Request for Application
Joint Quantum Institute and Joint Center for Quantum Information in Computer Science
University of Maryland, College Park
January 2016

SUMMARY:

This request for application is presented to the University of Maryland College Park, a constituent institution of the University System of Maryland, itself a public agency and instrumentality of the State of Maryland, located in College Park, Maryland, (hereinafter referred to as the "University" or "UMCP"). The National Institute of Standards and Technology ("NIST") has a long history of collaboration with the University in research areas such as Atomic, Molecular, and Optical (AMO) Physics; Condensed Matter (CM) Physics, Quantum Physics, and Quantum Information Science (QIS) including its relevance to computer science, mathematics, and engineering. In an effort to continue this collaborative effort the NIST invites the University to apply for continued support of the Joint Quantum Institute (JQI) and the Joint Center for Quantum Information in Computer Science (QuICS), which are joint enterprises between the NIST and the UMCP, with the support and participation of the National Security Agency / Central Security Service Research Directorate ("NSA/CSS RD" or "RD"). The JQI and QuICS are currently institutes/centers with facilities shared by the NIST, the University, and the RD that is primarily housed by the University. The JQI and QuICS in addition to current and future housing receive other resources from the University.

DATES: The University's full proposal shall be submitted by April 1, 2016.

ADDRESSES: If the University submits its application on paper, one (1) original and three (3) copies of the application and proposal should be provided to:

Dr. Carl J. Williams, Deputy Director
Physical Measurement Laboratory/NIST
100 Bureau Drive, MS 8400
Gaithersburg, MD 20899-8400

If the University wishes to apply electronically, Grants.gov must be used. The University should contact Christopher Hunton of NIST's Grants and Agreements Management Division, at 301- 975-5718, or at chunton@nist.gov, for details on applying through Grants.gov.

FOR FURTHER INFORMATION CONTACT: The University may contact Husai Rahman, Grants Officer, NIST, at 301-975-4355, or at husai.rahman@nist.gov for administrative or grants-related questions. For technical matters, the University should contact Carl Williams, of NIST, at 301-975-2220, or at carl.williams@nist.gov.

SUPPLEMENTARY INFORMATION

CATALOG OF FEDERAL DOMESTIC ASSISTANCE NAME AND NUMBER:

Measurement Science and Engineering Research - 11.609

PROGRAM DESCRIPTION:

Under this program, University personnel will perform research in the areas of AMO, CM, and quantum physics and the broader area of QIS. These activities will be undertaken upon request by and in close collaboration with staff members of the NIST Quantum Measurement Division (QMD) and the Applied and Computational Mathematics Division (ACMD) or their successors who are engaged as Fellows of the Joint Quantum Institute (JQI) and the Joint Center for Quantum Information in Computer Science (QuICS). The collaboration will include the development, fabrication, and construction of scientific apparatuses and the collection, analysis, and modeling of experimental results as well as related theoretical activities. These activities will require computing (both hardware and software) support, electronics and instrument maker support and a full range of administrative and clerical support, including outreach and web/communications support.

University personnel will interact and collaborate with members of the NIST QMD and ACMD or their successors in advancing scientific knowledge and practice in areas basic to the mission of these Divisions. It is the purpose of this program to produce scientifically appropriate research that is consistent with the mission of the NIST QMD and ACMD. This currently includes research within the following broad areas:

- Atomic, molecular, and optical physics, *e.g*. ultra-cold atomic gases, cavity quantum electrodynamics, matter wave optics, quantum optics, degenerate gases, optical lattices; and
- Condensed matter physics, *e.g*. quantum dots, optomechanics, superconductivity; and
- Quantum information science, *e.g*. quantum measurement theory, quantum computation, quantum based measurements, quantum communication, and quantum computer science; and
- Engineering of simple quantum systems.

Among the specific areas of interest:

1) Experimental and theoretical investigation of fundamental atomic systems (both neutral and charged), including the manipulation of ultra-cold atomic vapors and ions with light and magnetic fields, the extension of these techniques to ultra-cold molecular vapors and the study of quantum degenerate gasses.
2) Experimental and theoretical investigation of fundamental condensed matter systems that possess long coherence times that could contribute to quantum information science, including the manipulation and control of Josephson Junctions, spins in semiconductors and quantum dots and their applications to device technology, optomechanics, and improved quantum measurements.
3) Development of measurement techniques that exploit quantum behavior to improve our fundamental measurement capabilities including the development of sources and detectors for the single quanta (photons, spins, *etc.*) and measurements that surpass the

Heisenberg or shot-noise limit.

