plasma Transport Processes in High-Energy Density Plasmas	0	\$35,601	\$35,601	1/23/2019	1/22/2022	
PPPL-080	Quantum Computing for Fusion Energy Sciences	0	\$42,238	\$42,238	3/15/2019	3/14/2022	
PPPL-078	Feasibility Study of a Laser-Based Approach for Diagnosing Deuterium Neutrals in the Edge of Fusion Devices	0	\$22,667	\$22,667	1/23/2019	1/22/2020	
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 divertor suitable for implementation and testing in present-day fusion systems.	0	\$125,099	\$125,099	3/8/2017	3/7/2020	
PPPL-071	Future Stellarator Configuration Investigation	0	\$416,659	\$416,659	2/1/2017	1/31/2020	
PPPL-070	Definition of a next-step liquid-metal-wall toroidal confinement facility	0	\$119,749	\$119,749	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	\$119,014	\$119,014	2/1/2017	1/31/2020	
PPPL-067	Proton Beam X-ray Diagnostics	0	\$188,524	\$188,524	2/1/2017	1/31/2020	
PPPL-066	Permeation barriers in high atomic number materials used for fusion-reactor plasma-facing components	0	\$34,202	\$34,202	2/1/2017	1/31/2020	
Total # of Projects for PPPL: 23				Total Equipment Cost for PPPL: \$0	Total Other Cost for PPPL: \$2,212,219	Total Cost for PPPL: \$2,212,219	
NREL - National Renewable Energy Lab							
0600.102019.02.01.01	Costs on Closed Project	0	\$88,085	\$88,085	10/1/2018	9/30/2019	
0600.10017.19.90.01	Challenges and Opportunities for Photovoltaics in Resilience	0	\$9,377	\$9,377	6/15/2019	9/30/2019	
0600.10017.19.93.01	Critical Review of Decision Science Methodologies for Power Sector Resilience Planning from a Multidisciplinary Perspective	0	\$17,059	\$17,059	6/15/2019	9/30/2019	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
0600.10017.19.92.01	Grid-interactive Industries	0	\$7,748	\$7,748	6/15/2019	9/30/2019	
0600.10017.19.91.01	Optimization under Uncertainty with Applications to the Renewable Energy Optimization Tool	0	\$10,003	\$10,003	6/15/2019	9/30/2019	
0600.10011.19.91.01	Real-time Perturbation-based Noninvasive Power System Health Monitoring	0	\$4,773	\$4,773	6/15/2019	9/30/2019	
0600.10002.19.94.01	Cluster Perception in Three-Dimensional Scatterplots	0	\$15,241	\$15,241	7/1/2019	9/30/2019	
0600.10016.19.94.01	Critical Material Extraction and Energy Manufacturing Modeling	0	\$7,294	\$7,294	3/1/2019	9/30/2019	
0600.10016.19.93.01	Potential Interactions Between Bulk and Distributed Photovoltaics in High Penetration Scenarios and Implications for Curtailment Risk	0	\$9,585	\$9,585	3/1/2019	9/30/2019	
0600.10016.19.95.02	Distributed Energy Resource Aggregation Market and Policy Research	0	\$10,368	\$10,368	3/1/2019	9/30/2019	
0600.10016.19.95.01	Energy Recovery: Microgrid Pumped Storage Hydropower the Next Frontier	0	\$10,136	\$10,136	3/1/2019	9/30/2019	
0600.10016.19.91.01	Quantum Computing for Energy Analysis	0	\$4,376	\$4,376	2/1/2019	9/30/2019	
0600.10010.91.01.01	Dynamic Thermal Emulator for non-Linear at-Scale Thermodynamic Analysis	0	\$45,343	\$45,343	7/22/2019	9/30/2019	
0600.10001.19.92.01	Photoexcited Electrons to Molecules	0	\$20,046	\$20,046	7/22/2019	9/30/2019	
0600.10005.19.90.02	Use of Unsaturated Organic Compounds for Carbon Capture	0	\$28,199	\$28,199	9/1/2019	9/30/2019	
