01/29/13

ANNOUNCEMENT OF FEDERAL FUNDING OPPORTUNITY (FFO)
Measurement Science and Engineering (MSE) Research Grant Programs

EXECUTIVE SUMMARY

- **Federal Agency Name:** National Institute of Standards and Technology (NIST), United States Department of Commerce (DoC)

- **Funding Opportunity Title:** Measurement Science and Engineering (MSE) Research Grant Programs for:

    (1) the Material Measurement Laboratory (MML);
    (2) the Physical Measurement Laboratory (PML);
    (3) the Engineering Laboratory (EL);
    (4) the Information Technology Laboratory (ITL);
    (5) the NIST Center for Neutron Research (NCNR);
    (6) the Center for Nanoscale Science and Technology (CNST);
    (7) the Office of Special Programs (OSP), and
    (8) the Associate Director for Laboratory Programs (ADLP).

- **Announcement Type:** Initial

- **Funding Opportunity Number:** 2013-NIST-MSE-01

- **Catalog of Federal Domestic Assistance (CFDA) Number:** 11.609, Measurement and Engineering Research and Standards

- **Dates:** See Section IV.3 in the Full Announcement Text of this FFO.

- **Proposal Submission Address:** See Section IV in the Full Announcement Text of this FFO.

- **Funding Opportunity Description:** NIST is soliciting proposals for financial assistance for Fiscal Year 2013 (FY13) under the following programs:

    (1) the Material Measurement Laboratory (MML);
    (2) the Physical Measurement Laboratory (PML);
    (3) the Engineering Laboratory (EL);
    (4) the Information Technology Laboratory (ITL);
    (5) the NIST Center for Neutron Research (NCNR);
    (6) the Center for Nanoscale Science and Technology (CNST);
    (7) the Office of Special Programs (OSP), and
    (8) the Associate Director for Laboratory Programs (ADLP).

- **Total Amount to be Awarded:** See Section II in the Full Announcement Text of this FFO.

- **Anticipated Amounts:** See Section II in the Full Announcement Text of this FFO.

- **Funding Instrument:** Grant or cooperative agreement, as appropriate.

  Who is Eligible: Institutions of higher education; hospitals; non-profit organizations; commercial organizations; state, local, and Indian tribal governments; foreign governments; organizations under the jurisdiction of foreign governments; and international organizations. Applicants selected for

awards under 15 U.S.C. § 278g-1 are encouraged, but not required, to select underrepresented minorities for participation.

- **Cost Sharing Requirements:** Cost sharing or matching is not required under the programs listed in this FFO.

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FULL ANNOUNCEMENT TEXT

I. Funding Opportunity Description

1. Material Measurement Laboratory (MML) Grant Program

The statutory authority for the MML Grant Program is 15 U.S.C. § 272(b) and (c).

Program Description: The MML Grant Program provides financial assistance consistent with the MML mission to support research in the following fields: materials science and engineering, materials measurement science, biosystems and biomaterials, biomolecular measurements, chemical sciences, and applied chemicals and materials.

MML is one of two metrology laboratories within NIST that supports the NIST mission by serving as the national reference laboratory for measurements in the chemical, biological, and material sciences. MML is entrusted with developing, maintaining, advancing, and enabling the measurement system in these areas for the nation. MML activities range from fundamental and applied research on the composition, structure, and properties of industrial, biological, and environmental materials and processes to the development and dissemination of certified reference materials, critically evaluated data and other programs that help assure measurement quality. MML research and measurement services support areas of national importance, such as:

- Advanced materials, from nanomaterials to structural steels to complex fluids
- Electronics, from semiconductors to organic electronics
- Energy, from characterization and performance of fossil and alternative fuels to next-generation renewables
- Environment, from the measurement of automotive exhaust emissions to contaminant monitoring to assessment of climate change and the health and safety aspects of engineered nanomaterials
- Food safety and nutrition, from contaminant monitoring to ensuring the accuracy of nutritional

labels
- Health care, from clinical diagnostics to tissue engineering and more efficient manufacturing of biologic drugs
- Infrastructure, from the aging of the country's bridges and pipelines to the quality of our drinking water
- Manufacturing, from lightweight alloys for fuel-efficient automobiles to biomanufacturing and data for chemical manufacturing
- Safety, security and forensics, from gunshot and explosive residue detection to ensuring the performance of body armor materials and DNA-based human identity testing

MML also coordinates the NIST-wide Standard Reference Materials® and Standard Reference Data programs, which include production, documentation, inventory, marketing, distribution, and customer service.

The research and measurement services provided by MML underpin measurements in the chemical, biological, and material sciences and support innovation in both mature and emerging industrial sectors. As examples, work to enable reliable and trustworthy measurements and data help:

- Physicians make more accurate diagnoses and better monitor the effectiveness of new drug therapies
- Policy makers and regulatory bodies make science-based decisions about environmental quality
- Investigators make cases based on sound DNA and other forensic evidence
- Trading partners confidently exchange commodities such as foods, fuels, materials and structural steel
- Manufacturers reliably develop and use advanced materials and processes
- Industry link the performance of materials with their structure and processing, concepts necessary for the design of products from coatings and composites to magnetic devices and sensors

MML shapes its programs based on national needs. MML's research base provides MML with the flexibility to respond to the country's priorities and rapid advances in science and technology. MML's success depends upon timely dissemination of its:

- Critically evaluated measurement methods
- Standard Reference Materials®
- Standard Reference Data
- Publications describing MML's measurement science and technologies
- Training, education, and best practices, of which Recommended Practice Guides are one example

Additional information about the MML and MML Programs may be obtained at www.nist.gov/mml. All proposals submitted to the MML Grant Program must be in accordance with the program objectives listed below. The appropriate MML Program Manager for each MML field of research described in this Section may be contacted for clarification of the program objectives.

a. MML Office. Financial support may be provided for conferences, workshops, or other technical research meetings that are relevant to the mission of the Material Measurement Laboratory. Support is generally provided in increments of $5000. The contact person for this office is Margaret Phillips and she may be reached at (301) 975-4350 or by e-mail at margaret.phillips@nist.gov.

b. Materials Science and Engineering Division. The primary objective is to collaborate or conduct research consistent with division programs that provide the measurement science, standards, technology, instrumentation, and data required to support the Nation's need to design, develop, manufacture, and use materials. Division programs include measurement methods, data, standards, and science that support the development of polymeric materials which minimize environmental

impacts and reduce stress on natural resources; polymeric materials in energy and electronics applications; the development of complex fluids and nanoparticle dispersions; thin films and nanostructures processing of metals and electronic materials; advanced magnetic materials and devices; the mechanical and corrosion properties of advanced materials, such as high strength steel and aluminum alloys, under extreme environmental and operating conditions; and the development of thermodynamic and kinetic models, measurements and data to predict phase transformations, microstructure evolution, and properties of advanced materials. The contact person for this division is Dr. Eric Lin and he may be reached at (301) 975-6743 or by email at eric.lin@nist.gov.

c. **Materials Measurement Science Division.** The primary objective is to collaborate or conduct research consistent with division programs in support of measurement science, measurement standards, and measurement technology required to enable world-leading characterization of materials in support of the nation's needs for the determination of the composition, structure, and properties of materials. The division develops state-of-the-art instrumentation, methods, models and software to accurately and precisely measure materials over a range of length and time scales. The division provides benchmarking and validation of emerging materials analysis methods, and disseminates reference materials, standards and scientific data to foster innovation and advance a wide range of technologies, such as those for public safety, forensics, homeland security and nanomanufacturing. The contact person for this division is Dr. John Small and he may be reached at (301) 975-3900 or by email at john.small@nist.gov.

d. **Biosystems and Biomaterials Division.** The primary objective is to collaborate with or conduct research consistent with division projects in standards, measurement methods, and theoretical models that improve understanding and prediction of complex biological processes associated with environmental health, human health, and cell-based manufacturing. This includes analytical and bioanalytical measurements pertinent to method validation for bioassays, genome sequencing, cell identification, and quantitation of biological activity; facilitating research to support development of biomaterials with improved performance and appropriate interaction with cells and tissue; instrumentation, software, models and standards that support the understanding of complex biological phenomena at the cellular and subcellular level; and measurement science in bioimaging, proteomics, genomics, microfluidics, flow cytometry and informatics that facilitates characterization of biological state through the contemporaneous measurement of many biomolecules. The contact person for this division is Dr. Anne Plant and she may be reached at (301) 975-3124 or by e-mail at anne.plant@nist.gov.

e. **Biomolecular Measurement Division.** The primary objective is to collaborate with or conduct research consistent with the division activities in measurement science, standards, technology, and data required to support the nation's needs in determining the composition, structure, quantity, and function of biomolecules. In partnership with U.S. industry, government agencies, and scientific institutions, the division performs fundamental and applied research on the measurement of macromolecules such as proteins and nucleic acids, as well as peptides, glycans, metabolites, lipids, and natural products. Specific areas of interest include development of measurement methods, standards, reference data, and technologies for applications involving clinical diagnostics for healthcare; characterization, development, and manufacturing of biotherapeutics; proteomics, metabolomics, and drug discovery; and genetic testing in agriculture, law enforcement, and clinical diagnostics. The contact person for this division is Dr. Michael Tarlov and he may be reached at (301) 975-2058 or by email at michael.tarlov@nist.gov.

f. **Chemical Sciences Division.** The primary objective is to collaborate with or conduct research consistent with the division activities in support of the measurement science, standards, technology, data and chemical informatics required to support the nation's needs in the determination of chemical composition and chemical structure of gases, organic, and inorganic species and in the measurement of a wide variety of chemical properties and processes, including chemical reactivity and mechanisms, and thermochemical properties. In partnership with U.S. industry, government agencies, and academic scientific institutions, the division performs fundamental and applied research to advance and create state-of-the-art chemical measurement capabilities, theory and

computational methods for quantitative measurements, and sensing of solids, liquids, gases, plasmas, transient species, and multicomponent matrices. The division also formulates and disseminates reference materials and measurement standards, and critically evaluates reference data. These activities support the chemical science, technology, and engineering enterprise with the intent of fostering innovation and confidence in measurements and technologies used in a wide range of applications, including chemical analysis, environmental and climate assessment, clinical health assessment, food and nutritional assessment, sensing, manufacturing, and energy transformation. The contact person for this division is Dr. Carlos Gonzalez and he may be reached at (301) 975-2483 or by e-mail at carlos.gonzalez@nist.gov.

g. **Applied Chemicals and Materials Division.** The primary objective is to collaborate with or conduct research consistent with division programs in the measurement science, standards, technology, instrumentation, models and data required to support the nation's needs for design, production, and assessment of chemical and material products. In partnership with U.S. industry, other government agencies and other scientific institutions, the division provides thermophysical and mechanical properties; analysis of reliability and performance of materials and structures; and information systems for chemical and materials engineering, with the intent of fostering innovation and confidence in the nation's physical and energy infrastructures, enabling advances in chemical manufacturing and in electronics, and promoting sustainability. The contact person for this division is Dr. Stephanie Hooker and she may be reached at (303) 497-4326 or by e-mail at stephanie.hooker@nist.gov.

2. Physical Measurement Laboratory (PML) Grant Program

The statutory authority for the PML Grant Program is 15 U.S.C. § 272(b) and (c).

Program Description: The PML Grant Program provides financial assistance consistent with the PML mission to support research in the broad areas of mechanical metrology, semiconductors, ionizing radiation physics, medical physics, biophysics, neutron physics, atomic physics, optical technology, optoelectronics, electromagnetics, time and frequency, quantum physics, weights and measures, quantum electrical metrology, temperature, pressure, flow, far UV physics, and metrology with synchrotron radiation. Additional information about the PML and PML Programs may be obtained at www.nist.gov/pml.