4) Experimental and theoretical studies that allow for the transformation, transmission, and/or coupling of quanta from one characteristic system to another including nano-mechanical systems, quantum optic systems, and cavity quantum electrodynamics.
5) Development of nanotechnology techniques and concepts to advance the state of the art for quantum limited electronics, such as single electron transistors, and their utilization for applications such as quantum information and sensors.
6) Experimental and theoretical development of new quantum based measurement systems that exploit this increased knowledge of the quantum world.
7) Development of control techniques including ultra-fast laser techniques that improve our ability to control or manipulate quantum systems
8) Development and study of exotic states of quantum matter and the development of quantum materials that support the above endeavors.
9) Development of precision measurement tools that support improved measurement of fundamental constants and that help to test fundamental physical theories and their limitations.
10) Develop an understanding of the relationships between information theory, computational complexity theory and quantum mechanics, as well as the advances in computer science necessary to support future quantum computing and communication devices and systems.
11) Exploit the knowledge of the power of QIS to explore new cryptographic and information security protocols appropriate to post-quantum computing world.

The data and knowledge gained will benefit NIST, the University and the general public in supporting high technology industry and innovation as well as pushing current scientific limits.

NIST scientists will bring to bear their unique expertise and resources in collaboration with University technical personnel.

UNIVERSITY ACTIVITIES TO BE FUNDED UNDER THE COOPERATIVE AGREEMENT

Through the JQI and QuICS, the University will provide a number of technical experts with expertise complementary to those in the NIST Divisions and of considerable interest to NIST. By working in collaboration with NIST scientists, these technical experts will carry out important research aimed at advancing the nation's technology base. The JQI and QuICS organization is unique in this respect, having been organized with the express intention of creating such close collaboration with common facilities for the majority of their activities. The JQI and QuICS has since its origin demonstrated many efficiencies and much synergism. It is expected with the newly occupied space and facilities that many new efficiencies and synergisms will result from this exceptional arrangement, not the least of which will be an increasing flexible interaction among a group of scientists with varied and diverse expertise and background working on common problems.

Using Federal funds received under the cooperative agreement along with matching funds provided by the University, the University will provide qualified personnel and support for those personnel to include equipment; materials; communications services; mail services; transportation; parking; plant services; telephones; all utilities; computer services; multi-user instrumentation; furniture and facilities; renovation of space occupied by the JQI and QuICS at the University; and other office or lab supplies or services as may be required for these collaborative projects and programs. The following are included as items to be funded under the cooperative agreement:

1) Salaries and wages of full and part-time professional engineers, scientists, postdoctoral research associates, administrative and clerical staff, technicians, mechanics and other employees including executives who are directly engaged in the program. Included among these are individuals to provide a robust dissemination through modern digital media and the web of the scientific output of the JQI and QuICS. This output is expected to be accessible to the broader scientific public and should include material for educating the public in the broad areas of research relevant to the JQI and QuICS.
2) Research assistantships for graduate and undergraduate students.
3) All materials and supplies including machinery, tools and equipment acquired or fabricated for the purpose of performing work under this program.
4) Travel and subsistence expenses that are essential for performance of this contract in accordance with the contractors practices and travel regulations in effect on the date(s) of travel, including necessary visa fees. This travel and subsistence includes support for a robust JQI and QuICS seminar series and support of participants to JQI and QuICS sponsored workshops and conferences.
5) Support for the JQI and QuICS Visiting Fellows Program, the JQI and QuICS Postdoctoral-Fellow program, the JQI and QuICS Graduate Research-Fellow program, and the JQI and QuICS Cooperative Research program.

Application: The application should include: SF424 - Application for Federal Assistance; SF424-A – Budget Information – Non-Construction Program; SF424-B – Assurances Non-Construction; CD-511 – Certification Regarding Lobbying; SF-LLL – Disclosure of Lobbying Activities; a Technical Proposal; a Budget Narrative; and a Data Management Plan. All forms must be complete and signed by an authorized official of the University. If the University chooses to submit a paper application, one original and three copies of the application must be submitted.