0600.10005.19.90.01	Leveraging Fungal Hydrophobins to Enhance Gaseous Biocatalysis	0	\$15,538	\$15,538	7/22/2019	9/30/2019	
0600.10012.18.90.01	Principal Investigator Initiated Innovative Idea	0	\$71,526	\$71,526	10/1/2017	9/30/2019	
0600.10014.19.74.02	Electrospray Deposition: A New Tool for Understanding Energy Materials and Processes	0	\$16,592	\$16,592	4/24/2019	9/30/2019	
0600.10014.19.73.01	Vacancy-Derived Quantum States in Boron Nitride by Atomic Layer Deposition	0	\$23,605	\$23,605	3/25/2019	9/30/2019	
0600.10014.19.72.01	Synthesis of Quantum Material Cadmium Arsenide	0	\$52,188	\$52,188	3/25/2019	9/30/2019	
0600.10014.19.74.01	Gallium Oxide Ultra-Wide-Bandgap Power Electronics	0	\$101,863	\$101,863	6/2/2019	9/30/2019	
0600.10011.19.70.01	Power System Security Risks from Distributed Energy Resources	0	\$85,951	\$85,951	1/4/2019	9/30/2019	
0600.10010.19.70.01	Improved Reliability Analysis Leveraging Stochastic Optimization	0	\$35,897	\$35,897	6/2/2019	9/30/2019	
0600.10016.19.73.02	Enabling Detailed Photovoltaic Modeling in Co-Simulation Platforms	0	\$39,805	\$39,805	3/15/2019	9/30/2019	
0600.10016.19.75.01	Developing More Accurate Predictions of Distributed Photovoltaic Performance in Large Metropolitan Areas	0	\$18,092	\$18,092	3/15/2019	9/30/2019	
0600.10016.19.73.01	Propagation of Error Across Grid-Integration Modeling Pipelines: A Framework to Inform Decision-Making Under Uncertainty	0	\$34,919	\$34,919	3/15/2019	9/30/2019	
0600.10002.19.74.02	Computer Vision on Edge Devices for the Short-Term Prediction of Cloud Cover	0	\$29,793	\$29,793	3/15/2019	9/30/2019	
0600.10002.19.72.01	Exploring the Challenges of Energy-Efficient Cooling of Quantum Systems	0	\$28,546	\$28,546	3/15/2019	9/30/2019	
0600.10002.19.74.01	Supervised and Semi-Supervised Machine Learning Classifications for Synthetic Biology	0	\$34,789	\$34,789	3/15/2019	9/30/2019	
0600.10008.19.73.01	Super Wood	0	\$30,742	\$30,742	6/21/2019	9/30/2019	
0600.10007.19.71.01	Transportation Behavior and Energy Use Across Settlement and Population Groups—a Typology	0	\$47,847	\$47,847	11/1/2018	9/30/2019	
0600.10005.19.70.02	Reversible Polymeric Materials	0	\$11,172	\$11,172	9/1/2019	9/30/2019	
0600.10001.19.72.01	Machine Learning-Based Fluxomics Framework	0	\$17,400	\$17,400	7/22/2019	9/30/2019	
0600.10005.19.70.01	Oxygenated Naphthalenes for Production of Novel Polymers	0	\$12,198	\$12,198	7/22/2019	9/30/2019	
0600.10001.19.73.01	Machine Learning Approaches for Near Infrared Calibration Transfer	0	\$18,549	\$18,549	7/22/2019	9/30/2019	
0600.10005.19.73.01	Mapping Transcriptional and Metabolic Networks Regulating Single-Carbon Metabolism	0	\$18,071	\$18,071	3/25/2019	9/30/2019	
0600.10005.19.77.01	Generating Fusion Proteins for the Introduction of Non-Native Metabolic Pathways in Clostridium ljungdahlii: Towards the Production of Acetoin from Greenhouse Gases	0	\$43,866	\$43,866	12/10/2018	5/31/2019	
0600.10005.18.77.01	Phage-based Deoxyribonucleic Cargo Delivery Platform for Enhanced Strain Engineering	0	\$54,036	\$54,036	8/1/2018	7/30/2021	
0600.10009.19.34.01	Characterization and Modeling of Thermo-Radiative Cells for Thermal Energy Harvesting	0	\$11,172	\$11,172	9/9/2019	9/8/2022	