All proposals submitted to the PML Grant Program must be in accordance with the program objectives listed below. The appropriate PML Program Manager for each PML field of research that follows may be contacted for clarification of the program objectives.

a. **PML Office.** Financial support may be provided for conferences, workshops, or other technical research meetings that are relevant to the mission of PML. Support is generally provided in increments of $5,000 per award. The contact person for this office is Kum Ham and she may be reached at (301) 975-4203 or by e-mail at kum.ham@nist.gov.

b. **Office of Weights and Measures.** The primary objective is to provide funding for the broad areas of documentary standards and legal metrology. Specific objectives of interest in these areas include: evaluation of the impact of legal metrology on commerce, and topics related to health, safety and the environment as well as support for specific standards related activities, including development of web-based information systems. Support for legal metrology may include awards to the states for: purchase of specialized equipment required to conduct inspections and tests; purchase of specialized metrology laboratory equipment; purchase of software/hardware needed to collect data of inspection records/results; and conducting training schools for weights and measures field inspectors. Financial support may be provided for conferences, workshops, or other technical research meetings that are relevant to the mission and programs of the office. The contact person for this office is Ms. Carol Hockert and she may be reached at (301) 975-5507 or by e-mail at carol.hockert@nist.gov.

c. **Radiation and Biomolecular Physics Division.** The primary objective is to collaborate with or conduct research consistent with the division's programs in the areas of terahertz measurements,

ionizing radiation (x- and gamma-ray) dosimetry, neutron physics, and radioactivity measurements supporting the protection of workers and the general public, therapy and diagnosis, nuclear medicine and medical imaging, radiography, industrial processing, nuclear and alternative energies, national defense and security, space science, and environmental protection. The contact person for this division is Dr. Lisa Karam and she may be reached at 301-975-5561 or by e-mail at lisa.karam@nist.gov.

d. **Semiconductor and Dimensional Metrology Division.** The primary objective is to collaborate with or conduct research consistent with the division's programs in the areas of dimensional, nanometer-scale, surface, and acoustic pressure metrology; accelerometry; silicon Complementary Metal-Oxide Semiconductor (CMOS) technology; MicroElectroMechanical Systems (MEMS); power electronics; nanoelectronics; and flexible/printed electronics. The contact person for this division is Dr. David Seiler and he may be reached at (301) 975–2054 or by e-mail at david.seiler@nist.gov.

e. **Quantum Measurement Division.** The primary objective is to collaborate with or conduct research consistent with division basic and applied research programs, including precision measurements; mass, force, and electrical metrology; electronic instrumentation; measurements of basic atomic properties including new metrology techniques in atomic spectroscopy; measuring fundamental quantum processes in ultra cold atomic systems including Bose-Einstein condensates and Fermi degenerate gases, nanophotonic systems, quantum dots, single electron devices, single photon devices, and quantum materials relevant to these system; and advancing quantum information science and laser cooling and their broad applications to measurement science and measurement beyond the standard quantum limit. The contact person for this division is Dr. Carl J. Williams and he may be reached at (301) 975-3200 or by e-mail at carl.williams@nist.gov.

f. **Sensor Science Division.** The primary objective is to collaborate with or conduct research consistent with the division's programs in temperature, humidity, pressure, vacuum, flow, optical properties, and optical radiation measurement and standards and their application to addressing national needs. The contact person for this division is Dr. Gerald T. Fraser and he may be reached at (301) 975-3797 or by e-mail at gerald.fraser@nist.gov.

g. **Quantum Electronics and Photonics Division.** The primary objective is to collaborate with or conduct research consistent with the division's programs in the area of quantum electronics and photonics. The contact person for this division is Dr. Robert Hickernell and he may be reached at (303) 497–3455 or by e-mail at robert.hickernell@nist.gov.

h. **Electromagnetics Division.** The primary objective is to collaborate with or conduct research consistent with the division's programs in the areas of radio-frequency and microwave technology, electromagnetic fields, magnetics and superconductors (bulk), and MRI imaging metrology. The contact person for this division is Dr. Michael Kelley and he may be reached at (303) 497-4736 or by e-mail at michael.kelley@nist.gov.

i. **Time and Frequency Division.** The primary objective is to collaborate with or conduct research consistent with the division's basic and applied research programs in the areas of time and frequency standards, phase noise measurements, network synchronization, ion storage, quantum information, atomic standards and optical frequency measurements in support of future standards, chip-scale atomic clocks, magnetometers, and related devices, time and frequency dissemination services, and time and frequency applications such as navigational systems and telecommunications. The contact person for this division is Dr. Thomas R. O'Brian and he may be reached at (303) 497-4570 or by e-mail at thomas.obrian@nist.gov.

j. **Quantum Physics Division.** The primary objective is to collaborate with or conduct research consistent with the division's basic and applied research programs in the areas of quantum degenerate gases, ultrafast phenomena, femtosecond laser frequency comb development and applications, precision quantum measurements, chemical physics, nanotechnology, and biophysics. The contact person for this division is Dr. Thomas R. O'Brian and he may be reached at (303) 497-

4570 or by e-mail at thomas.obrian@nist.gov.

3. Engineering Laboratory (EL) Grant Program

The statutory authorities for the EL Grant Program is 15 U.S.C. § 272(b) and (c), 15 U.S.C § 278f, 15 U.S.C. § 278n-2, 42 U.S.C. §§ 7701 et seq., 42 U.S.C. §§ 15701 et seq.

Program Description: The EL Grant Program provides financial assistance consistent with the EL's mission to support research in the following fields: machine tool and machining process metrology; advanced manufacturing; intelligent systems and information systems integration for applications in manufacturing; structures, construction metrology and automation; inorganic materials; polymeric materials; heating, ventilation, air conditioning, and refrigeration (HVAC & R) equipment performance; mechanical systems and controls; heat transfer and alternative energy systems; computer integrated building processes; indoor air quality and ventilation; earthquake risk reduction for buildings and infrastructure; smart grid; windstorm impact reduction; applied economics; and fire research. Financial support may be provided for conferences, workshops, or other technical research meetings that are relevant to the mission of EL. Additional information about the EL and EL Programs may be obtained at www.nist.gov/el.

The EL Grant Program promotes the development and dissemination of advanced manufacturing and construction technologies, guidelines, and services to the U.S. manufacturing and construction industries through activities including measurement science research, performance metrics, tools and methodologies for engineering applications, and critical technical contributions to standards and codes development.

The EL Grant Program operates within three major goals, 1) Disaster-Resilient Buildings, Infrastructure, and Communities, 2) Sustainable and Energy-Efficient Manufacturing, Materials, and Infrastructure, and 3) Smart Manufacturing, Construction, and Cyber-Physical Systems. The associated EL goal(s) are identified for the technical programs listed below.

All proposals submitted must be in accordance with the program objectives listed below. Prospective proposers are encouraged to contact the appropriate EL Program Manager for each EL field of research that follows for clarification of the program objectives and to determine the extent of interest prior to preparation of a detailed proposal.

a. Applied Economics Office. (Associated EL goals: Disaster-Resilient Buildings, Infrastructure, and Communities, Sustainable and Energy-Efficient Manufacturing, Materials, and Infrastructure, and Smart Manufacturing, Construction, and Cyber-Physical Systems). The office provides standardized methods, economic models, training programs and materials and expert technical consulting in support of resource allocation decisions and uses techniques such as benefit-cost analysis, life-cycle costing, multi-criteria decision analysis and econometrics to evaluate new technologies. The contact person for this division is Robert Chapman and he may be reached at (301) 975-2723 or by email at robert.chapman@nist.gov.

b. The National Earthquake Hazards Reduction Program (NEHRP) Office. (Associated EL goal: Disaster-Resilient Buildings, Infrastructure, and Communities). The NEHRP Office's primary research objective is to conduct applied, problem-focused research through a combination of intramural and collaborative extramural programs to improve U.S. seismic design and construction practices. Areas of emphasis include developing the technical basis for performance-based seismic engineering (PBSE); providing technical support for the earthquake engineering practice and associated model building code development; developing technical resources, tools, and guidelines that improve earthquake engineering practice; disseminating information on earthquake engineering technologies to earthquake practitioners; and developing tools that enhance the productivity of earthquake engineering design and construction productivity, economy, and effectiveness. Research needs references may be found at http://www.nehrp.gov/library/researchneeds.htm. The contact

person for this division is Dr. John R. Hayes, Jr. and he may be reached at (301) 975-5640 or by e-mail at jack.hayes@nist.gov.

c. Smart Grid and Cyber-Physical Systems Program. (Associated EL goal: Smart Manufacturing, Construction, and Cyber-Physical Systems). The program's primary objective is to promote U.S. innovation and industrial competitiveness in areas of critical national priority by anticipating and meeting the measurement science and standards needs for cyber-physical systems, such as smart grid, in ways that enhance economic prosperity and improve the quality of life. The contact person is David Wollman and he may be reached at (301) 975-2433 or by email at david.wollman@nist.gov.

d. Materials and Structural Systems Division. (Associated EL goals: Disaster-Resilient Buildings, Infrastructure, and Communities and Sustainable and Energy-Efficient Manufacturing, Materials, and Infrastructure). The primary objective is to collaborate with or conduct research consistent with the division's programs in the areas of structures, inorganic materials, and polymeric materials (including safety, security, and sustainability of building and physical infrastructure, service-life performance of building materials, and construction cycle time reductions). In particular, applications for financial assistance are sought that would:

(1) Provide measurement science to: (1) predict structural performance up to failure under extreme loading conditions; (2) predict disaster resilience at the building and community scale; (3) assess and evaluate the ability of existing structures to withstand extreme loads; and, (4) design new buildings and retrofit existing buildings using cost-effective, performance-based methods. The program enhances the resilience and robustness of structures by focusing on: prevention of disproportionate structural collapse, fire resistance of structures, and measures of disaster resilience.

(2) Provide the measurement science needed to support standards used to classify and specify materials used in infrastructure, construction, and manufacturing to ensure sustainable performance. This materials program approaches the solution of this problem from the perspective of service life prediction, a crucial sustainability metric, and applies this concept to polymer composites and concrete. These two material thrusts will develop measurement science composed of a combination of characterization, performance measurement, accelerated durability tests, and modeling to develop standards that will be used by industry and specified by end-users in these broad application areas to enable service life prediction and thus help to ensure sustainable materials performance.

The contact person for this division is Mr. Stephen Cauffman and he may be reached at (301) 975-6051 or by email at stephen.cauffman@nist.gov.

e. Energy and Environment Division. (Associated EL goal: Sustainable and Energy-Efficient Manufacturing, Materials, and Infrastructure). The primary objective is to collaborate with or conduct research consistent with the laboratory programs in areas related to measurement science needed to enable Net Zero High Performance Green Buildings. The breadth of this area includes measurement science associated with the building envelope, HVAC equipment, renewable energy systems, building controls/building automation systems, and equipment used to achieve acceptable indoor air quality. In particular, applications for financial assistance are sought that would:

(1) Provide measurement science for net-zero energy, high-performance buildings. Measurement systems, approaches, and predictive models are required that can provide detailed information to enable net-zero energy, high-performance buildings. In particular, measurement methods and approaches, data, and predictive models are sought to assess the effectiveness of building enclosures from a thermal and airtightness perspective, the performance of vapor compression systems, the performance of photovoltaics and other renewable energy systems, and indoor air quality. Additionally, techniques are sought that will provide measurement science required to assess buildings on a whole-building scale. These techniques could relate to building standards, should consider system interactions, and could deal with factors beyond energy use.

(2) Enable energy-use reduction through embedded intelligence in building controls. The key to realizing design potentials is combining new measurement technology and performance metrics with analysis techniques that can be implemented in building automation and control products. The resulting systems have a distributed, embedded intelligence that can detect and respond to faults and operational errors and inefficiencies.

(3) Develop carbon footprint metrics/tools for building sustainability evaluation. Next-generation metrics and tools enabling rigorous carbon footprint assessment over the building service life are needed to link green building technology innovation to environmental/economic benefits.

