

**AMENDED NOTICE OF FUNDING OPPORTUNITY FOR
THE MEASUREMENT SCIENCE AND ENGINEERING (MSE)
RESEARCH GRANT PROGRAM
AMENDMENT 1
May 23, 2022**

The National Institute of Standards and Technology (NIST) is amending its January 26, 2021 Notice of Funding Opportunity (NOFO) number 2021-NIST-MSE-01, posted on Grants.gov and on the NIST Web site (<https://www.grants.gov/web/grants/view-opportunity.html?oppld=331121>), that solicits proposals for the Measurement Science and Engineering (MSE) Research Grant Program.

NIST is issuing this amendment (Amendment 1) to make several updates to the 2021-NIST-MSE-01 NOFO as described below.

Update #:	Revised Section:	What revisions were made?	How does the new text now read?
1	Executive Summary	Updates the announcement type.	Amendment (see FY2022 Amendment Revisions document under Related Documents tab for a list of changes from the original announcement).
2	Executive Summary	Adds UEI information under dates.	NOTE: As of Monday, April 4, 2022, the federal government stopped using the DUNS number to identify entities. All entities doing business with the federal government must use a Unique Entity Identifier (UEI) generated in SAM.gov . Applicants must request and be assigned a UEI number prior to completing the grant application forms and submitting their application via Grants.gov . For more information, please see Planned UEI Updates GRANTS.GOV . The Standard Forms (e.g., SF424, SF424 R&R, etc.) were also updated on April 4, 2022, to allow entities to enter the UEI number. Applicants must use the applicable UEI Forms for all submissions.
3	Section I.1	Adds additional text and updates contact person.	Financial support may be provided for conferences, workshops, studies, or workforce development activities technical R&D meetings that are relevant to advancing NIST partnerships pursuant to technology innovation and service to American industry. However, NIST cannot be an official sponsor or co-sponsor for any event funded through this program. All applications submitted to the ADIIS Grant Program must be in accordance with the program objectives listed above.

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			Financial support will not be provided for the establishment of an MEP Center or to augment capabilities of an MEP Center through an MEP Center applicant. Current MEP Centers may add capabilities to the MEP Program, including the development of projects to solve new or emerging manufacturing problems, through the rolling MEP Competitive Awards Program NOFO (see https://www.nist.gov/mep/nist-mep-competitive-awards-program-cap). Financial support will not be provided for the NIST Small Business Innovation Research (SBIR) program. The NIST SBIR program solicits research and development proposals from small businesses that respond to specific technical needs described in the annual NIST SBIR Program NOFO. Please visit the NIST SBIR Program webpage for more information: https://www.nist.gov/tpo/small-business-innovation-research-program. Additional information about the ADIIS and ADIIS Programs may be obtained at https://www.nist.gov/adiis. The contact person for the ADIIS Grant Program, who may be contacted for clarification of the program objectives, is Sheena Simmons and she may be reached at (301) 975-3597 or by e-mail at sheena.simmons@nist.gov.
4	Section I.2	Updates contact person.	All applications submitted to the ADLP Grant Program must be in accordance with the program objectives listed above. The contact person for the ADLP Grant Program, who may be contacted for clarification of the program objectives, is Stephanie Shaw and she may be reached at (301) 975-2667 or by e-mail at stephanie.shaw@nist.gov .
5	Section I.3	Updates the statutory authority	The statutory authority for the CTL Grant Program is 15 U.S.C. § 272(b) and (c), 15 U.S.C. § 278g-1(e)(1) and (e)(3), 15 U.S.C. § 278n-1, 15 U.S.C. § 3706 47 U.S.C. § 1443, and § 1305 of the Energy Independence and Security Act of 2007 (Public Law 110-140).
6	Section I.3	Updates program description to reflect NIST reorganization	Program Description: The CTL Grant Program provides financial assistance to support the conduct of research or a recipient's portion of collaborative research consistent with the CTL mission in broad areas that support the accelerated development, testing, and deployment of advanced communications and connected systems technologies in support of both commercial and government applications including core network technologies; high-speed electronics, superconducting electronics, wireless systems metrology, antenna and radio-frequency (RF) capabilities, high-speed and high frequency measurement capabilities, advanced optics, quantum communications, network design and optimization, network modeling, next generation core networks, spectrum sharing; Internet of Things (IoT), cyber-physical systems, trustworthy network control systems, smart grid, smart connected manufacturing, automated/connected vehicles, smart infrastructure, smart cities and communities, next generation wireless systems; public safety communications; smart infrastructure and manufacturing; and spectrum sensing and testing.
7	Sections I.3.c	Updates program description.	RF Technologies Division. Specific objectives of interest include but are not limited to researching, developing, promoting, measuring, and deploying emerging technologies and standards in fundamental microwave quantities, high-speed microelectronics, superconducting electronics, electromagnetic