0600.10011.19.31.01	Robust Data-Driven Framework for System Identification, Dynamic State Estimation, and Autonomous Control of Electric Power Systems Using the Kosman Operator Theory	0	\$47,033	\$47,033	5/27/2019	5/26/2022	
0600.10009.19.33.01	Membrane Electrode Assembly Architecture Using Two-Dimensional Material to Mitigate Water Electrolysis Crossover	0	\$60,921	\$60,921	6/10/2019	6/9/2022	
0600.10009.19.32.01	Solid-State Optoelectronic Devices Based on Low-Dimensional Perovskite Triplet Sensitization and Molecular Photon Upconversion	0	\$25,432	\$25,432	8/12/2019	8/11/2022	
0600.10009.19.31.01	Driving Ion Transport with Liquid-Like Molecular Dynamics in Solid-State Electrolytes	0	\$93,715	\$93,715	12/17/2018	12/16/2021	
0600.10005.19.31.01	Catalytic Production of High-Value Chemicals from Waste Plastics: Depolymerization Through Carbon-Hydrogen Bond Activation and Cross Metathesis	0	\$133,463	\$133,463	6/7/2019	6/8/2021	
0600.10008.18.33.01	Combined Thermal Energy Storage & Moisture Control using Salt Hydrates	0	\$165,122	\$165,122	8/20/2018	8/19/2021	
0600.10014.18.33.01	Precise Deposition of Novel Nitrides: Heteroepitaxial Integration with Existing Nitrides for Property Manipulation	0	\$175,039	\$175,039	5/29/2018	5/28/2021	
0600.10002.18.33.01	Realistic, in-situ Modeling of Premier and Developing Catalysts for the Electrolysis of Water for the Hydrogen Economy	0	\$107,357	\$107,357	1/9/2018	1/2/2021	
0600.10009.18.12.02	Carbon Nanotube Electrodes for Perovskite Solar Cells	0	\$176,259	\$176,259	10/1/2017	9/30/2020	
0600.10009.17.02.01	Synthesis and Characterization of Well-Defined Organic Supramolecular Structures with Size-Dependent Optoelectronic Properties	0	\$145,202	\$145,202	5/22/2017	5/21/2020	
0600.10009.17.01.03	Doped Silicon Nanocrystals for Photovoltaics	0	\$77,640	\$77,640	3/13/2017	1/15/2019	
0600.10009.17.01.02	Developing Superlattices of Perovskites (Methylammonium Lead Iodide) Containing Lead Quantum Dots	0	\$61,341	\$61,341	1/3/2017	12/31/2019	
0600.10005.17.01.02	Development of a High-Throughput, Recombining System for Use in Diverse, Industrially-Relevant Biocatalysis	0	\$41,855	\$41,855	2/1/2017	12/21/2018	
0600.10005.17.01.01	Accelerating Lignin Valorization with Cell-free Methods	0	\$55,966	\$55,966	1/30/2017	6/1/2019	
0600.10004.17.01.01	Uncertainty Quantification in Wind Plant Flow and Wake Loss Models	0	\$20,599	\$20,599	5/8/2017	11/20/2018	
0600.10012.18.40.02	Advancing Beyond Density Functional Theory Methods and Application to Optoelectronic Perovskites	0	\$104,731	\$104,731	1/2/2018	9/30/2020	
0600.10012.19.40.01	Next-Generation Ion Batteries—From Materials to Manufacturing	0	\$801,570	\$801,570	10/1/2018	9/30/2021	
0600.10016.19.44.01	Prototype Scalable, Integrated Modeling Architecture	0	\$1,181,174	\$1,181,174	10/1/2018	9/30/2021	
0600.10010.18.40.02	Autonomous Energy Systems	0	\$2,272,483	\$2,272,483	1/2/2018	9/30/2020	
0600.10010.18.50.03	Increasing the Security and Resilience of the Electric Power System - Value of Resiliency	0	\$306,012	\$306,012	1/2/2018	9/30/2019	