The contact person for this division is Dr. A. Hunter Fanney and he may be reached at (301) 975-5864 or by email at hunter.fanney@nist.gov.

f. Systems Integration Division. (Associated EL goals: Sustainable and Energy-Efficient Manufacturing, Materials, and Infrastructure and Smart Manufacturing, Construction, and Cyber-Physical Systems). Pursues measurement science research to facilitate solutions to systems integration problems in the manufacturing and construction sectors. Research supports the development of mathematically sound, model-based, integration standards and new science-based methods for testing conformance to those standards. Research is conducted in collaboration with three Engineering Laboratory programs: Cyber Physical Systems (CPS), Sustainable Manufacturing (SM), and Systems Integration for Manufacturing and Construction Applications (SIMCA). Research topic areas include multi-physics modeling, system architectures, systems engineering, requirements modeling, information models and methods for advanced manufacturing processes, production network integration, service-based manufacturing, model-based engineering, distributed manufacturing simulation, sustainable product and process models, product life cycle analysis, and life cycle engineering assessments for material and energy efficiency. The contact person for this division is Vijay Srinivasan and he may be reached at (301) 975-3508 or by e-mail at vijay.srinivasan@nist.gov.

g. Intelligent Systems Division. (Associated EL goal: Smart Manufacturing, Construction, and Cyber-Physical Systems). The primary objective is to collaborate with or conduct research consistent with NIST laboratory programs and research in manufacturing process and equipment interoperability, industrial control system security, intelligent systems and robotics, and intelligent control of mobility systems; machine tool and machining process metrology; smart manufacturing systems; and sensor networking and integration. The contact person for this division is Albert Wavering and he may be reached at (301) 975-3418 or by e-mail at albert.wavering@nist.gov.

h. National Windstorm Impact Reduction Program. (Associated EL goal: Disaster-Resilient Buildings, Infrastructure, and Communities). The primary objective is to collaborate with or conduct research consistent with the laboratory programs in the areas of windstorm and coastal inundation impact reduction (including engineering for extreme winds, storm surge, and tsunami). The contact person is: Dr. Marc Levitan who can be reached at 301-975-5340 or marc.levitan@nist.gov.

i. Disaster and Failure Studies Program. (Associated EL goal: Disaster-Resilient Buildings, Infrastructure, and Communities). The primary objective is to collaborate with or conduct research consistent with the laboratory programs in the areas of disaster and failure studies. This program provides for the establishment of teams to assess (1) building and physical infrastructure performance and (2) emergency response and evacuation procedures in the wake of disaster and failure events that have resulted in substantial loss of life or posed significant potential of substantial loss of life. The contact person is: Eric Letvin who can be reached at 301-975-5412 or eric.letvin@nist.gov. More information about the Disaster and Failure Studies Program can be found here at http://www.nist.gov/el/disasterstudies/index.cfm.

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j. Fire Research Division. (Associated EL goals: Disaster-Resilient Buildings, Infrastructure, and Communities and Sustainable and Energy-Efficient Manufacturing, Materials, and Infrastructure). The primary objective is to collaborate with or conduct research consistent with the laboratory programs in areas of current interest to the Fire Research Division. The Fire Research Division develops, verifies, and utilizes measurements and predictive methods to quantify the behavior of fire and means to reduce the impact of fire on people, property, and the environment. This work involves integration of laboratory measurements, verified methods of prediction, and large-scale fire experiments to demonstrate the use and value of the research products. Details on current Division research activities are available at http://www.nist.gov/el/fire_research/index.cfm. Also, NIST SP 1130 "Reducing the Risk of Fire in Buildings and Communities: A Strategic Roadmap to Guide and Prioritize Research" provides an overview of current research interests http://www.nist.gov/manuscript-publication-search.cfm?pub_id=909653.

All proposals submitted must be in accordance with the program objectives listed below. The appropriate Group Leader that follows may be contacted for clarification of the program objectives.

(1) Fire Fighting Technology Group. Develops, advances, and deploys measurement science to improve fire fighting safety and effectiveness, and provide a science-based understanding of fire phenomena. Carries out mission-related measurement science research and services to advance fire fighting tactics, technology integration into fire-fighting equipment, physics-based training tools that predict fire phenomena and their effects on structures and occupants, fire forensics, and conduct disaster and failure studies to reduce the risk of fire hazard to buildings and fire fighters. The contact person for this group is Daniel Madrzykowski and he may be reached at (301) 975-6677 or by e-mail at daniel.madrzykowski@nist.gov..

(2) Engineered Fire Safety Group. Develops, advances, and deploys measurement science for cost-effective fire protection of structures. Carries out mission-related measurement science research and services to predict the fire performance of structures with respect to ignition fire growth and spread, detection, suppression, toxicity, and egress; develop cost-effective performance-based codes, standards, and practices used for fire prevention and control; and conduct disaster and failure studies to reduce the risk of fire hazard to buildings and occupants. The contact person for this group is Thomas Cleary and he may be reached at (301) 975-6858 or by e-mail at thomas.cleary@nist.gov.

(3) Flammability Reduction Group. Develops, advances, and deploys measurement science to reduce the fire hazard of building contents and construction materials. Carries out mission-related measurement science research and services to reduce material ignition probability, fire growth and spread, and environmental impacts; and support development of codes and standards for cost-effective, fire-safe building contents and construction materials. The contact person for this group is Rick Davis and he may be reached at (301) 975-5901 or by email at rick.davis@nist.gov.

(4) Wildland Urban Interface Fire Group. Develops, advances, and deploys measurement science to reduce the risk of fire spread in wildland-urban interface (WUI) communities. Carries out mission-related measurement science research and services to develop risk exposure metrics, predict the spread of fires in WUI communities, assess fire performance of structures and communities, mitigate the impact of WUI fires on structures and communities, and conduct disaster and failure studies to reduce the risk of fire hazard in WUI communities. The contact person for this group is Nelson Bryner and he may be reached at (301) 975-6868 or by email at nelson.bryner@nist.gov.

(5) The National Fire Research Laboratory. Develops, advances, and deploys measurement science to characterize the real-scale fire behavior of combustibles, and the fire performance of structures under realistic fire and structural loading. Carries out mission-related measurement science research and services to improve the fire performance of communities, structures and building contents; develop physics-based models that predict fire behavior and structural

performance; and conduct disaster and failure studies to reduce the risk of fire hazards to structures and fire fighters. The contact person for this group is Jiann Yang and he may be reached at (301) 975-6662 or by email at jiann.yang@nist.gov.

Additional information, including a description and objectives for the Fire Research Division is available at http://www.nist.gov/el/fire_research/index.cfm.

4. Information Technology Laboratory (ITL) Grant Program

The statutory authority for the ITL Grant Program is 15 U.S.C. § 272(b) and (c).

Program Description: The ITL Grant Program provides financial assistance to support research in the broad areas of advanced network technologies, big data, cloud computing, computer forensics, information access, information processing and understanding, cybersecurity, health information technology, human factors and usability, mathematical and computational sciences, mathematical foundations of measurement science for information systems; a metrology infrastructure for modeling and simulation smart grid, software testing, and statistics for metrology .

Specific objectives of interest in these areas of research include: quantum information theory; computational materials science; computational biology; systems biology; image analysis; semantics; medical device interoperability; software assurance for small applications and devices; data analytics; search and retrieval algorithms; biometrics; human language technology; voting systems standards; grid computing; service oriented architecture; post quantum public key cryptography; secure distributed computation; very efficient cryptography; leakage resistant computation for cloud computing; homomorphic encryption; mobile platform and application security; trusted ad hoc networks; device identity and authentication; data storage, preservation, query, indexing and access technology; secure communications for cloud, identity management support for clouds and device mobility among heterogeneous networks. Additional information about the ITL and ITL Programs may be obtained at www.nist.gov/itl. Financial support may be provided for conferences, workshops, or other technical research meetings that are relevant to the mission of ITL. The contact person for the ITL Grant Program is Kamie Roberts and she may be reached at (301) 975-2901 or by e-mail at kroberts@nist.gov.

5. NIST Center for Neutron Research (NCNR) Grant Program

The statutory authority for the NCNR Grant Program is 15 U.S.C. § 272(b) and (c).

Program Description: The NCNR Grant Program provides financial assistance to support research involving neutron scattering and the development of innovative technologies that advance the state-of-the-art in neutron research. Financial assistance may be provided for conferences, workshops, or other technical research meetings that are relevant to the mission of NCNR. Additional information about the NCNR and NCNR Programs may be obtained at www.nist.gov/ncnr.

All proposals submitted to the NCNR Grant Program must be in accordance with the program objectives: to create novel approaches to advance high resolution cold and thermal neutron scattering research; to develop new applications of neutron scattering to physics, chemistry, and macromolecular and materials research; and to support the development of innovative technologies relevant to neutron research, including, for example, high resolution two-dimensional neutron detectors, neutron monochromators, and neutron focusing and polarizing devices. Awards to universities to help promote research by university students at the NIST/NSF Center for High Resolution Scattering are also funded under this program. The contact person for the NCNR Grant Program is Dr. Dan Neumann and he may be reached at (301) 975-5252 or by e-mail at dan.neumann@nist.gov.

6. Center for Nanoscale Science and Technology (CNST) Grant Program

The statutory authorities for the CNST Grant Program are 15 U.S.C. § 272(b) and (c), 15 U.S.C. § 278g-1and 15 U.S.C. § 7501 *et seq*.

Program Description: The CNST Grant Program provides financial assistance to support research in the field of nanotechnology specifically aimed at developing essential measurement and fabrication methods and technology in support of all phases of nanotechnology development, from discovery to production; conducting collaborative research with NIST scientists, including research at the CNST NanoFab, a national shared resource for nanofabrication and measurement; and supporting researchers visiting CNST. Financial assistance may be provided for conferences, workshops, or other technical research meetings, or fellowships that are relevant to the mission of the CNST. Proposals involving fellowships are intended to support scientists and engineers with the education, experience, training, and demonstrated record of excellence to effectively pursue and advance the proposed field of nanotechnology research. In some cases one or more scientific staff members, including undergraduate or graduate students, may be stationed at NIST in order to work in collaboration with NIST and other visiting scientists.

The primary program objectives of the CNST Grant Program are to develop new measurement and fabrication methods and instrumentation for nanotechnology and to explore a variety of new areas of nanoscale science and technology. Broad areas of interest include post-complementary metal oxide semiconductor electronics; nanofabrication and nanomanufacturing; energy transport, storage, and conversion; and bionanotechnology. Specific areas of interest include atomic-scale characterization and manipulation; scanning and transmission electron microscopy; focused ion beams; laser-atom manipulation; nanophotonic; nanoplasmonics; optical micro- and nanoelectromechanical systems (MEMS and NEMS); nanomagnetic imaging and dynamics; nanolithography; nanofabrication process development; directed self-assembly; nanoscale properties of soft matter; nanoscale stochastic processes; nanoscale control theory; nanoscale electronic and ionic transport; light-matter interaction, charge and energy transfer processes, catalytic activity, and interfacial structure in energy-related devices (including photovoltaics, thermoelectric, photoanodes, fuel cells, batteries, supercapacitors, and field emitters); nanobiosensors; nanofluidics; nanomedicine; and theory, modeling, and simulation of nanostructures. Additional objectives of this program are to assist and train CNST collaborators and NanoFab users in their research; and to conduct other outreach and educational activities that advance the development of nanotechnology by U.S. academic and industrial scientists. These objectives will entail collaborative research between the selected financial assistance recipients and the CNST research staff. Additional information about CNST may be obtained at www.nist.gov/cnst. The contact person for the CNST Grant Program is Donna Lauren and she may be reached at (301) 975-3729 or by e-mail at donna.lauren@nist.gov.

7. Office of Special Programs (OSP) Grant Program

The statutory authority for the OSP Grant Program is 15 U.S.C. § 272(b) and (c), 15 U.S.C. 278n-1.

Program Description: The OSP Grant Program provides financial assistance consistent with the OSP mission to support research in the broad areas of greenhouse gas and climate science measurements and law enforcement standards in accordance with the two program descriptions below. Additional information about OSP and OSP Programs may be obtained at http://www.nist.gov/director/spo/index.cfm.

All proposals submitted to the OSP Grant Program must be in accordance with the program objectives listed below. The appropriate OSP Program Manager for each OSP field of research that follows may be contacted for clarification of the program objectives.

a. Greenhouse Gas (GHG) and Climate Science Measurements Grant Program. The GHG and Climate Science Measurements Grant Program provides financial assistance consistent with the program objective of supporting research in measurement science that develops or extends internationally-recognized measurement standards, methodologies, and technologies that enhance science-based greenhouse gas emissions data and inventories and measurement capabilities to advance understanding of the processes driving climate and weather. Specific areas of interest include methodologies that: increase accuracy and confidence in GHG stationary source emissions

determinations, develop and/or validate advanced measurement tools for area GHG sources and sinks and increase the accuracy of climate science measurements, and develop and demonstrate measurement methodologies to reconcile U.S. GHG inventories with atmospheric GHG observing methodologies as a technical means of addressing requirements for measurable, reportable, and verifiable GHG emissions at local and regional scales. The primary areas of interest are the advancement of measurement capabilities which further understanding of greenhouse gas transport in the atmosphere. The contact person for the GHG and Climate Science Measurements Grant Program is James Whetstone and he may be reached at (301) 975-2738 or by e-mail at james.whetstone@nist.gov.

b. Office of Law Enforcement Standards (OLES) Grant Program. The OLES Grant Program provides financial assistance consistent with the OLES mission to support research in the following broad fields: protective systems; detection enforcement and inspection technologies; forensic sciences; public safety communication; and counterterrorism and response technologies. Financial assistance may be provided for conferences, workshops, or other technical research meetings that are relevant to the mission of the OLES.