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			compatibility, electromagnetic field characterization, antenna metrology, electromagnetic properties of materials, spectrum sharing, and radio-frequency communications systems. Additional objectives include quantum networks, characterization of microwave circuits at cryogenic temperatures, superconducting integrated circuits for precision measurement and fundamental standards, such as for dc and ac voltage, impedance, signal synthesis, RF reference sources for wireless communications, and both quantum and energy-efficient advanced computing.
8	Section I.3.d	Revises program description by removing word “operated” and adding “designed, managed.”	Wireless Networks Division. Specific objectives of interest include but are not limited to researching, developing, promoting, measuring, and deploying emerging technologies and standards that revolutionize how wireless networks are designed, managed, and used; conducting theoretical and experimental research in communication networks, protocols, digital communication systems, and components; utilizing analytical and empirical approaches, developing simulation models, experimental test beds, and building proof of concept prototypes to evaluate new technologies and refine standard specifications for wireless networks and systems; and developing metrics and measurement methods to assess the performance of wireless systems.
9	Section I.3.e	Adds new sub-section to reflect NIST reorganization	Smart Connected Systems Division. Specific objectives of interest include but are not limited to researching, developing, promoting, measuring, and deploying emerging technologies, standards, and test methods for trustworthy (e.g., reliable, resilient, safe, secure, and privacy-protecting) IoT systems and critical applications including smart grid, smart connected manufacturing, next generation core networks, quantum networks, networked control systems, smart infrastructure and devices, IoT/cyber-physical systems, automated/connected vehicles, and smart cities and communities.
10	Section I.4	Updates statutory authority for the EL program by removing and section 1305 of the Energy Independence and Security Act of 2007 Public Law 110 140).	The statutory authorities for the EL Grant Program are 15 U.S.C. § 272(b) and (c), 15 U.S.C. § 278g-1(e)(1) and (e)(3), 15 U.S.C. § 278n-1, 15 U.S.C. § 278n-2, 42 U.S.C. § 7701 et seq., and 42 U.S.C. § 15701 et seq.
11	Section I.4	Updates Program description (removes cyber physical systems; smart grid; Internet of Things) to reflect NIST reorganization.	Program Description: The EL Grant Program provides financial assistance to support the conduct of research or a recipient's portion of collaborative research consistent with the EL's mission to support research in the following fields: advanced manufacturing; additive manufacturing; robotics; intelligent systems and information systems integration for applications in manufacturing; polymeric materials; heating, ventilation, air conditioning, and refrigeration (HVAC & R) equipment performance; mechanical systems and controls; heat transfer and alternative energy systems; indoor air quality and ventilation and applied economics. Financial support may be provided for conferences, workshops, or other technical research meetings that are relevant to the mission of EL. However, NIST cannot be an official sponsor or co-sponsor for any event funded through this program. Additional information about the EL and EL Programs may be obtained at www.nist.gov/el .

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12	Section I.4.b	Removes Smart Grid and Cyber Physical Systems Program Office to reflect NIST reorganization.	No new language inserted.
13	Section I.4.b	Renumbers Section I.4.1.b	b. Materials and Structural Systems Division. The primary objective is to collaborate with or conduct research consistent with the division's programs in the area of construction materials and infrastructural systems (including safety, security, and sustainability of building and physical infrastructure, service-life performance of engineered materials and nanomaterials, and construction cycle time reductions). In particular, applications for financial assistance are sought that would address the following specific subject areas:
14	Section I.4.c	Renumbers and renames Section I.4.1.c Building Energy and Environment.	c. Building Energy and Environment Division. 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 energy high performance green buildings. The breadth of this area includes measurement science associated with the building envelope, HVAC equipment, renewable and alternative energy systems, building controls/building automation systems, and strategies to improve indoor air quality. In particular, applications for financial assistance are sought that would:
15	Section I.4.d	Renumbers Section I.4.1.d Systems Integration Division and updates contact person.	d. Systems Integration Division. Measurement science and standards are important to facilitate smart manufacturing solutions to systems integration problems. A primary objective is the development of mathematically sound, model-based, integration standards and new science-based methods and tools for validating compliance to those standards. Topical areas supporting this objective include system architectures; systems engineering; production network integration; service-based manufacturing; manufacturing simulation; methods and tools for assessing material and energy efficiency; data analytics; machine learning; uncertainty quantification; systems assurance methods and tools; model-based engineering, including multi-physics modeling, process modeling, requirements modeling, information modeling, material modeling, assembly modeling, sustainability modeling, and model composability and compositionality. The contact person is Simon Frechette and he may be reached at (301) 975-3335 or by e-mail at simon.frechette@nist.gov .
16	Section I.4.e	Renumbers Section I.4.1.e Intelligent Systems Division	e. Intelligent Systems Division. The primary objective is to collaborate with or conduct research consistent with Division programs and research in measurement science for intelligent systems. Areas of particular interest include performance metrics, measurement methods and tools, test artifacts, and associated reference data and software for:
17	Section I.4.e.(3)	Moves text “; and Emergency response robot performance metrics and standards.” from now-deleted subsection (6) to subsection (3).	(3) Sensing, prognostics, and health management (PHM) for smart manufacturing, including applications for PHM; and Emergency response robot performance metrics and standards.