The Technical Proposal shall provide a full description of the types of research activities that may be undertaken during the life of the project (5 years). The Proposal shall provide for a list of proposed research collaboration efforts that the University intends to conduct with NIST's support. The proposed research collaboration descriptions should provide enough detail to allow NIST to determine the level and types of effort to be devoted to the project. Research goals and objectives should be clearly stated.

This program is funded through a five-year cooperative agreement, as NIST will be

substantially involved in its implementation. NIST shall collaborate with the University on the scope of work. NIST involvement will include:

1) Approval by an appropriate DOC official of substantive provisions of proposed subawards.
2) Involvement in the selection of key JQI and QuICS personnel. The University has final authority over its own personnel.
3) Requirement that the appropriate DOC official (a) collaborate with the recipient by working jointly with a recipient scientist or technician, in carrying out the scope of work, (b) assist in training recipient personnel, or (c) detail Federal personnel to work on the project effort.
4) Specify direction or redirection of the scope of work due to inter-relationships with other projects, such as requiring recipients to achieve a specific level of cooperation with other projects.
5) DOC operational involvement during the project to ensure compliance with such statutory requirements as civil rights and environmental protection
6) Limitation on recipient discretion with respect to scope of work, organizational structure, staffing, mode of operations and other management processes, coupled with close monitoring of operational involvement during performance.

A cooperative agreement will be entered into in the context of the JQI and QuICS, joint enterprises between the NIST and the UMCP, with the support and participation of the National Security Agency / Central Security Service Research Directorate ("NSA/CSS RD" or "RD"). The involvement of the NIST, the UMCP, and the NSA/CSS RD in the JQI and QuICS is detailed in the Memorandum of Understanding (MOU) between NIST, the UMCP, and the NSA/CSS RD that established the JQI and the JQI By-Laws and the QuICS and the QuICS By-Laws which derive from the MOU. Both the MOU and By-Laws will be incorporated into any resulting award by reference. The cooperative agreement does not obligate the RD beyond that described by the MOU but allows for their engagement through either separate funding instruments directly with the University or through the cooperative agreement under separate interagency funding agreements entered into by the NIST and the NSA/CSS. In the latter case NIST will use the cooperative agreement to fulfill the obligations set forth in the interagency agreements.

Budget and Budget Narrative: The applicant must provide a budget that delineates the ***maximum annual*** funding that NIST is expected to contribute. The maximum annual budget is provided to allow NIST flexibility to meet it programmatic activities while simultaneously providing JQI and QuICS support consistent with the MoU. The budget should be delineated by Object Class using the SF-424-A, Budget Information – Non-Construction Programs. The following assumptions should be used when preparing the budget:

The number of Research Associates, Graduate Research Assistants, Professional Research Assistants, Instrument Maker Fabricators, Electronic Engineers & Specialists, Administrative & Clerical Support, and Student Assistants proposed should be consistent with the levels of support provided over the past year. The budget should grow in a manner consistent with projections from the past three years and projected forward. Additionally, the level of Technical

& Administrative Supplies/Services, Equipment, and Travel proposed should also be consistent with that funded over the past year with growth projected as mentioned previously. Any increased costs related to the consolidation of the JQI and QuICS into a shared facility or the addition of new support personnel should be clearly noted.

The matching funds provided by the University are expected to be consistent with the formula used in the past funding period as modified and agreed to with the addition of QuICS In accordance with the previous arrangement it is expected that the JQI and QuICS will provide funds for renovating the space occupied by the JQI and QuICS and to provide research support for the hiring of new JQI and QuICS Fellows.

The Budget Narrative should provide enough detail so that NIST can make a determination of cost allowability, allocablility, and reasonableness.

Data Management Plan: In accordance with the Office of Science and Technology Memorandum for the Heads of Executive Departments and Agencies of February 22, 2013,[1] *Increasing Access to the Results of Federally Funded Scientific Research*, and as implemented through NIST Policy 5700.00,[2] *Managing Public Access to Results of Federally Funded Research*, and NIST Order 5701.00,[3] *Managing Public Access to Results of Federally Funded Research*", NIST requires submission of a Data Management Plan (DMP).

The DMP is a supplementary document of not more than two pages that must include, at a minimum, a summary of activities that generate data, a summary of the types of data generated by the identified activities, a plan for storage and maintenance of the data generated by the identified activities, and a plan describing whether and how data generated by the identified activities will be reviewed and made available to the public. As long as the DMP meets these NIST requirements, it may take the form specified by the applicant's institution or some other entity (e.g., the National Science Foundation or the National Institutes of Health). Some organizations' templates are available on the Internet.