OLES helps criminal justice, public safety, emergency responder, and homeland security agencies make informed procurement, deployment, applications, operating, and training decisions, primarily by developing performance standards, measurement tools, operating procedures and equipment guidelines. Details on these various activities are available at www.nist.gov/oles.

All proposals submitted to the OLES Grant Program must be in accordance with the program objectives listed below. Prospective proposers are encouraged to contact the appropriate OLES Program Manager for each OLES field of research that follows to for clarification of the program objectives and to determine the extent of interest prior to preparation of a detailed proposal.

The program description and objectives for the OLES Grant Program are as follows:

(1) Counterterrorism and Response Technologies (CART) Program. The CART Program's mission is to address the equipment needs of law enforcement, fire fighters, and emergency medical services (EMS) through standards-focused research and development projects based on chemical, biological, radiological, nuclear and explosive (CBRNE) and security requirements. Specific objectives of interest include: innovative responder requirement collection using tools such as social media; CBRNE countermeasures including novel detection technologies, personal and vehicle protection, training, decontamination, defeat and tactics; responder vehicle security and safety; transit security; and interoperable integration of surveillance, intelligence, access controls, CBRNE sensors, and other security devices. The contact person for the CART Program is William Billotte and he may be reached at (301) 975-8610 or by e-mail at william.billotte@nist.gov.

(2) Detection, Enforcement, and Inspection (DEI) Program. The DEI Program has several major thrust areas that support the advancement, development, and deployment of technologies, instruments, and systems used in physical security, threat detection and sensing, surveillance, personal identification, and traffic enforcement. The DEI Program performs this work by maintaining and advancing research and development efforts; developing performance standards, guidelines and reports; and promoting, developing, and investing in multi-agency programs. The DEI Program's current portfolio includes 1) concealed threat and contraband sensing and imaging; 2) imaging technologies used in surveillance, tracking, and security applications; 3) traffic enforcement technologies; 4) through barrier sensing and imaging; 5) less-lethal (nonlethal) weapons; 6) firearm ballistics; and 7) biometric recognition. The contact person for the DEI Program is Nicholas G. Paulter and he may be reached at (301) 975-2405 or by e-mail at nicholas.paulter@nist.gov.

(3) Forensic Sciences Program (FSP). FSP conducts and coordinates research and provides technical services to address the needs of the forensic science community. FSP focuses on

creating new material standards; initiating research to verify methodology; and evaluating new technologies primarily for the following forensic science disciplines: computer and digital forensics; DNA; impression and pattern evidence, such as fingerprints and toolmarks; controlled and dangerous substances; and trace analysis. FSP also seeks to establish expert technical working groups, comprised of federal, state, local and tribal employees acting in their official capacities, to facilitate knowledge exchange and identify best practices for the forensic science community. The contact person for FSP is Melissa Taylor and she may be reached at (301) 975-6363 or by e-mail at melissa.taylor@nist.gov.

(4) Protective Systems Research (PSR) Program. The PSR Program conducts and coordinates research and provides technical services to address standards needs for protective equipment used by law enforcement and corrections officers. The PSR Program recognizes that improvements made to standards and test methods often emerge from applied research. Specific objectives of interest include: the development of new test methods to assess the effectiveness of body armor in reducing blunt trauma, the evaluation of alternative test surrogates for use in body armor testing, the development of new methods for measuring the permeation of moisture through textile materials, and the development of models to describe armor performance. Additional, more general areas of interest include the development of biofidelic models to relate behind armor blunt trauma to injury criteria in humans, advances in high strength fibers used in body armor, research into new technologies to reduce the weight of armor without affecting its protection, and improvements in test methods for assessing stab-resistant body armor and ballistic helmets. The contact person for the PSR Program is Kirk Rice and he may be reached at (301) 975-8071 or by e-mail at kirk.rice@nist.gov.

(5) Public Safety Communication Research (PSCR) Program. The PSCR Program provides research, development, testing, and evaluation to foster nationwide communications interoperability. Drawing on critical requirements provided by public safety practitioners, the PSCR Program provides insight to wireline and wireless standards committees developing standards for voice, data, image, and video communications. Specific areas of interest include: land mobile radio technology, broadband technology, interim interoperability devices, emerging public safety communications technologies, and requirements and architecture frameworks. The contact person for the PSCR Program is Dereck Orr and he may be reached at (303) 497-5400 or by e-mail at dereck.orr@nist.gov.

8. Associate Director for Laboratory Programs (ADLP) Grant Program

The statutory authority for the OSP Grant Program is 15 U.S.C. § 272(b) and (c).

Program Description: The ADLP Grant Program provides financial assistance consistent with the NIST mission to support research in the following fields: chemistry, materials, physics, engineering, infrastructure, information technology, neutron research and nanotechnology. Additional information about the ADLP and ADLP Programs may be obtained at http://www.nist.gov/director/adlp.cfm. Financial support may be provided for conferences, workshops, or other technical research meetings that are relevant to the mission of the Associate Director for Laboratory programs. The contact person for this office is Donna Kimball and she may be reached at (301) 975-8362 or by e-mail at donna.kimball@nist.gov

II. Award Information

1. Funding Instrument. The funding instruments used in these programs will be grants or cooperative agreements, as appropriate. Where cooperative agreements are used, the nature of NIST's "substantial involvement" will generally be collaboration with the recipient by working jointly with a recipient scientist in carrying out the scope of work, or specifying direction or redirection of the scope of work due to inter-relationships with other projects requiring such cooperation. Additional forms of substantial involvement that may arise are described in the DoC Grants and Cooperative Agreements

Manual, which is available at http://www.osec.doc.gov/oam/grants_management/policy/doc_grants_manual/default.htm.

2. **Multi-Year Funding Policy.** When a proposal for a multi-year award is approved, funding will usually be provided for only the first year of the program. If a project is selected for funding, NIST has no obligation to provide any additional funding in connection with that award. Continuation of an award to increase funding or extend the period of performance is at the sole discretion of NIST. Continued funding will be contingent upon satisfactory performance, continued relevance to the mission and priorities of the individual MSE research grant programs, and the availability of funds.

3. **Funding Availability.** The availability of funds depends upon actual authorization of funds, programmatic needs, and other costs expected to be incurred by individual divisions within each laboratory, center, or office. If funds are identified as available for financial assistance, those funds may be awarded to highly ranked proposals as determined by the applicable program's review and selection process (*see* Section V.2. of this FFO).

a. **Material Measurement Laboratory (MML) Grant Program.** In FY 2013 MML anticipates funding individual projects in the $10,000 - $500,000 range and with project performance periods of up to five (5) years, consistent with the multi-year funding policy (*see* Section II.2. of this FFO). In FY 2012, the MML Grant Program funded thirty-three (33) new awards totaling $11,347,558.

b. **Physical Measurement Laboratory (PML) Grant Program.** In FY 2013, PML anticipates funding individual projects in the $5,000 - $250,000 range and with project performance periods of up to five (5) years, consistent with the multi-year funding policy (*see S*ection II.2. of this FFO). In FY 2012, the PML Grant Program funded 24 new awards totaling $2,514,398.

c. **Engineering Laboratory (EL) Grant Program.** In FY 2013, EL anticipates funding individual projects in the $5,000 - $500,000 range and with project performance periods of up to five (5) years, consistent with the multi-year funding policy (*see* Section II.2. of this FFO). In FY 2012, the EL Grant Program funded 34 new awards totaling $4,700,000; of this amount, $327,000 funded awards made under the Fire Grant Program, which is now included in the FY 2013 EL Grant Program.

d. **Information Technology Laboratory (ITL) Grant Program.** In FY 2013, ITL anticipates funding individual projects in the $10,000 - $500,000 range and with project performance periods of up to five (5) years, consistent with the multi-year funding policy (*see* Section II.2. of this FFO). In FY 2012, the ITL Grant Program funded 50 new awards totaling $9,400,000.

e. **NIST Center for Neutron Research (NCNR) Grant Program.** NIST anticipates that approximately $300,000 may be available in FY 2013 to fund new and continuing projects under the NCNR Grant Program. In FY 2013, NCNR anticipates funding new, individual projects in the $25,000 - $100,000 per year range and with project performance periods of up to five (5) years, consistent with the multi-year funding policy (*see* Section II.2. of this FFO). In FY 2012, the NCNR Grant Program funded two (2) new awards totaling $154,126.

f. **Center for Nanoscale and Science and Technology (CNST) Grant Program.** Although funding may be available to support a continuation project under the CNST Grant Program, at this time NIST does not anticipate funding becoming available for new awards in FY 2013. If funds become available in FY 2013, a typical project may be in the $15,000 - $100,000 per year range and with project performance periods of up to five (5) years, consistent with the multi-year funding policy (*see* Section II.2. of this FFO). In FY 2012, the CNST Grant Program funded three new awards totaling $91,000.

g. **Office of Special Programs (OSP) Grant Program.** In FY 2013, OSP anticipates funding individual projects under the Greenhouse Gas (GHG) and Climate Science Measurements Grant Program in the $25,000 - $1,500,000 range and under the Office of Law Enforcement Standards (OLES) Grant Program in the $25,000 - $1,200,000 range, and with project performance periods of up to five (5)

years, consistent with the multi-year funding policy (see Section II.2. of this FFO). In FY 2012, NIST funded four (4) grants totaling $1,528,109 under the GHG and Climate Science Measurements Grant Program and thirteen (13) grants totaling $1,764,865 under the OLES Grant Program.

h. Associate Director for Laboratory Programs (ADLP) Grant Program. In FY 2013, ADLP anticipates funding individual projects in the $5,000 - $100,000 range and with project performance periods of up to five (5) years, consistent with the multi-year funding policy (see Section II.2. of this FFO). The ADLP has no prior funding history.

III. Eligibility Information

1. Eligible Proposers. All programs listed in this FFO are open to institutions of higher education; hospitals; non-profit organizations; commercial organizations; state, local, and Indian tribal governments; foreign governments; organizations under the jurisdiction of foreign governments; and international organizations. Applicants selected for awards under 15 U.S.C. § 278g-1 are encouraged, but not required, to select underrepresented minorities for participation.

2. Cost Sharing or Matching. Cost sharing or matching is not required under the programs listed in this FFO.

3. Other

Pre-Proposals. NIST is not accepting pre-proposals or white papers under the MSE research grant programs listed in this FFO.

IV. Application/Proposal and Submission Information

1. Address to Request Application Package. The standard application package, consisting of the standard forms, i.e., SF-424, SF-424A, SF-424B, SF-LLL, and the CD-511, is available at www.grants.gov. The standard application package may also be requested by contacting the appropriate MSE research grant program office personnel listed below.

a. Material Measurement Laboratory (MML) Grant Program. Ms. Margaret Phillips, Material Measurement Laboratory, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8500, Gaithersburg, MD 20899-8500 (Phone: (301) 975-4350; email: margaret.phillips@nist.gov).

b. Physical Measurement Laboratory (PML) Grant Program. Ms. Kum Ham, Physical Measurement Laboratory, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8400, Gaithersburg, MD 20899-8400 (Phone: (301) 975-4203; email: kum.ham@mist.gov).

c. Engineering Laboratory (EL) Grant Program. Karen Perry, Engineering Laboratory, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8602, Gaithersburg, MD 20899-8602 (Phone: (301) 975-5910; email: karen.perry@nist.gov).

d. Information Technology Laboratory (ITL) Grant Program. Gerlinde Harr, Information Technology Laboratory, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8900, Gaithersburg, Maryland 20899-8900 (Phone: (301) 975-2901; email: gerlinde.harr@nist.gov).

e. NIST Center for Neutron Research (NCNR) Grant Program. Ms. Tanya Burke, NIST Center for Neutron Research, National Institute of Standards and Technology, 100 Bureau Drive, Stop 6100, Gaithersburg, Maryland 20899-6100 (Phone: (301) 975-4711; email: tanya.burke@nist.gov).

f. Center for Nanoscale and Science and Technology (CNST) Grant Program. Donna Lauren, Center for Nanoscale Science and Technology, National Institute of Standards and Technology, 100 Bureau Drive, Stop 6200, Gaithersburg, Maryland 20899-6200 (Phone: (301) 975-3729; email:

donna.lauren@nist.gov).

g. Office of Special Programs (OSP) Grant Program. Cindy Stanley, Law Enforcement Standards Office, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8102, Gaithersburg, MD 20899-8102 (Phone: (301) 975-2756; email: cindy.stanley@nist.gov).

h. Associate Director for Laboratory Programs (ADLP) Grant Program. Donna Kimball, National Institute of Standards and Technology, Associate Director for Laboratory Programs, 100 Bureau Drive, Stop 6000, Gaithersburg, MD 20899-6000 (Phone: (301) 975-8362; email: donna.kimball@nist.gov).