0600.10010.18.50.02	Increasing the Security and Resilience of the Electric Power System - Microgrids	0	\$192,380	\$192,380	1/2/2018	9/30/2019	
0600.10010.18.50.01	Increasing the Security and Resilience of the Electric Power System - Cybersecurity	0	\$421,810	\$421,810	1/2/2018	9/30/2019	
0600.10005.19.46.01	Nano-Catalysts for Converting Carbon Dioxide and Electrons to Fuels with Protonic Ceramic Electrolyzers	0	\$146,849	\$146,849	10/1/2018	9/30/2020	
0600.10009.19.43.01	Electrochemical Reduction of Gaseous Carbon Dioxide to Formate/Formic Acid	0	\$131,142	\$131,142	10/1/2018	9/30/2020	
0600.10001.19.41.01	Cell-Free Electrocatalytic Conversion of Carbon Dioxide to Butanol Using Curtailed Electricity	0	\$262,840	\$262,840	10/1/2018	9/30/2020	
0600.10009.19.40.01	Facilitating Gas-Phase Electrochemical Carbon Dioxide Reduction	0	\$252,045	\$252,045	10/1/2017	9/30/2020	
0600.10005.18.40.01	Tailoring the Active Site for Structure-Sensitive Electrocatalytic Carbon Dioxide Reduction through Nanoscaling, Alloying, and Ligand-Promoted Stabilization	0	\$288,892	\$288,892	1/2/2018	9/30/2020	
0600.10001.19.43.01	Probing the Effects of Electron-Bifurcating Pathways on Microbial Energetics	0	\$224,421	\$224,421	10/1/2018	9/30/2019	
0600.10001.18.40.01	Development of Novel 13-Carbon Nuclear Magnetic Resonance Fluxomic Approaches for Improved Bioprocess Development	0	\$69,456	\$69,456	10/1/2017	9/30/2019	
0600.10001.18.42.01	Reductive Acetyl Coenzyme A Bi-cycle for Syngas Bioconversion	0	\$254,901	\$254,901	10/1/2017	9/30/2019	
0600.10009.18.40.01	Redox Activity of Single-Walled Carbon Nanotube-Clostridium Hybrid for Microbial Electrosynthesis	0	\$408,554	\$408,554	10/1/2017	9/30/2019	
0600.10007.19.15.01	Transportation System Macro-Model	0	\$205,542	\$205,542	10/1/2018	9/30/2020	
0600.10002.19.13.02	Physics-Informed Deep Learning to Enable Energy System Transformations	0	\$199,628	\$199,628	10/1/2018	9/30/2020	
0600.10016.19.13.01	A Distribution System Solver for the Future	0	\$199,131	\$199,131	10/1/2018	9/30/2019	
0600.10016.19.14.01	Integrated Electricity Market Toolkit	0	\$348,596	\$348,596	10/1/2018	9/30/2020	
0600.10001.19.12.01	Elucidate Regulatory Network Connectivity to Enable Gene-Circuit Redesign for Electrosynthesis of Biofuels/Chemicals	0	\$247,422	\$247,422	10/1/2018	9/30/2020	
0600.10014.19.12.02	Efficient Carbon Nanotube-Based Exciton-Polariton Light Sources and Quantum Information Elements	0	\$226,320	\$226,320	10/1/2018	9/30/2020	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
0600.10009.19.12.01	Cost-Effective Three-Five Semiconductor/Silicon Integration Enabled by Thin-Film Vapor-Liquid-Solid Growth	0	\$229,334	\$229,334	10/1/2018	9/30/2020	
0600.10005.19.12.01	Photo-Gated Covalent Organic Frameworks for Biomimetic Cascade Catalysis	0	\$356,903	\$356,903	10/1/2018	9/30/2020	
0600.10002.19.13.01	Machine Learning to Enable Chemically Informative Atomistic Simulation in Complex Environments	0	\$190,752	\$190,752	10/1/2018	9/30/2020	
0600.10001.19.11.01	Genetically Programmable Biohybrid Materials Platform Based on Diatom Microalgae	0	\$43,910	\$43,910	10/1/2018	9/30/2019	