All applications for activities that will generate scientific data using NIST funding are required to adhere to a DMP or explain why data sharing and/or preservation are not within the scope of the project.

For the purposes of the DMP, NIST adopted the definition of "research data" at 2 C.F.R. § 200.315(e)(3) (available at http://go.usa.gov/3sZvQ)

Reasonable costs for data preservation and access may be included in the application.

The sufficiency of the DMP will be considered as part of the selection process; however, the

[1] Holdren, J. (2013) Office of Science and Technology Policy. *"Increasing Access to the Results of Federally Funded Scientific Research"*.
https://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf
[2] See http://www.nist.gov/data/upload/Final-P-5700.pdf . June 2015.
[3] See http://www.nist.gov/data/upload/Final-O-5701_0.pdf. June 2015.

DMP will not be evaluated against any evaluation criteria.

Anticipated Amounts: It is anticipated that any resulting award from this request could receive funding over a five year period not to exceed $42 million, with the NIST contribution not exceeding $32 million.

Multi-Year Funding Policy: When an application for a multi-year award is approved, funding will usually be made available to recipients for only the first year of the program, and incrementally thereafter. If a project is selected for funding, NIST has no obligation to provide any additional funding in connection with that award beyond that which is initially obligated/awarded to the recipient. Continued funding of an award to 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 NIST, and the availability of funding.

Statutory Authority: As authorized by 15 U.S.C. § 272 (b)(1)(4)(5)(6)(9)(11)(12) and (c)(2)(3)(5)(10)(11)(16)(17)(21), NIST conducts directly, and supports through grants and cooperative agreements, a basic and applied research program in the general area of fundamental measurement and the determination of fundamental constants of nature.

Eligibility: The only eligible applicant is the University of Maryland College Park. The proposed award is an institutional award under the Department of Commerce Grants and Cooperative Agreement Manual (March 1, 2013), Chapter 6.A.2., and Chapter 3.A.29.

Review and Selection Process: The application and proposal will undergo a merit review by a group of at least three professionally and technically qualified individuals who are independent and objective. Merit reviewers will evaluate the application by applying the Evaluation Criteria listed below. The merit reviewers will provide their results to the selecting official.

James Olthoff, Director of the Physical Measurement Laboratory, NIST will serve as the selecting official. In making any final recommendation for funding, the selecting official will take into consideration the results of the merit review, availability of funding, and relevance to the program objectives as described above in the Program Description.

Evaluation Criteria: The evaluation criteria to be used in evaluating the proposal will be as follows:

1) Quality of previous work performed by the JQI and QuICS with a focus on collaborations and synergies between UMCP professors, scientists, research associates, and graduate students and NIST permanent staff.
2) Quality of proposed work to be performed under the cooperative agreement including potential synergism of UMCP personnel to complement and reinforce the primary objectives of the JQI and QuICS as demonstrated by current and future possible collaborations with the NIST as documented in the proposal.
3) Quality of the proposal in terms of providing easily accessible Research Associates, Research

Assistants and other administrative and support staff to be located at the JQI and QuICS facility at the University campus or to collaborate with JQI and QuICS Fellows on the NIST campus. This includes support for the JQI and QuICS Graduate Research Fellowship Program, the JQI and QuICS Postdoctoral Research Fellowship Program, the JQI and QuICS Visiting Fellows Program, and the JQI and QuICS seminar series that support the broader research ecosystem.

4) Quality of the proposal in terms of the University's dedication to the JQI and QuICS as demonstrated both by the level of the matching funds provided and the accessibility of administrative services in order to procure equipment, materials and supplies, travel arrangements, and laboratory renovations as deemed necessary based upon the needs of the JQI/NIST and QuICS/NISTresearchers.
5) Potential broader impact of the proposal including its ability to advance discovery, disseminate results through modern digital media and the web, education, training and creating a robust research environment relevant to NIST and the nation.

Each of the above criteria is of equal importance.

The final approval of a selected application and award of a cooperative agreement will be made by the NIST Grants Officer based on compliance with application requirements as published in this notice, compliance with applicable legal and regulatory requirements.

The applicant may be asked to modify objectives, work plans, or budgets and provide supplemental information required by NIST prior to award.

The award decision of the Grants Officer is final.

Cost Share Requirements: The University cost share to be negotiated is expected to be consistent with existing agreements.