2. Content and Format of Application/Proposal Submission

a. Required Forms and Documents

(1) SF-424, Application for Federal Assistance. The SF-424 must be signed by an authorized representative of the proposing organization. The FFO number 2013-NIST-MSE-01 must be identified in item 12 of the SF-424. The list of certifications and assurances referenced in item 21 of the SF-424 is contained in the SF-424B.

(2) SF-424A, Budget Information – Non-Construction Programs. (The budget should reflect anticipated expenses for each year of the project, considering all potential cost increases, including cost of living adjustments.)

(3) SF-424B, Assurances – Non-Construction Programs

(4) CD-511, Certification Regarding Lobbying

(5) SF-LLL, Disclosure of Lobbying Activities (if applicable)

(6) **Technical Proposal**. The Technical Proposal is a word-processed document responsive to the applicable program description(s) (*see* Section I. of this FFO) and the evaluation criteria (*see* Section V.1. of this FFO). The Technical Proposal should describe in depth the scope of the proposal, its goals, the methods and equipment to be used, its schedule, the personnel working on the project and their qualifications, and the institutional capabilities of the proposer.

(7) **Budget Narrative**. There is no set format for the Budget Narrative; however, it should provide a detailed breakdown of each of the object class categories as reflected on the SF-424A.

(8) **Indirect Cost Rate Agreement.** If indirect costs are included in the proposed budget, provide a copy of the approved negotiated agreement if this rate was negotiated with a cognizant Federal audit agency. If the rate was not established by a cognizant Federal audit agency, provide a statement to this effect. Successful proposers will be required to obtain such a rate.

If submitting the proposal electronically via Grants.gov, items IV.2.a.(1) through IV.2.a.(5) above are part of the standard application package in Grants.gov and can be completed through the download application process. Items IV.2.a.(6) through IV.2.a.(8) must be completed and attached by clicking on “Add Attachments” found in item 15 of the SF-424, Application for Federal Assistance. This will create a zip file that allows for transmittal of the documents electronically via Grants.gov. Proposers should carefully follow specific Grants.gov instructions at www.grants.gov to ensure the attachments will be accepted by the Grants.gov system. A receipt from Grants.gov indicating a proposal is received does not provide information about whether attachments have been received.

If submitting a proposal by paper, all of the required proposal documents should be submitted in the order listed above.

b. Proposal Format

(1) Cover Page. In an effort to route a proposal to the appropriate program official, proposers should reference on the Technical Proposal cover page the applicable MSE research grant program that the proposal is being submitted under using the following choices:

(a) Material Measurement Laboratory (MML) Grant Program
(b) Physical Measurement Laboratory (PML) Grant Program
(c) Engineering Laboratory (EL) Grant Program
(d) Information Technology Laboratory (ITL) Grant Program
(e) NIST Center for Neutron Research (NCNR) Grant Program
(f) Center for Nanoscale Science and Technology (CNST) Grant Program
(g) Office of Special Programs (OSP) Grant Program
(h) Associate Director for Laboratory Programs (ADLP) Grant Program

(2) Double-sided. For paper submissions, print on both sides of the paper for original and copies.

(3) E-mail and facsimile (fax) submissions. Will not be accepted.

(4) Number of paper copies. For paper submissions, one (1) signed stapled original and two (2) stapled copies. If original proposal is in color, the two (2) copies must also be in color. If submitting electronically via Grants.gov, paper copies are not required.

(5) Page layout. The Technical Proposal must be in portrait orientation.

(6) Page numbering. Number pages sequentially.

(7) Proposal language. English.

(8) Staple paper submission. For paper submissions, staple the original signed proposal and each of the two (2) copies securely with one (1) staple in the upper left-hand corner.

(9) Typed document. All proposals, including forms, must be typed; handwritten proposals and forms will not be accepted.

3. Submission Dates and Times

a. All NIST MSE Research Grant Programs except the Engineering Laboratory Grant Program. Proposals will be considered on a continuing/rolling basis. Proposals received after 5:00 p.m. Eastern Time on June 3, 2013 may be processed and considered for funding under this FFO in the current fiscal year or in the next fiscal year, subject to the availability of funds.

b. The EL Grant Program. The primary deadline for applications is Friday, March 1, 2013. EL will continue to receive applications under this FFO on a continuing/rolling basis in the current fiscal year and the next fiscal year, and if residual funds are available, will process and consider for funding applications received by May 1, 2013. A subsequent review of applications will be considered if funds are available for applications received by October 15, 2013. Applications after this date are expected to be held for consideration under the next annual MSE FFO. All electronic applications must be received no later 11:59 p.m. Eastern Time, and all paper applications must be received by NIST by 5:00 p.m. Eastern Time on the due date. *See* Section V.2.b.(3) of this FFO for information about the EL review process.

All proposals for the NIST MSE Research Grant Programs, including the EL Grant Program, paper and electronic, must be received prior to the posting of the FY 2014 FFO on Grants.gov for the NIST MSE research grant programs in order to be processed under this FFO. Proposals determined to be ineligible,

incomplete, and/or non-responsive based on this FFO may be eliminated from further review. Additionally, if it is determined that sufficient funding is not available to consider proposals in the technical area of the proposal, the proposal will not be reviewed for technical merit, and the proposer will be promptly notified of the unavailability of funds for their proposal. The respective MSE research grant program will post a notice on its Web site when funds are exhausted for the fiscal year.

4. Executive Order 12372 (Intergovernmental Review of Federal Programs). Proposals under all Programs in this FFO are not subject to Executive Order 12372.

5. Funding Restrictions. Proposals on product development and commercialization are not considered responsive to this FFO.

6. Other Submission Requirements

a. Proposals may be submitted by paper or electronically.

(1) Paper proposals must be submitted in triplicate (an original and two copies) and submitted to the appropriate MSE research grant program office personnel listed in Section IV.1. of this FFO.

(2) Electronic proposals must be submitted via Grants.gov at www.grants.gov, under announcement 2013-NIST-MSE-01.

a) Submitters of electronic proposals should carefully follow specific Grants.gov instructions to ensure the attachments will be accepted by the Grants.gov system. A receipt from Grants.gov indicating a proposal is received does not provide information about whether attachments have been received. For further information or questions regarding applying electronically for the 2013-NIST-MSE-01 announcement, contact Christopher Hunton by phone at 301-975-5718 or by e-mail at christopher.hunton@nist.gov.

b) Applicants are strongly encouraged to start early and not wait until the approaching due date before logging on and reviewing the instructions for submitting a proposal through Grants.gov. The Grants.gov registration process must be completed before a new registrant can apply electronically. If all goes well, the registration process takes three (3) to five (5) business days. If problems are encountered, the registration process can take up to two (2) weeks or more. Applicants must have a Dun and Bradstreet Data Universal Numbering System (DUNS) number (See Section VI.2.b) and must maintain a current registration in the Federal government's primary registrant database, the System for Award Management (https://www.sam.gov/), as explained on the Grants.gov Web site. After registering, it may take several days or longer from the initial log-on before a new Grants.gov system user can submit a proposal. Only authorized individual(s) will be able to submit the proposal, and the system may need time to process a submitted proposal. Applicants should save and print the proof of submission they receive from Grants.gov. If problems occur while using Grants.gov, the applicant is advised to (a) print any error message received and (b) call Grants.gov directly for immediate assistance. If calling from within the United States or from a U. S. territory, please call 800-518-4726. If calling from a place other than the United States or a U. S. territory, please call 606-545-5035. Assistance from the Grants.gov Help Desk will be available around the clock every day, with the exception of Federal holidays. Help Desk service will resume at 7:00 a.m. Eastern Time the day after Federal holidays. For assistance using Grants.gov, you may also contact support@grants.gov.

c) Information essential to successful submission of proposals on the Grants.gov system is detailed in the For Applicants section found in red on the left side of the www.grants.gov home page, and all potential applicants should pay close attention to the information contained therein. The All About Grants, Applicant FAQs, and Submit Application FAQs sections found under the Applicant Resources option are particularly important.

Important: *All applicants, both electronic and paper submitters, should be aware that adequate time must be factored into applicants' schedules for delivery of their proposal. Submitters of electronic proposals are advised that volume on Grants.gov may be extremely heavy on the deadline date, and if Grants.gov is unable to accept proposals electronically in a timely fashion, applicants are encouraged to exercise their option to submit proposals in paper format. Submitters of paper proposals should allow adequate time to ensure a paper proposal will be received on time, taking into account that Federal Government security screening for U.S. Postal Service mail may delay receipt of mail for up to two (2) weeks and that guaranteed express mailings and/or couriers are not always able to fulfill their guarantees.*

Refer to important information in Section IV.3. Submission Dates and Times, to help ensure your proposal is received on time.

b. Amendments. Any amendments to this FFO will be announced through Grants.gov. Applicants can sign up for Grants.gov FFO amendments, while applicants without access to the Internet can contact the programmatic and technical questions contact for the appropriate program (see Section VII. of this FFO) to request copies.

V. Application/Proposal Review Information

1. Evaluation Criteria

a. Material Measurement Laboratory (MML) Grant Program. The evaluation criteria that will be used in evaluating proposals considered by the MML Grant Program are as follows:

(1) Rationality. The coherence of the proposer's approach and the extent to which the proposal effectively addresses scientific and technical issues that are relevant to MML programs. **(0 – 25 points)**

(2) Qualifications of Technical Personnel. The professional accomplishments, skills, and training of the proposed personnel to perform the work proposed in the proposal. **(0 – 25 points)**

(3) Resources Availability. The extent to which the proposer has access to the necessary facilities and overall support to accomplish project objectives. **(0 – 25 points)**

(4) Technical Merit of Contribution. The potential technical effectiveness of the proposed work and the value it would contribute to the field of measurement science and engineering, especially as it pertains to reference methods, reference materials and reference data in Material Measurements. **(0 – 25 points)**

b. Physical Measurement Laboratory (PML) Grant Program. The evaluation criteria that will be used in evaluating proposals considered by the PML Grant Program are as follows (except for proposals to the Office of Weights and Measures):

(1) Rationality. The coherence of the proposer's approach and the extent to which the proposal effectively addresses scientific and technical issues that are relevant to PML programs.

(2) Qualifications of Technical Personnel. The professional accomplishments, skills, and training of the proposed personnel to perform the work proposed in the proposal.

(3) Resources Availability. The extent to which the proposer has access to the necessary facilities and overall support to accomplish project objectives.

(4) Technical Merit of Contribution. The potential technical effectiveness of the proposed work

and the value it would contribute to the field of measurement science. Proposals must be relevant to current PML research programs and have a relation to the objectives of ongoing PML programs and activities.

Each of these factors will be given equal weight in the evaluation process.

The evaluation criteria that will be used in evaluating proposals considered by the **Office of Weights and Measures** and assigned weights are as follows:

(1) Technical Quality of the Research. The rationality, innovation and imagination of the proposal and the fit to NIST's documentary standards and legal metrology programs. **(0 – 35 points)**

(2) Potential Impact of the Results. The potential impact and the technical application of the results to NIST's in-house programs and the documentary standards and legal metrology communities. **(0 – 25 points)**

(3) Staff and Institution Capability to Perform the Work. The quality of the facilities and experience of the staff to assess the likelihood of achieving the objective of the proposal**. (0 – 20 points)**

(4) Match of Budget to Proposed Work. Assessment of the budget against the proposed work to ascertain the reasonableness of the request. **(0 – 20 points)**

c. Engineering Laboratory (EL) Grant Program. The evaluation criteria that will be used in evaluating proposals considered by the EL Grant Program and assigned weights are as follows:

(1) Technical Quality of the Research. The clarity, rationality, organization, innovation and imagination of the proposal, and the fit to NIST's in-house EL programs. **(0 – 35 points)**

(2) Potential Impact of the Results. The potential impact and the likelihood of the technical application of the results. **(0 – 35 points)**

(3) Staff and Institution Capability to Perform the Work. The quality of the facilities and experience of the staff to assess the likelihood of achieving the objective of the proposal. **(0 – 15 points)**

(4) Match of Budget to Proposed Work. Assessment of the budget against the proposed work to ascertain the reasonableness of the request. **(0 – 15 points)**

d. Information Technology Laboratory (ITL) Grant Program. The evaluation criteria that will be used in evaluating proposals considered by the ITL Grant Program are as follows:

(1) Rationality. The coherence of the proposer's approach and the extent to which the proposal effectively addresses scientific and technical issues relevant to ITL programs.