0600.10014.19.15.01	Controlling Structural and Electronic Phase Transitions in Novel Materials for Neuromorphic Applications	0	\$346,662	\$346,662	10/1/2018	9/30/2020	
0600.10002.19.12.01	Fast and Accurate Mesoscale Models for Bioenergy Conversion Processes	0	\$153,371	\$153,371	10/1/2018	9/30/2020	
0600.10004.19.11.01	Integrated Design and Analysis of Hybrid Power Plants	0	\$425,116	\$425,116	10/1/2018	9/30/2020	
0600.10011.19.14.01	Self-Evolving, Resilient Distribution Grids Using Dynamic Network Reconfiguration and Grid Edge Intelligence	0	\$242,385	\$242,385	10/1/2018	9/30/2020	
0600.10017.19.11.01	Design and Modeling of a Blockchain-Based Distributed Energy Market	0	\$147,359	\$147,359	10/1/2018	9/30/2019	
0600.10011.19.10.01	Infinite-Inertia Inverter-Dominant Power Systems	0	\$110,605	\$110,605	10/1/2018	9/30/2020	
0600.10012.18.40.01	High Performance Perovskites: Nucleating United States Capability in Perovskite Science and Technology	0	\$264,901	\$264,901	1/2/2018	9/30/2020	
0600.10004.18.43.01	Innovative Blade Finishing at the Composites Manufacturing Education and Technology Facility: Enabling On-Site Manufacturing	0	\$309,897	\$309,897	8/1/2017	9/30/2019	
0600.10011.18.15.01	Scalable Forecasting for Improving Grid Efficiency and Resiliency	0	\$271,870	\$271,870	10/1/2017	9/30/2019	
0600.10011.18.14.01	Wide-bandgap Modular Architecture for Medium Voltage Energy Conversion in Utility-scale Wind and Solar	0	\$206,594	\$206,594	10/1/2017	9/30/2019	
0600.10014.18.11.01	An Architecture to Accelerate Materials Development for Thermal Control	0	\$245,766	\$245,766	10/1/2017	9/30/2019	
0600.10007.18.16.01	High-Performance and Reliable Packaging for Low-Cost Oxide-Based Power Electronic Devices	0	\$302,377	\$302,377	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	\$358,588	\$358,588	10/1/2017	9/30/2020	
0600.10009.18.11.01	Low Capital Expense, Rapidly Manufactured, Perovskite Tandem Cells with Greater than 30 Percent Efficiency	0	\$252,651	\$252,651	10/1/2017	9/30/2019	
0600.10009.18.12.01	Carbon Nanotube Electronic Ratchets	0	\$251,198	\$251,198	10/1/2017	9/30/2019	
0600.10005.18.12.01	Plastics Upcycling	0	\$275,339	\$275,339	10/1/2017	9/30/2019	
0600.10005.18.11.02	Elucidating the Intracellular Metabolism of White-rot Fungi during Lignin Decay	0	\$241,202	\$241,202	10/1/2017	9/30/2019	
0600.10005.18.10.01	Electrochemical Transformations to Enable Fuel and Chemical Production from the Carboxylate Platform	0	\$258,579	\$258,579	10/1/2017	9/30/2019	
0600.10005.18.11.01	Microbial Interaction Metabolomics to Drive the Algae Nitrogen Economy	0	\$253,795	\$253,795	10/1/2017	9/30/2019	
Total # of Projects for NREL: 99				Total Equipment Cost for NREL: \$0	Total Other Cost for NREL: \$17,013,787	Total Cost for NREL: \$17,013,787	
SLAC - Stanford National Accelerator Laboratory							
19-027	FY19 Panofsky - Higgs Boson Research	0	\$204,328	\$204,328	10/1/2018	9/30/2021	
19-026	FY19 Panofsky - Matter in Extreme Conditions Research	0	\$230,013	\$230,013	10/1/2018	9/30/2021	
19-017	Generation and Manipulation of High Pressure, Low Temperature Plasmas Using High-Power radio frequency Pulse Modulation	0	\$150,233	\$150,233	10/1/2018	9/30/2021	