AWARD ADMINISTRATION INFORMATION

Uniform Administrative Requirements, Cost Principles and Audit Requirements: Through 2 C.F.R. § 1327.101, the Department of Commerce adopted Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards at 2 C.F.R. Part 200, which apply to awards in this program. Refer to http://go.usa.gov/SBYh and http://go.usa.gov/SBg4.

Department of Commerce Financial Assistance Standard Terms and Conditions: The Department of Commerce will apply the Financial Assistance Standard Terms and Conditions dated December 26, 2014, accessible at http://go.usa.gov/hKbj, to this award. If the Department of Commerce publishes revised Standard Terms and Conditions prior to issuance of an award under this Request, the revised Standard Terms and Conditions will be incorporated into the award.

Department of Commerce Pre-Award Notification Requirements: The Department of Commerce will apply the Pre-Award Notification Requirements for Grants and Cooperative Agreements, dated December 30, 2014, (79 FR 78390). If the Department of Commerce publishes revised Pre-Award Notification Requirements prior to issuance of an award under this Request, the revised Pre-Award Notification Requirements will be incorporated into the award.

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

If an applicant 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. *For the JQI and QuICS, collaboration with NIST employees is expected.*

Use of NIST Intellectual Property: This "Use of NIST Intellectual Property" section shall not apply to any intellectual property developed as part of the JQI and/or QuICS. All rights for intellectual property developed as part of the JQI and/or QuICS shall be governed by the *Amendment to the Memorandum of Understanding Among the National Institute of Standards and Technology, the University of Maryland, College Park, and the National Security Agency/Central Security Services Research Directorate for the Establishment of the Joint Quantum Institute (October 31, 2014).*

If the applicant anticipates using any NIST-owned intellectual property to carry out the work proposed, the applicant 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 applicant intends to use NIST-owned intellectual property, the applicant 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, 2 C.F.R. § 200.315, and in Section D.03 of the DoC Financial Assistance Terms and Conditions dated December 26, 2014, found at http://go.usa.gov/hKbj. Questions about these requirements may be directed to Chief Counsel for NIST, (301) 975-2803, nistcounsel@nist.gov.

Any use of NIST-owned intellectual property by an applicant is subject to the applicant's obtaining a license from NIST. Licensing of NIST inventions is at the sole discretion of NIST and will be negotiated on a case-by-case basis if a project is deemed meritorious. The applicant 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 are made in whole or in part by a NIST employee during the course of an award made pursuant to this Request, 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 not seeking patent protection and NIST putting its ownership interest in the intellectual property into the public domain.

Paperwork Reduction Act: The standard forms in the application kit involve a collection of information subject to the Paperwork Reduction Act. The use of Standard Forms 424, 424A, 424B, SF-LLL, and CD-346 have been approved by OMB under the respective Control Numbers 0348-0043, 0348-0044, 0348-0040, 0348-0046, and 0605-0001.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

Research Activities Involving Human Subjects, Human Tissue, Data or Recordings Involving Human Subjects Including Software Testing: Any application that includes research activities involving human subjects, human tissue/cells, or data or recordings from or about human subjects, must satisfy the requirements of the Common Rule for the Protection of Human Subjects ("Common Rule"), codified for the Department of Commerce at 15 C.F.R. Part 27. Research activities involving human subjects who fall within one or more of the classes of vulnerable subjects found in 45 C.F.R. Part 46, Subparts B, C and D must satisfy the requirements of the applicable subpart(s). In addition, any such application that includes research activities on these subjects must be in compliance with all applicable statutory requirements imposed upon the Department of Health and Human Services (DHHS) and other Federal agencies, all regulations, 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 applicable topics. (Regulatory Resources: http://www.hhs.gov/ohrp/humansubjects/index.html which includes links to FDA regulations, but may not include all applicable regulations and policies).

NIST uses the following Common Rule definitions for research and human subjects research:

Research: A systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge. Activities which meet this definition constitute research for purposes of this policy, whether or not they are conducted or supported under a program which is considered research for other purposes. For example, some demonstration and service programs may include research activity.

Human Subject: A living individual about whom an investigator (whether professional or student) conducting research obtains data through intervention or interaction with the individual or identifiable private information.

(1) *Intervention* includes both physical procedures by which data are gathered and manipulations of the subject or the subject's environment that are performed for research purposes.