(2) Technical Merit of Contribution. The potential technical effectiveness of the proposed work and the value it would contribute to the field of information technology research.

(3) Qualifications of Technical Personnel. The professional accomplishments, skills, and training of the proposed personnel to perform the proposed work.

(4) Resources Availability. The extent to which the proposer has access to the necessary facilities and overall support to accomplish project objectives.

Each of these factors will be given equal weight in the evaluation process.

e. NIST Center for Neutron Research (NCNR) Grant Program. The evaluation criteria that will be used in evaluating proposals considered by the NCNR Grant Program and assigned weights are as follows:

(1) Rationality. The innovation, rationality, and coherence of the proposer's approach and the extent to which the proposal effectively addresses important scientific and technical issues using neutron methods and/or the development of innovative devices for neutron research. **(0 to 35 points)**

(2) Qualifications of Technical Personnel. The professional accomplishments, skills, and training of the proposed personnel to perform the work proposed in the proposal. **(0 to 20 points)**

(3) Resources. The extent to which the proposer has access to the necessary resources, facilities, and overall support to accomplish project objectives, and assessment of the budget against the proposed work to ascertain the reasonableness of the request. **(0 to 20 points)**

(4) Technical Merit of Contribution. The potential technical effectiveness of the proposed work and the value it would contribute to neutron research. **(0 to 25 points)**

f. Center for Nanoscale Science and Technology (CNST) Grant Program. The evaluation criteria that will be used in evaluating proposals considered by the CNST Grant Program are as follows:

(1) Rationality. The coherence of the proposer's approach and the extent to which the proposal effectively addresses scientific and technical issues relevant to CNST.

(2) Qualifications of Technical Personnel. The professional accomplishments, skills, and training of the proposed personnel to perform the work proposed in the proposal.

(3) Resources Availability. The extent to which the proposer has access to the necessary facilities and overall support to accomplish project objectives.

(4) Technical Merit of Contribution. The potential technical effectiveness of the proposed work and the value it would contribute to the field of nanotechnology.

Each of these factors will be given equal weight in the evaluation process.

g. Office of Special Programs (OSP) Grant Program. The evaluation criteria that will be used in evaluating proposals considered by the OSP Grant Program are as follows:

(1) Rationality. The logic and soundness of the proposer's approach and the extent to which the successful completion of the proposed work addresses scientific and technical issues relevant to OSP programs.

(2) Technical Merit of Contribution. The potential technical effectiveness of the proposed work and the value it would contribute to research areas addressed by the OSP.

(3) Qualifications of Technical Personnel. The professional accomplishments, skills, and training of the proposed personnel to perform the work proposed in the proposal.

(4) Resources Availability. The extent to which the proposer has access to the necessary equipment and facilities and overall support to accomplish project objectives.

Each of these factors will be given equal weight in the evaluation process.

h. Associate Director for Laboratory Programs (ADLP) Grant Program. The evaluation criteria that will be used in evaluating proposals considered by the ADLP Grant Program and assigned weights

are as follows:

(1) Technical Quality of the Research. The rationality, innovation and imagination of the proposal, and the fit to NIST's in-house ADLP programs. **(0 – 35 points)**

(2) Potential Impact of the Results. The potential impact and the likelihood of the technical application of the results. **(0 – 25 points)**

(3) Staff and Institution Capability to Perform the Work. The quality of the facilities and experience of the staff to assess the likelihood of achieving the objective of the proposal. **(0 – 20 points)**

(4) Match of Budget to Proposed Work. Assessment of the budget against the proposed work to ascertain the reasonableness of the request. **(0 – 20 points)**

2. Review and Selection Process

a. Initial Screening of all NIST MSE Research Grant Program Proposals. All proposals received in response to this FFO will be assigned to the appropriate program and reviewed as received on a rolling basis to determine whether they are eligible, complete, and responsive to this FFO and the scope of the stated program objectives and are compatible with the respective MSE research grant program areas and the relevance to the objectives of the respective MSE research grant program, as described in the Program Description (*see* Section I of this FFO).

Proposals determined to be ineligible, incomplete, and/or non-responsive based on the initial screening may be eliminated from further review. Additionally, if it is determined that sufficient funding is not available to consider proposals in the technical area of the proposal, the proposal will not be reviewed for technical merit, and the proposer will be promptly notified of the unavailability of funds for their proposal. Each MSE research grant program will post a notice on its Web site when funds are exhausted for the fiscal year.

b. Full Review of Eligible, Complete, and Responsive Proposals for all NIST MSE Research Grant Proposals. Under each MSE research grant program, proposals that are determined to be eligible, complete, and responsive will proceed for full reviews in accordance with the review and selection processes below for each of the respective programs.

(1) Material Measurement Laboratory (MML) Grant Program

At least three (3) independent, objective individuals knowledgeable about the particular scientific area described in the proposal will conduct a technical review of each proposal, based on the evaluation criteria (*see S*ection V.1.a. of this FFO). If non-Federal reviewers are used, the reviewers may discuss the proposals with each other, but scores will be determined on an individual basis, not as a consensus.

The Selecting Official, who is the MML Executive Officer, will make final proposal selections in collaboration with the appropriate MML Division Chief, taking into consideration the results of the reviewers' evaluations, relevance to the objectives described in the MML Grant Program Description (*see* Section I.1. of this FFO), and the availability of funds.

In accordance with the Federal appropriations law expected to be in effect at the time of project funding, NIST anticipates that the selected applicant will be provided a form and asked to make a representation regarding any unpaid delinquent tax liability or felony conviction under any Federal law.

NIST reserves the right to negotiate the budget costs with the proposers that have been selected to receive awards, which may include requesting that the proposer remove certain costs.

Additionally, NIST may request that the proposer modify objectives or work plans and provide supplemental information required by the agency prior to award. For international applications, NIST will follow applicable U.S. laws and policies. NIST also reserves the right to reject a proposal where information is uncovered that raises a reasonable doubt as to the responsibility of the proposer. NIST may select part, some, all, or none of the proposals. The final approval of selected proposals and issuance of awards will be by the NIST Grants Officer. The award decisions of the NIST Grants Officer are final.

(2) Physical Measurement Laboratory (PML) Grant Program

At least three (3) independent, objective individuals knowledgeable about the particular scientific area described in the proposal will conduct a technical review of each proposal, based on the evaluation criteria (*see S*ection V.1.b. of this FFO). If non-Federal reviewers are used, the reviewers may discuss the proposals with each other, but scores will be determined on an individual basis, not as a consensus.

The Selecting Official, who is the PML Deputy Director, PML Executive Officer, or appropriate PML Division Chief, will make final proposal selections, taking into consideration the results of the reviewers' evaluations, relevance to the objectives described in the PML Grant Program Description (*see* Section I.2. of this FFO), and the availability of funds.

In accordance with the Federal appropriations law expected to be in effect at the time of project funding, NIST anticipates that the selected applicant will be provided a form and asked to make a representation regarding any unpaid delinquent tax liability or felony conviction under any Federal law.

NIST reserves the right to negotiate the budget costs with the proposers that have been selected to receive awards, which may include requesting that the proposer remove certain costs. Additionally, NIST may request that the proposer modify objectives or work plans and provide supplemental information required by the agency prior to award. For international applications, NIST will follow applicable U.S. laws and policies. NIST also reserves the right to reject a proposal where information is uncovered that raises a reasonable doubt as to the responsibility of the proposer. NIST may select part, some, all, or none of the proposals. The final approval of selected proposals and issuance of awards will be by the NIST Grants Officer. The award decisions of the NIST Grants Officer are final.

(3) Engineering Laboratory (EL) Grant Program

At least three (3) independent, objective individuals knowledgeable about the particular scientific area described in the proposal will conduct a technical review of each proposal, based on the evaluation criteria (*see S*ection V.1.c. of this FFO). If non-federal reviewers are used, the reviewers may discuss the proposals with each other, but scores will be determined on an individual basis, not as a consensus.

A Review Panel will be convened for each of the three goals described in the EL Grant Program description (*see* Section I.3. of this FFO) in March for proposals received by the March 1 deadline (*see* Section IV.3.b of this FFO). The Review Panels for each of the three goals will convene again to review and recommend applications if funds are available in accordance with the schedule outlined in Section IV.3.b. of this FFO.

Each Review Panel will consist of NIST staff with appropriate technical expertise, appropriate Group Leaders, Program Managers, and/or Deputy Division Chief. Each Review Panel will prepare and provide a rank order of the proposals to the Selecting Official, who may be the appropriate Goal Leader/Division Chief, the EL Deputy Director, or the EL Director, taking into consideration the results of the reviewers' evaluations, the availability of funds; program balance; and the relevance to the objectives described in the EL Grants Program.

The Selecting Official will make final proposal selections. The Selecting Official shall select proposals for award based upon the rank order of the proposals, and may select a proposal out of rank based on one or more of the following selection factors: the results of the reviewers' evaluations; the availability of funds; program balance; and the relevance to the objectives described in the EL Grants Program (*see* Section I.3. of this FFO) and at the EL Web site at www.nist.gov/el.

In accordance with the Federal appropriations law expected to be in effect at the time of project funding, NIST anticipates that the selected applicant will be provided a form and asked to make a representation regarding any unpaid delinquent tax liability or felony conviction under any Federal law.

NIST reserves the right to negotiate the budget costs with the proposers that have been selected to receive awards, which may include requesting that the proposer remove certain costs. Additionally, NIST may request that the proposer modify objectives or work plans and provide supplemental information required by the agency prior to award. For international applications, NIST will follow applicable U.S. laws and policies. NIST also reserves the right to reject a proposal where information is uncovered that raises a reasonable doubt as to the responsibility of the proposer. NIST may select part, some, all, or none of the proposals. The final approval of selected proposals and issuance of awards will be by the NIST Grants Officer. The award decisions of the NIST Grants Officer are final.

(4) Information Technology Laboratory (ITL) Grant Program

At least three (3) independent, objective individuals knowledgeable about the particular scientific area described in the proposal will conduct a technical review of each proposal, based on the evaluation criteria (*see* Section V.1.d. of this FFO). If non-Federal reviewers are used, the reviewers may discuss the proposals with each other, but scores will be determined on an individual basis, not as a consensus.

The Selecting Official, who is the appropriate ITL Division Chief or Program Manager, in concurrence with the ITL Director, will make final proposal selections, taking into consideration the results of the reviewers' evaluations, relevance to the objectives described in the ITL Grant Program Description (*see* Section I.4. of this FFO), and the availability of funds.

In accordance with the Federal appropriations law expected to be in effect at the time of project funding, NIST anticipates that the selected applicant will be provided a form and asked to make a representation regarding any unpaid delinquent tax liability or felony conviction under any Federal law.

NIST reserves the right to negotiate the budget costs with the proposers that have been selected to receive awards, which may include requesting that the proposer remove certain costs. Additionally, NIST may request that the proposer modify objectives or work plans and provide supplemental information required by the agency prior to award. For international applications, NIST will follow applicable U.S. laws and policies. NIST also reserves the right to reject a proposal where information is uncovered that raises a reasonable doubt as to the responsibility of the proposer. NIST may select part, some, all, or none of the proposals. The final approval of selected proposals and issuance of awards will be by the NIST Grants Officer. The award decisions of the NIST Grants Officer are final.

(5) NIST Center for Neutron Research (NCNR) Grant Program

At least three (3) independent, objective individuals knowledgeable about the particular scientific area described in the proposal will conduct a technical review of each proposal, based on the evaluation criteria (*see* Section V.1.e. of this FFO). If non-Federal reviewers are used, the

reviewers may discuss the proposals with each other, but scores will be determined on an individual basis, not as a consensus.

The Selecting Official, who is the NCNR Director, will make final proposal selections, taking into consideration the results of the reviewers' evaluations, relevance to the objectives described in the NCNR Grant Program Description (*see* Section I.5. of this FFO), and the availability of funds.

In accordance with the Federal appropriations law expected to be in effect at the time of project funding, NIST anticipates that the selected applicant will be provided a form and asked to make a representation regarding any unpaid delinquent tax liability or felony conviction under any Federal law.

NIST reserves the right to negotiate the budget costs with the proposers that have been selected to receive awards, which may include requesting that the proposer remove certain costs. Additionally, NIST may request that the proposer modify objectives or work plans and provide supplemental information required by the agency prior to award. For international applications, NIST will follow applicable U.S. laws and policies. NIST also reserves the right to reject a proposal where information is uncovered that raises a reasonable doubt as to the responsibility of the proposer. NIST may select part, some, all, or none of the proposals. The final approval of selected proposals and issuance of awards will be by the NIST Grants Officer. The award decisions of the NIST Grants Officer are final.