19-013	High-Throughput Real-Time Theory	0	\$167,526	\$167,526	10/1/2018	9/30/2021	
19-012	Active Q-switching an X-ray Cavity to Enable a Regenerative Amplifier Free-Electron Laser at Linac Coherent Light Source II	0	\$246,333	\$246,333	11/1/2018	10/31/2021	
19-008	Engineering Atomically Controlled Complex Oxide/Aqueous Interfaces	0	\$138,306	\$138,306	10/1/2018	9/30/2021	
18-006	Gaussian Process Optimization - Machine Learning for Linac Coherent Light Source, Linac Coherent Light Source II, and the Free Electron Laser Farm of the Future	0	\$320,502	\$320,502	10/1/2017	9/30/2020	
18-025	FY18 Panofsky - Development of Multidimensional X-ray Spectroscopy with Stochastic Signal Recovery at SFEI	0	\$277,434	\$277,434	10/1/2017	9/30/2020	
18-018	Development of a High Repetition Rate Soft X-Ray Source in Preparation of Linac Coherent Light Source II Experiments	0	\$233,148	\$233,148	12/1/2017	11/30/2020	
18-020	Novel Photoemissive Materials for Improving the Experimental Reach of Future Hard X-ray Free Electron Lasers	0	\$220,656	\$220,656	5/1/2018	4/30/2021	
18-024	FY17 Panofsky - ATLAS Research	0	\$223,437	\$223,437	10/1/2017	9/30/2020	
18-021	FY16 Panofsky - Cosmic Microwave Background Research	0	\$327,629	\$327,629	10/1/2017	9/30/2020	
18-017	Optimization and Demonstration of a Parallel-Feed Accelerator Structure for Superconducting Radio-Frequency Applications	0	\$178,859	\$178,859	10/1/2017	9/30/2020	
18-022	FY16 Panofsky - Advance Free Electron Laser Research	0	\$297,451	\$297,451	10/1/2017	9/30/2020	
18-016	Developing Impulsive Nuclear and X-Ray Scattering to Study the Structural	0	\$91,334	\$91,334	1/1/2018	12/31/2020	
18-026	FY18 Panofsky - Novel Methods for Single-Particle Bio-imaging Using X-ray and Electron Sources	0	\$353,461	\$353,461	11/1/2017	10/31/2020	
18-012	Fresh-Slice Beams at the Linac Coherent Light Source II	0	\$270,207	\$270,207	10/1/2017	9/30/2020	
18-007	Modeling Strong-Field Quantum Electrodynamics at SLAC	0	\$142,438	\$142,438	5/1/2018	4/30/2021	
18-005	Machine Learning for Data Reduction at Linac Coherent Light Source II: A Path Toward Terahertz Detection	0	\$201,081	\$201,081	10/1/2017	9/30/2020	
18-023	FY17 Panofsky-Development and Application of Ultrafast X-ray Imaging Techniques	0	\$332,825	\$332,825	10/1/2017	9/30/2020	
18-013	Studying Bacterial Dehalogenation in Action	0	\$130,202	\$130,202	2/1/2018	1/31/2021	
18-004	Next Generation Power System Operator Training for Smart Grids	0	\$151,617	\$151,617	10/1/2017	9/30/2020	
18-010	Lead-Free Perovskites As Solar-Cell Absorbers	0	\$75,918	\$75,918	11/1/2016	10/31/2019	
18-008	Emergent Spintronics In Complex Oxide Heterostructures	0	\$86,323	\$86,323	5/1/2017	4/30/2020	
18-003	Charged Particle Beam Manipulation Using Carrier-Envelope Phase-Stable Coherently Combined Discretely Polarized Laser Pulses	0	\$125,011	\$125,011	1/1/2017	12/31/2019	
18-002	Stimulated X-Ray Emission Spectroscopy - A Powerful New Tool to Study Transition Metal Centers at X-Ray Free Electron Lasers	0	\$128,795	\$128,795	5/1/2017	4/30/2020	
18-001	Development of Combined X-ray absorption fine structure spectroscopy/Fourier transform infra-red In Situ Cell For Insight Into Catalyst Function	0	\$104,480	\$104,480	2/1/2017	1/31/2020	