(2) *Interaction* includes communication or interpersonal contact between investigator and subject.

(3) *Private information* includes information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, and information which has been provided for specific purposes by an individual and which the individual can reasonably expect will not be made public (for example, a medical record). Private information must be individually identifiable (i.e., the identity of the subject is or may readily be ascertained by the investigator associated with the information) in order for obtaining the information to constitute research involving human subjects.

See 15 C.F.R. § 27.102 Definitions.

1) **Requirement for Federalwide Assurance.** If the application is accepted for [or awarded] funding, organizations that have an IRB are required to follow the procedures of their organization for approval of exempt and non-exempt research activities that involve human subjects. Both domestic and foreign organizations performing non-exempt research activities involving human subjects will be required to have protocols approved by a cognizant, active IRB currently registered with the Office for Human Research Protections (OHRP) within the DHHS that is linked to the engaged organizations. All engaged organizations must possess a currently valid Federalwide Assurance (FWA) on file from OHRP. Information regarding how to apply for an FWA and register an IRB with OHRP can be found at http://www.hhs.gov/ohrp/assurances/index.html. NIST relies only on OHRP-issued FWAs and IRB Registrations for both domestic and foreign organizations for NIST supported research involving human subjects. NIST will not issue its own FWAs or IRB Registrations for domestic or foreign organizations.

2) **Administrative Review.** NIST reserves the right to make an independent determination of whether an applicant's activities include research involving human subjects. NIST will conduct an independent administrative review of all applications accepted for funding that include research involving human subjects that were approved by a non-NIST Institutional Review Board (IRB). Research may not start until the NIST Human Subjects Protection Office (HSPO) issues institutional review approval for final action by the NIST Grants Officer. (15 C.F.R. § 27.112 Review by Institution.) If NIST determines that an application includes research activities which involve human subjects, the applicant will be required to provide additional information for review and approval. The documents required for funded proposals are listed in each section below. Most such documents will need to be produced during the proposal review process; however, the Grants Officer may allow final versions of certain required documents to be produced at an appropriate designated time post-award. If an award is issued, no research activities involving human subjects shall be initiated or costs

incurred for those activities under the award until the NIST Grants Officer issues written approval. Retroactive approvals are not permitted.

3) **Required documents for proposal review. All applications involving human subject research must clearly indicate, by separable task, all research activities believed to be exempt or non-exempt research involving human subjects, the expected institution(s) where the research activities involving human subjects may be conducted, and the institution(s) expected to be engaged in the research activities.**

   a. Not research determination. If an activity/task involves human subjects as defined in the Common Rule, but the applicant participant(s) indicates to NIST that the activity/task is not research as defined in the Common Rule, the following information may be requested for that activity/task:

   (1) Justification, including the rationale for the determination and such additional documentation as may be deemed necessary by NIST to review and/or support a determination that the activity/task in the application is not research as defined in the Common Rule.
   (2) If the applicant participant(s) used a cognizant IRB that provided a determination that the activity/task is not research, a copy of that determination documentation must be provided to NIST. The applicant participant(s) is not required to establish a relationship with a cognizant IRB if they do not have one.

   NIST will review the information submitted and may coordinate further with the applicant before determining whether the activity/task will be defined as research under the Common Rule in the applicable NIST financial assistance program or project.

   b. Exempt research determination with no IRB. If the application appears to NIST to include exempt research activities, and the performer of the activity or the supplier and/or the receiver of the biological materials or data from human subjects **does not** have a cognizant IRB to provide an exemption determination, the following information may be requested during the review process so that NIST can evaluate whether an exemption under the Common Rule applies (see 15 C.F.R. § 27.101(b), (c) and (d)).

   (1) The name(s) of the institution(s) where the exempt research will be conducted.
   (2) The name(s) of the institution(s) providing the biological materials or data from human subjects will be provided.
   (3) A copy of the protocol for the research to be conducted; and/or the biological materials or data from human subjects to be collected/provided, not pre-existing samples (*i.e.*, will proposed research collect only information without personal identifiable information, will biological materials or data be de-identified and when and by whom was the de-identification performed, how were the materials or data originally collected).
   (4) For pre-existing biological materials or data from human subjects, provide copies of the consent forms used for collection and a description of how the materials or data

were originally collected and stripped of personal identifiers. If copies of consent forms are not available, explain.