(6) Center for Nanoscale Science and Technology (CNST) Grant Program

At least three (3) independent, objective individuals knowledgeable about the particular scientific area described in the proposal will conduct a technical review of each proposal, based on the evaluation criteria (*see* Section V.1.f. of this FFO). If non-Federal reviewers are used, the reviewers may discuss the proposal with each other, but scores will be determined on an individual basis, not as a consensus.

The Selecting Official, who is the CNST Director, will make final proposal selections, taking into consideration the results of the reviewers' evaluations, relevance to the objectives described in the CNST Grant Program Description (*see* Section I.6. of this FFO), and the availability of funds.

In accordance with the Federal appropriations law expected to be in effect at the time of project funding, NIST anticipates that the selected applicant will be provided a form and asked to make a representation regarding any unpaid delinquent tax liability or felony conviction under any Federal law.

NIST reserves the right to negotiate the budget costs with the proposers that have been selected to receive awards, which may include requesting that the proposer remove certain costs. Additionally, NIST may request that the proposer modify objectives or work plans and provide supplemental information required by the agency prior to award. For international applications, NIST will follow applicable U.S. laws and policies. NIST also reserves the right to reject a proposal where information is uncovered that raises a reasonable doubt as to the responsibility of the proposer. NIST may select part, some, all, or none of the proposals. The final approval of selected proposals and issuance of awards will be by the NIST Grants Officer. The award decisions of the NIST Grants Officer are final.

(7) Office of Special Programs (OSP) Grant Program *(Prospective proposers are encouraged to contact the appropriate Program Manager (see Section VII. of this FFO) for clarification of the program objectives and to determine the extent of interest prior to preparation of a detailed proposal.)*

(a) Greenhouse Gas (GHG) and Climate Science Measurements Grant Program. At least three (3) independent, objective individuals knowledgeable about the particular scientific area

described in the proposal will conduct a technical review of each proposal, based on the evaluation criteria (*see* Section V.1.g. of this FFO). If non-Federal reviewers are used, the reviewers may discuss the proposals with each other, but scores will be determined on an individual basis, not as a consensus.

The Selecting Official, who is the OSP Director, will make final proposal selections, taking into consideration the results of the reviewers' evaluations, relevance to the objectives described in the OSP Grant Program Description (*see* Section I.7.a. of this FFO), and the availability of funds.

(b) Office of Law Enforcement Standards (OLES) Grant Program. At least three (3) independent, objective individuals knowledgeable about the particular scientific area described in the proposal will conduct a technical review of each proposal, based on the evaluation criteria (*see* Section V.1.g. of this FFO). If non-Federal reviewers are used, the reviewers may discuss the proposals with each other, but scores will be determined on an individual basis, not as a consensus.

The Selecting Official, who is the OSP Director, will make final proposal selections, taking into consideration the results of the reviewers' evaluations, relevance to the objectives described in the OSP Grant Program Description (*see* Section I.7.b. of this FFO), and the availability of funds.

In accordance with the Federal appropriations law expected to be in effect at the time of project funding, NIST anticipates that the selected applicant will be provided a form and asked to make a representation regarding any unpaid delinquent tax liability or felony conviction under any Federal law.

NIST reserves the right to negotiate the budget costs with the proposers that have been selected to receive awards, which may include requesting that the proposer remove certain costs. Additionally, NIST may request that the proposer modify objectives or work plans and provide supplemental information required by the agency prior to award. For international applications, NIST will follow applicable U.S. laws and policies. NIST also reserves the right to reject a proposal where information is uncovered that raises a reasonable doubt as to the responsibility of the proposer. NIST may select part, some, all, or none of the proposals. The final approval of selected proposals and issuance of awards will be by the NIST Grants Officer. The award decisions of the NIST Grants Officer are final.

(8) Associate Director for Laboratory Programs (ADLP) Grant Program

At least three (3) independent, objective individuals knowledgeable about the particular scientific area described in the proposal will conduct a technical review of each proposal, based on the evaluation criteria (*see S*ection V.1.h. of this FFO). If non-Federal reviewers are used, the reviewers may discuss the proposals with each other, but scores will be determined on an individual basis, not as a consensus.

The Selecting Official, the Associate Director for Laboratory Programs, or a designee, will make final proposal selections, taking into consideration the results of the reviewers' evaluations, relevance to the objectives described in the ADLP Grant Program Description (*see* Section I.8. of this FFO), and the availability of funds.

In accordance with the Federal appropriations law expected to be in effect at the time of project funding, NIST anticipates that the selected applicant will be provided a form and asked to make a representation regarding any unpaid delinquent tax liability or felony conviction under any Federal law.

NIST reserves the right to negotiate the budget costs with the proposers that have been selected

to receive awards, which may include requesting that the proposer remove certain costs. Additionally, NIST may request that the proposer modify objectives or work plans and provide supplemental information required by the agency prior to award. For international applications, NIST will follow applicable U.S. laws and policies. NIST also reserves the right to reject a proposal where information is uncovered that raises a reasonable doubt as to the responsibility of the proposer. NIST may select part, some, all, or none of the proposals. The final approval of selected proposals and issuance of awards will be by the NIST Grants Officer. The award decisions of the NIST Grants Officer are final.

3. Anticipated Announcement and Award Dates.

a. All NIST Measurement Science and Engineering (MSE) Research Grant Programs. Awards will be made approximately 90 days after the end of the review process. See information in Section IV.3 of this FFO regarding awards made in a subsequent fiscal year.

4. Additional Information

a. Safety. Safety is a top priority at NIST. Employees and affiliates of award recipients who conduct project work at NIST will be expected to be safety-conscious, to attend NIST safety training, and to comply with all NIST safety policies and procedures, and with all applicable NIST visitor policies.

b. Proposal Replacement Pages. Proposers may not submit replacement pages and/or missing documents once a proposal has been submitted. Any revisions must be made by submission of a new proposal that must be received by NIST by the submission deadline.

c. Notification to Unsuccessful Proposers. Unsuccessful proposers will be notified in writing.

d. Retention of Unsuccessful Proposals. One (1) of each non-selected proposal will be retained for three (3) years for record keeping purposes and the other two (2) copies will be destroyed. After three (3) years, the remaining copy will be destroyed.

VI. Award Administration Information

1. Award Notices. Successful proposers will receive an award from the NIST Grants Officer. The award cover page, i.e., CD-450, Financial Assistance Award is available at http://ocio.os.doc.gov/s/groups/public/@doc/@os/@ocio/@oitpp/documents/content/dev01_002513.pdf and the DoC Financial Assistance Standard Terms and Conditions (January 2013) are available at http://www.osec.doc.gov/oam/grants_management/policy/documents/DOC_Standard_Terms_and_Conditions_01_10_2013.pdf.

2. Administrative and National Policy Requirements

a. DoC Pre-Award Notification Requirements. The DoC Pre-Award Notification Requirements for Grants and Cooperative Agreements, 77 FR 74634 (December 17, 2012), are applicable to this FFO and are available at https://www.federalregister.gov/articles/2012/12/17/2012-30228/department-of-commerce-pre-award-notification-requirements-for-grants-and-cooperative-agreements.

b. Employer/Taxpayer Identification Number (EIN/TIN), Dun and Bradstreet Data Universal Numbering System (DUNS), and System for Award Management (SAM) All applicants for Federal financial assistance are required to obtain a universal identifier in the form of DUNS number and maintain a current registration in the Federal government's primary registrant database, SAM. On the form SF-424 items 8.b. and 8.c., the applicant's 9-digit EIN/TIN and 9-digit DUNS number must be consistent with the information in SAM (https://www.sam.gov/) and Automated Standard Application for Payment System (ASAP). For complex organizations with multiple EIN/TIN and DUNS numbers, the EIN/TIN and DUNS numbers MUST be the numbers for the applying organization. Organizations that provide incorrect/inconsistent EIN/TIN and DUNS numbers may

experience significant delays in receiving funds if their proposal is selected for funding. Confirm that the EIN/TIN and DUNS number are consistent with the information on the SAM and ASAP.

Per 2 C.F.R. Part 25, each applicant must:

(1) Be registered in the CCR before submitting a proposal noting the CCR now resides in SAM;
(2) Maintain an active CCR registration, noting the CCR now resides in SAM, with current information at all times during which it has an active Federal award or a proposal under consideration by an agency; and
(3) Provide its DUNS number in each application or proposal it submits to the agency.

The applicant can obtain a DUNS number from Dun and Bradstreet. A DUNS number can be created within one business day. The CCR or SAM registration process may take five or more business days to complete. If you are currently registered with the CCR, you may not need to make any changes. However, please make certain that the TIN associated with your DUNS number is correct. Also note that you will need to update your CCR registration annually. This may take three or more business days to complete. Information about SAM is available at SAM.gov. See also.

c. Collaborations with NIST Employees. All proposals should include a description of any work proposed to be performed by an entity other than the proposer, and the cost of such work should ordinarily be included in the budget.

If a proposer proposes collaboration with NIST, the statement of work should include a statement of this intention, a description of the collaboration, and prominently identify the NIST employee(s) involved, if known. Any collaboration by a NIST employee must be approved by appropriate NIST management and is at the sole discretion of NIST. Prior to beginning the merit review process, NIST will verify the approval of the proposed collaboration. Any unapproved collaboration will be stricken from the proposal prior to the merit review.

d. Use of NIST Intellectual Property. If the proposer anticipates using any NIST-owned intellectual property to carry out the work proposed, the proposer should identify such intellectual property. This information will be used to ensure that no NIST employee involved in the development of the intellectual property will participate in the review process for that competition. In addition, if the proposer intends to use NIST-owned intellectual property, the proposer must comply with all statutes and regulations governing the licensing of Federal government patents and inventions, described in 35 U.S.C. §§ 200-212, 37 C.F.R. Part 401, 15 C.F.R. § 14.36, and in Section B.21 of the DoC Pre-Award Notification Requirements, 77 FR 74634 (December 17, 2012). Questions about these requirements may be directed to the Chief Counsel for NIST, (301) 975-2803.

Any use of NIST-owned intellectual property by a proposer is at the sole discretion of NIST and will be negotiated on a case-by-case basis if a project is deemed meritorious. The proposer should indicate within the statement of work whether it already has a license to use such intellectual property or whether it intends to seek one.

If any inventions made in whole or in part by a NIST employee arise in the course of an award made pursuant to this FFO, the United States government may retain its ownership rights in any such invention. Licensing or other disposition of NIST's rights in such inventions will be determined solely by NIST, and include the possibility of NIST putting the intellectual property into the public domain.

e. Additional Consideration of Proposals. NIST programs are often cross-cutting and multi-disciplinary. If a NIST program official believes a proposal that is not selected for funding under a specific MSE research grant program may be of interest to another NIST MSE research grant program(s), the official may forward the proposal to any other NIST MSE research grant program(s) that the program official believes may have an interest in the project, for potential consideration under the other NIST MSE research grant program(s) procedures. If, upon initial screening, the other NIST

MSE research grant program(s) finds the proposal may be of programmatic interest, the proposal will proceed through the review and selection process (*see* Section V.2 of this FFO) for the specific MSE research grant program(s). If not, the proposal will be returned to the original program for final processing. Any proposer that does not wish for its proposal to be considered by other NIST programs should indicate on its proposal that it would like consideration of the project to be limited to the program to which it originally submitted the proposal. Proposers will be notified if their proposals have been forwarded to another NIST program(s) for potential consideration.

f. Research Projects Involving Human Subjects, Human Tissue, Data or Recordings Involving Human Subjects Including Software Testing. Any proposal that includes research involving human subjects, human tissue/cells, data or recordings involving human subjects, including software testing, must meet the requirements of the Common Rule for the Protection of Human Subjects ("Common Rule"), codified for the Department of Commerce (DoC) at 15 C.F.R. Part 27. In addition, any such application that includes research on these topics must be in compliance with any statutory requirements imposed upon the Department of Health and Human Services (DHHS) and other Federal agencies regarding these topics, all regulatory policies and guidance adopted by DHHS, the Food and Drug Administration, and other Federal agencies on these topics, and all Executive Orders and Presidential statements of policy on these topics.

NIST reserves the right to make an independent determination of whether an applicant's research involves human subjects. If NIST determines that your research project involves human subjects, you will be required to provide additional information for review and approval. If an award is issued, no research activities involving human subjects shall be initiated or costs incurred under the award until the NIST Grants Officer issues written approval. Retroactive approvals are not permitted.