Total # of Projects for SLAC: 27				Total Equipment Cost for SLAC: \$0	Total Other Cost for SLAC: \$5,409,547	Total Cost for SLAC: \$5,409,547	
FERMI - FERMI National Accelerator Lab							
FNAL-LDRD-2016-021	Implement open source high energy physics non-structured query language database	0	\$48,834	\$48,834	2/21/2016	12/31/2018	
FNAL-LDRD-2018-052	Understanding Dark Matter with the Faintest Galaxies	0	\$54,218	\$54,218	8/1/2018	7/31/2019	
FNAL-LDRD-2017-038	Quantum computing using superconducting radio-frequency technology	0	\$14,726	\$14,726	3/28/2017	2/28/2020	
FNAL-LDRD-2017-028	Increasing the photon detector light efficiency in a liquid argon detector by an order of magnitude	0	\$152,719	\$152,719	3/20/2017	2/28/2020	
FNAL-LDRD-2017-027	Silicon precision timing detectors for minimum ionizing particles	0	\$81,963	\$81,963	3/13/2017	2/28/2020	
FNAL-LDRD-2017-019	First demonstration of conduction cooled superconducting radio-frequency cavity	0	\$313,621	\$313,621	3/6/2017	2/28/2020	
FNAL-LDRD-2017-010	Training Deep Neural Networks for Neutrino Identification in the Cloud	0	\$28,409	\$28,409	3/27/2017	2/28/2020	
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	\$30,002	\$30,002	11/26/2016	9/30/2019	
FNAL-LDRD-2016-008	Novel Methods for High Performance Superconducting Coating on Copper	0	\$48,842	\$48,842	4/24/2016	3/31/2019	
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	\$55,163	\$55,163	2/21/2016	12/31/2018	
FNAL-LDRD-2019-039	Development of Microwave Readout Electronics for Massively Multiplexed Arrays of Transition-Edge Sensors	0	\$29,995	\$29,995	4/12/2019	4/11/2022	
FNAL-LDRD-2019-033	Improving magnetic materials for Rapid Cycling Synchrotron cavity tuners	0	\$47,849	\$47,849	4/15/2019	4/14/2022	
FNAL-LDRD-2019-031	Demonstration of the microwave quantum communication via "warm" channel between two ultracold quantum systems	0	\$26,401	\$26,401	4/8/2019	4/7/2022	
FNAL-LDRD-2019-027	Accelerator Control with Artificial Intelligence	0	\$27,859	\$27,859	4/8/2019	4/7/2022	
FNAL-LDRD-2019-025	Quantum effects in undulator radiation	0	\$5,895	\$5,895	3/4/2019	3/3/2022	
FNAL-LDRD-2019-020	Charge and Flux-insensitive Superconducting Quantum-bit Prototype Accelerated superconducting magnet training by a Quench Current-Boosting device at quench current	0	\$19,678	\$19,678	3/25/2019	3/24/2022	
FNAL-LDRD-2019-019	Graph Neural Networks for Accelerating Calorimetry and Event Reconstruction	0	\$57,576	\$57,576	3/10/2019	3/9/2022	
FNAL-LDRD-2019-017	Graph Neural Networks for Accelerating Calorimetry and Event Reconstruction	0	\$30,266	\$30,266	3/10/2019	3/9/2022	
FNAL-LDRD-2019-011	Pixel-Configurable Skipper Charge Coupled Devices for Cosmological Applications	0	48302	\$48,302	5/27/2019	5/26/2022	

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Project ID	Project Name	Equipment	Other	Total Project Cost	Start Date	Complete Date	Justification for over 36 months
FNAL-LDRD-2019-010	Characterization and Development of Nanoscale Integrated Circuits for Quantum Systems and Deep Cryogenic Detectors	0	\$78,256	\$78,256	3/25/2019	3/24/2022	