(5) Any additional clarifying documentation that NIST may deem necessary in order to make a determination whether the activity/task or use of biological materials or data from human subjects is exempt under the Common Rule.

c. Research review with an IRB. If the application appears to NIST to include research activities (exempt or non-exempt) involving human subjects, and the proposed performer of the activity has a cognizant IRB registered with OHRP, and linked to their Federalwide Assurance, the following information may be requested during the 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/task, 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 of the engaged organizations has applied for or will apply for an FWA or IRB registration, those details should be clearly provided for each engaged organization.

If the application includes research activities involving human subjects to be performed in the first year of an award, additional documentation may be requested by NIST during pre-award review for those performers, and may include the following for those research activities:

(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 application submitted to NIST, if the protocol includes tasks not included in the application, 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 is issued, a draft of the proposed protocol;
(6) Any additional clarifying documentation that NIST may request during the review process to perform the NIST administrative review of research involving human subjects. (*See* 15 C.F.R. § 27.112 Review by Institution.)

This clause reflects the existing NIST policy and requirements for Research Involving Human Subjects. Should the policy be revised prior to award, a clause reflecting the policy current at time of award may be incorporated into the award.

If the policy is revised after award, a clause reflecting the updated policy may be incorporated into the award.

For more information regarding research projects involving human subjects, contact Anne Andrews, Director, NIST Human Subjects Protection Office (e-mail: anne.andrews@nist.gov; phone: (301) 975-5445).

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

REPORTING REQUIREMENTS

a. Reporting Requirements. The following reporting requirements described in Sections A.01 Performance (Technical) Reports and B.02 Financial Reports of the Department of Commerce Financial Assistance Standard Terms and Conditions dated December 26, 2014, http://go.usa.gov/hKbj, apply to awards in this program:

(1) Financial Reports. Each award recipient will be required to submit an SF-425, Federal Financial Report on an annual basis for the reporting period of September 1 through August 31 of each year. Reports will be due within 90 days after the end of the reporting period to the NIST Grants Officer and Grants Specialist named in the award documents. A final financial report is due within 90 days after the end of the project period.

(2) Performance (Technical) Reports. Each award recipient will be required to submit a technical progress report to the NIST Grants Officer and the Federal Program Officer on an annual basis for the reporting period of September 1 through August 31 of each year. Technical progress reports shall contain information as prescribed in 2 C.F.R. § 200.328.

Reports will be due within 90 days after the end of the reporting period. A final technical report shall be submitted within 90 days after the expiration date of the award, and publication citation information as well as links to publicly available data shall be submitted as soon as they become available.

If a recipient's Data Management Plan (DMP) has changed since their last submission of a technical progress report, the recipient must include their revised DMP in the next technical progress report following the revision to the DMP. The revised DMP must meet the minimum requirements for a DMP, as stated in this Request.

(3) Patent and Property Reports. From time to time, and in accordance with 2 CFR Part 200 and other terms and conditions governing the award, the recipient may be required to submit property and patent reports.

(4) Recipient Integrity and Performance Matters. In accordance with section 872 of Public Law 110-417 (as amended; see 41 U.S.C. 2313), if the total value of a recipient's currently active grants, cooperative agreements, and procurement contracts from all Federal awarding agencies exceeds $10,000,000 for any period of time during the period of performance of an award made under this FFO, then the recipient shall be subject to the requirements specified in Appendix XII to 2 C.F.R. Part 200 (http://go.usa.gov/cTBwC), for maintaining the currency of information reported to SAM that is made available in FAPIIS about certain civil, criminal, or administrative proceedings involving the recipient.

b. Audit Requirements. 2 C.F.R. Part 200, Subpart F, adopted by the Department of Commerce through 2 C.F.R. § 1327.101, requires any non-Federal entity (*i.e.*, including non-profit institutions of higher education and other non-profit organizations) that expends Federal awards of $750,000 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 Subpart. Applicants are reminded that NIST, the Department of Commerce Office of Inspector General, or another authorized Federal agency may conduct an audit of an award at any time. Additionally, for-profit entities must comply the audit requirements specified in the Department of Commerce Financial Assistance Standard Terms and Conditions, dated December 26, 2014. These terms and conditions are accessible at http://go.usa.gov/hKbj.

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. Applicants 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 available here http://go.usa.gov/hKnQ.

Executive Order 12372: Applications under this program are not subject to Executive Order 12372, ``Intergovernmental Review of Federal Programs."