NIST will accept applications that include exempt and non-exempt human subjects research activities. Non-exempt human subjects research activities will be required to have protocols approved by an Institutional Review Board (IRB) currently registered with the Office for Human Research Protections (OHRP) within the DHHS and that will be performed by entities possessing a currently valid Federal-wide Assurance (FWA) on file from OHRP that is appropriately linked to the cognizant IRB for the protocol. Information regarding how to apply for an FWA and register and IRB with OHRP can be found at http://www.hhs.gov/ohrp/assurances/index.html. ***The applicant should clearly indicate in the proposal, by separable task, all research activities believed to be exempt or non-exempt research involving human subjects and the expected institution(s) where the research activities involving human subjects may be conducted.***

Generally, NIST does not fund research involving human subjects in foreign countries. NIST will consider, however, the use of **preexisting** tissue, cells, or data from a foreign source on a limited basis if all of the following criteria are satisfied:

(1) the scientific source is considered unique,
(2) an equivalent source is unavailable within the United States,
(3) an alternative approach is not scientifically of equivalent merit, and
(4) the specific use qualifies for an exemption under the Common Rule.

Any award issued by NIST for the program announced in this FFO is required to adhere to all Presidential policies, statutes, guidelines, and regulations regarding the use of human embryonic stem cells. The DoC/NIST follows the NIH Guidelines by supporting and conducting research using only human embryonic stem cell lines that have been approved by NIH in accordance with the NIH Guidelines. Detailed information regarding NIH Guidelines for stem cells is located on the NIH Stem Cell Information website: http://stemcells.nih.gov. The DoC/NIST will not support or conduct any type of research that the NIH Guidelines prohibit NIH from funding. The DoC/NIST will review research using human embryonic stem cell lines that it supports and conducts in accordance with the Common Rule and NIST implementing procedures, as appropriate.

Any request to support or conduct research using human embryonic stem cell lines not currently approved by the NIH, will require that the owner, deriver or licensee of the human embryonic stem cell line apply for and receive approval of the registration of the cell line through the established NIH application procedures: http://hescregapp.od.nih.gov/NIH_Form_2890_Login.htm. Due to the timing uncertainty associated with establishing an embryonic stem cell line in the NIH registry, the use of existing human embryonic stem cell lines in the NIH Embryonic Stem Cell Registry may be preferred by applicants or current award recipients. The NIH Embryonic Stem Cell Registry is located at: http://grants.nih.gov/stem_cells/registry/current.htm.

An applicant or current award recipient proposing to use a registered embryonic stem cell line will be required to document an executed agreement for access to the cell line with the provider of the cell line, and acceptance of any established restrictions for use of the cell line, as may be noted in the NIH Embryonic Stem Cell Registry.

If the applicant's proposal appears to include research activities involving human subjects the following information may be requested during the proposal review process:

(1) The name(s) of the institution(s) where the research will be conducted;
(2) The name(s) and institution(s) of the cognizant IRB(s), and the IRB registration number(s);
(3) The FWA number of the applicant linked to the cognizant IRB(s);
(4) The FWAs associated with all organizations engaged in the planned research activity linked to the cognizant IRB;
(5) If the IRB review(s) is pending, the estimated start date for research involving human subjects;
(6) The IRB approval date (if currently approved for exempt or non-exempt research);
(7) If any FWAs or IRB registrations are being applied for, that should be clearly stated.

Additional documentation may be requested, as warranted, during review of the applicant's proposal, but may include the following for research activities involving human subjects that are planned in the first year of the award:

(1) A signed (by the study principal investigator) copy of each applicable final IRB-approved protocol;
(2) A signed and dated approval letter from the cognizant IRB(s) that includes the name of the institution housing each applicable IRB, provides the start and end dates for the approval of the research activities, and any IRB-required interim reporting or continuing review requirements;
(3) A copy of any IRB-required application information, such as documentation of approval of special clearances (i.e., biohazard, HIPAA, etc.) conflict-of-interest letters, or special training requirements;
(4) A brief description of what portions of the IRB submitted protocol are specifically included in the applicant's proposal submitted to NIST, if the protocol includes tasks not applicable to the proposal, or if the protocol is supported by multiple funding sources. For protocols with multiple funding sources, NIST will not approve the study without a non duplication-of-funding letter indicating that no other federal funds will be used to support the tasks proposed under the proposed research or ongoing project;
(5) If a new protocol will only be submitted to an IRB if an award from NIST issued, a draft of the proposed protocol may be requested;
(6) Any additional clarifying documentation that NIST may request during review of proposals to perform the NIST administrative review of research involving human subjects.

g. Research Projects Involving Live Vertebrate Animals. Any application that includes participation in research involving live vertebrate animals, that are being cared for, euthanized, or used by the project participants to accomplish research goals, teaching, or testing, must be in compliance with the National Research Council's "Guide for the Care and Use of Laboratory Animals," which can be

obtained from National Academy Press, 500 5th Street, N.W., Department 285, Washington, DC 20055. In addition, such applications must meet the requirements of the Animal Welfare Act (7 U.S.C. § 2131 et seq.), 9 C.F.R. Parts 1, 2, and 3, and if appropriate, 21 C.F.R. Part 58. These regulations do not apply to proposed research using **preexisting** images of animals or to research plans that do not include live animals. These regulations also do not apply to obtaining animal materials from commercial processors of animal products or to animal cell lines or tissues from tissue banks. ***The applicant should clearly indicate in the proposal, by separable task, all research activities believed to include research involving live vertebrate animals and the institution(s) where the research activities involving live vertebrate animals may be conducted.***

NIST reserves the right to make an independent determination of whether your research involves live vertebrate animals. If NIST determines that your research project involves live vertebrate animals, you will be required to provide additional information for review and approval. If an award is issued, no research activities involving live vertebrate animals subjects shall be initiated or costs incurred under the award until the NIST Grants Officer issues written approval.

If the applicant's proposal appears to include research activities involving live vertebrate animals the following information may be requested during the proposal review process:

(1) The name(s) of the institution(s) where the animal research will be conducted;
(2) The assurance type and number, as applicable, for the cognizant IACUC where the research activity is located. [For example: Animal Welfare Assurance from the Office of Laboratory Animal Welfare (OLAW) should be indicated by the OLAW assurance number, i.e. A-1234; an USDA Animal Welfare Act certification should be indicated by the certification number i.e. 12-R-3456; and an Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC) should be indicated by AAALAC.]
(3) The IACUC approval date (if currently approved);
(4) If the review by the cognizant Institutional Animal Care and Use Committee (IACUC) is pending, the estimated start date for research involving vertebrate animals;
(5) If any assurances or IACUCs need to be obtained or established, that should be clearly stated.

Additional documentation will be requested, as warranted, during review of the proposal, but may include the following for research activities involving live vertebrate animals that are planned in the first year of the award:

(1) A signed (by the Principal Investigator) copy of the IACUC approved Animal Study Proposal (ASP);
(2) Documentation of the IACUC approval indicating the approval and expiration dates of the ASP; and
(3) If applicable, a nonduplication-of-funding letter if the ASP is funded from several sources.
(4) If a new ASP will only be submitted to an IACUC if an award from NIST issued, a draft of the proposed ASP may be requested.

Any additional clarifying documentation that NIST may request during review of proposals to perform the NIST administrative review of research involving live vertebrate animals.

h. Funding Availability and Limitation of Liability. Funding for the programs listed in this FFO is contingent upon the availability of appropriations. In no event will NIST or DoC be responsible for proposal preparation costs if these programs fail to receive funding or are cancelled because of agency priorities. Publication of this FFO does not oblige NIST or DoC to award any specific project or to obligate any available funds.

i. Collaborations Making Use of Federal Facilities. All proposals should include a description of any work proposed to be performed using Federal facilities.

If a proposer proposes use of NIST facilities, the statement of work should include a statement of this intention and a description of the facilities. Any use of NIST facilities must be approved by appropriate NIST management and is at the sole discretion of NIST. Prior to beginning the merit review process, NIST will verify the availability of the facilities and approval of the proposed usage. Any unapproved facility use will be stricken from the proposal prior to the merit review. Examples of some facilities that may be available for collaborations are listed on the NIST Technology Services Web site, http://www.nist.gov/user-facilities.cfm.

3. Reporting

a. Reporting Requirements. In lieu of the reporting requirements described in Sections A.01 Financial Reports and B.01 Performance (Technical) Reports of the DoC Financial Assistance Standard Terms and Conditions dated January 2013 (http://www.osec.doc.gov/oam/grants_management/policy/documents/DOC_Standard_Terms_and_Conditions_01_10_2013.pdf), the following reporting requirements shall apply:

(1) Financial Reports. Each award recipient will be required to submit an SF-425, Federal Financial Report in triplicate (an original and two (2) copies), on a semi-annual basis for the periods ending March 31 and September 30 of each year. Reports will be due within 30 days after the end of the reporting period,

(2) Performance (Technical) Reports. Each award recipient will be required to submit a technical progress report in triplicate (an original and two (2) copies), on a semi-annual basis for the periods ending March 31 and September 30 of each year. Reports will be due within 30 days after the end of the reporting period. A final technical progress report shall be submitted within 90 days after the expiration date of the award. Two (2) copies of the technical progress report shall be submitted to the Project Manager and the original report to the NIST Grants Officer. Technical progress reports shall contain information as prescribed in 15 C.F.R. § 14.51.

(3) Patent and Property Reports. From time to time, and in accordance with the Uniform Administrative Requirements and other terms and conditions governing the award, the recipient may need to submit property and patent reports.

b. OMB Circular A-133 Audit Requirements. Single or program-specific audits shall be performed in accordance with the requirements contained in OMB Circular A-133, "*Audits of States, Local Governments, and Non-Profit Organizations*," and the related *Compliance Supplement*. OMB Circular A-133 requires any non-Federal entity (*i.e.*, including non-profit institutions of higher education and other non-profit organizations) that expends Federal awards of $500,000 or more in the recipient's fiscal year to conduct a single or program-specific audit in accordance with the requirements set out in the Circular. Proposers are reminded that NIST, the DoC Office of Inspector General or another authorized Federal agency may conduct an audit of an award at any time.

c. Federal Funding Accountability and Transparency Act of 2006. In accordance with 2 C.F.R. Part 170, all recipients of a Federal award made on or after October 1, 2010, are required to comply with reporting requirements under the Federal Funding Accountability and Transparency Act of 2006 (Pub. L. No. 109-282). In general, all recipients are responsible for reporting sub-awards of $25,000 or more. In addition, recipients that meet certain criteria are responsible for reporting executive compensation. Proposers must ensure they have the necessary processes and systems in place to comply with the reporting requirements should they receive funding. Also see the *Federal Register* notice published September 14, 2010, at 75 FR 55663.

VII. Agency Contact(s)

Questions should be directed to the following contact persons:

Subject Area	Point of Contact

Programmatic and technical questions:	**MML**: Margaret Phillips Phone: 301-975-4350 E-mail: margaret.phillips@nist.gov **PML**: Kum Ham Phone: 301-975-4203 E-mail: kum.ham@nist.gov **EL**: Karen Perry Phone: 301-975-5910 E-mail: karen.perry@nist.gov **ITL**: Gerlinde Harr Phone: 301-975-2901 E-mail: gharr@nist.gov **NCNR**: Dr. Dan Neumann Phone: 301-975-5252 E-mail: dan.neumann@nist.gov **CNST**: Donna Lauren Phone: 301-975-3729 E-mail: donna.lauren@nist.gov **GHG and Climate Science Measurements:** Darlene Hamilton Phone: 301-975-2227 E-mail: darlene.hamilton@nist.gov **OLES/Counterterrorism and Response Technologies Program**: William Billotte Phone: 301-975-8610 E-mail: william.billotte@nist.gov **OLES/Detection, Enforcement, and Inspection Program**: Nicholas Paulter Phone: 301-975-2405 E-mail: nicholas.paulter@nist.gov **OLES/Forensic Sciences Program:** Melissa Taylor Phone: 301-975-6363 E-mail: melissa.taylor@nist.gov **OLES/Protective Systems Research Program**: Kirk Rice Phone: 301-975-8071 E-mail: kirk.rice@nist.gov **OLES/Public Safety Communication Research Program**: Dereck Orr Phone: 303-497-5400 E-mail: dereck.orr@nist.gov **ADLP:** Donna Kimball Phone: 301-975-8362 E-mail: donna.kimball@nist.gov

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Grant rules and regulations	Scott McNichol Phone: 301-975-5603 Fax: 301-840-5976 E-mail: scott.mcnichol@nist.gov