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	\$44,183	\$44,183	8/1/2018	12/31/2019	
FNAL-LDRD-2018-049	A Quasi-Continuous Wave bunch-by-bunch H- Neutralization Laser System for Longitudinal Phase Collimation in Linacs and other Applications	0	\$106,630	\$106,630	3/15/2018	9/30/2020	
FNAL-LDRD-2018-041	Quantum Networks Using Time-bin Photonic Qubits	0	\$321,398	\$321,398	3/15/2018	9/30/2020	
FNAL-LDRD-2018-040	Dark Matter as Sterile Neutrinos Search Satellite	0	\$144,736	\$144,736	3/15/2018	2/28/2021	
FNAL-LDRD-2018-037	Development of 10 kilogram Skipper Charge Coupled Device experiments	0	\$165,311	\$165,311	3/15/2018	2/28/2021	
FNAL-LDRD-2018-025	Towards a Quantum Computing Science Center at Fermilab	0	\$97,459	\$97,459	4/2/2018	4/1/2021	
FNAL-LDRD-2018-020	Increasing the intensity of muon based experiments using wedge absorbers	0	\$115,188	\$115,188	3/15/2018	8/31/2019	
FNAL-LDRD-2018-019	Broadband spectral sensitive graphene photodetector	0	\$21,567	\$21,567	3/15/2018	12/31/2020	
FNAL-LDRD-2018-009	High Temperature Superconducting Magnet with Circular Coils	0	\$93,186	\$93,186	3/15/2018	12/31/2020	
FNAL-LDRD-2018-006	Modeling Physical Systems with Deep Learning Algorithms	0	\$116,207	\$116,207	3/15/2018	2/28/2021	
FNAL-LDRD-2017-020	Development of next-generation niobium-3 tin superconductors for accelerator magnets	0	\$205,817	\$205,817	3/13/2017	3/12/2020	
FNAL-LDRD-2017-014	Cryogenic photon sensors for the low mass frontier	0	\$725,132	\$725,132	6/11/2018	6/1/2021	
FNAL-LDRD-2017-011	Liquid Argon Charge Amplification Devices	0	\$18,933	\$18,933	12/11/2017	12/4/2020	
FNAL-LDRD-2017-003	Optical Microwave Kinetic Inductance Devices for future Cosmic Surveys	0	\$134,284	\$134,284	4/11/2017	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	\$348,949	\$348,949	4/20/2018	3/31/2021	
Total # of Projects for FERMI: 35		Total Equipment Cost for FERMI: 50		Total Other Cost for FERMI: \$3,859,554		Total Cost for FERMI: \$3,859,554	
TJNAF - Thomas Jefferson National Accelerator Facility							
2019-LDRD-13	Universal Monte Carlo Event Generator	0	\$151,296	\$151,296	10/1/2018	9/30/2019	
2019-LDRD-12	Tagged Short-Range Correlations for Medium to Heavy Ions at Jefferson Lab Electron Ion Collider	0	\$140,243	\$140,243	10/1/2018	9/30/2019	
2019-LDRD-10	Evaluation And Development Of Algorithms And Techniques For Streaming Detector Readout	0	\$147,970	\$147,970	10/1/2018	9/30/2019	
2019-LDRD-1	Accelerator Novel High Current Superconducting Radiofrequency Cavity with On-Cell Waveguide Dampers	0	\$107,232	\$107,232	10/1/2018	9/30/2019	
2018-LDRD-09	Development of Next Generation Parallel Event Processing Framework	0	\$135,990	\$135,990	10/1/2017	9/30/2019	
2017-LDRD-11	Phenomenological Study of Hadronization in Nuclear and High-Energy Physics Experiments	0	(\$56)	(\$56)	10/1/2016	9/30/2018	
2016-LDRD-2a	Generation and Characterization of Magnetized Bunched Electron Beam from Direct Current Photogun for Jefferson Lab Electron-Ion Collider Cooler	0	(\$106)	(\$106)	10/1/2015	9/30/2018	
Total # of Projects for TJNAF: 7		Total Equipment Cost for TJNAF: 50		Total Other Cost for TJNAF: \$682,569		Total Cost for TJNAF: \$682,569	