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18	Section I.4.e.(4)-(6)	Subsections (4) through (6) removed to reflect NIST reorganization and updates contact person for Intelligent Systems Division after numerical list.	Additional information regarding Intelligent Systems Division research programs and projects can be found at www.nist.gov/el/isd . The contact person for this division is Kevin Jurrens and he may be reached at (301) 975-5486 or by e-mail at kevin.jurrens@nist.gov .
19	Section I.6	"Advanced Network Technologies" text removed in paragraph of Program Description to reflect NIST reorganization.	The ITL Grant Program provides financial assistance to support the conduct of research or a recipient's portion of collaborative research consistent with the ITL's missions to support research in the following fields: Applied and Computational Mathematics, Artificial Intelligence, Big Data, Biometrics, Cloud Computing, Cyber-Physical Systems, Cybersecurity, Forensic Science, Health Information Technology, Human Factors and Usability, Information Access, Information Processing and Understanding, Internet of Things (IoT), Metrology Infrastructure for Modeling and Simulation, Privacy Engineering, and Statistics for Metrology.
20	Section I.6.b	Removes "Advanced Network Technologies Division" section I.6.b. to reflect NIST reorganization.	No new text added.
21	Section I.6.b	Renumbers I.6.c as I.6.b (original Section I.6.b has been removed) with language updated.	b. Applied and Computational Mathematics Division (ACMD) nurtures trust in metrology and scientific computing through the development and application of advanced mathematical and computational techniques and tools. Current topics of interest include: the Mathematics of Special Functions; Network Science; Machine Learning for Scientific Applications; Neuromorphic Computing; Quantum Information Science; Combinatorial Methods; and Modeling of Internet of Things for Health Applications.
22	Section I.6.c	Renumbers Section I.6.d as I.6.c with language updated.	c. Applied Cybersecurity Division (ACD) implements practical cybersecurity and privacy through outreach and effective application of standards and best practices necessary for the U.S. to adopt cybersecurity capabilities. ACD establishes cybersecurity standards and guidelines in an open, transparent, and collaborative way; provides cybersecurity testing and measurement (from developing test suits and methods to validating cryptographic modules); and conducts research in applied cybersecurity. Specific objectives of interest in these areas of research include: Cybersecurity Awareness, Training, Education, and Workforce Development; Cybersecurity Risk Management; Identity and Access Management; Internet of Things Cybersecurity, Privacy Engineering; and Cybersecurity and Privacy of Genomics Data.
23	Section I.6.d	Renumbers Section I.6.e as I.6.d	d. Computer Security Division (CSD) develops cybersecurity standards, guidelines, tests, and metrics to protect federal information systems. CSD helps to develop innovative security technologies that enhance the nation's ability to address current and future computer and information security challenges. CSD's research focuses on cryptography, automation, identity and access management, the Internet of Things, and public safety networks. The Division maintains a Computer Security Resource Center (CSRC), which provides access to NIST's cybersecurity- and information security-related projects, publications, news, and events. Specific objectives of interest in these areas of research include: Cryptography and Cryptographic Test Methods; Light Weight

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			Cryptography; Post Quantum Cryptography; Security Testing Tools and Metrics; Semantics; Service Oriented Architecture; Privacy Enhancing Cryptography, Entropy Assessment; Cybersecurity Conformance Testing; Security Automation; and Security Engineering.
24	Section I.6.f	Renumbers Section I.6.f as I.6.e with language updated.	e. Information Access Division (IAD) supports technologies used to access complex information relating to human action, behavior or characteristics. Through collaborations with industry, academia, and the federal government, IAD enables the advancement of these technologies for commercial use. IAD provides standards and measurements to accelerate this evolution. Specific objectives of interest in these areas of research include: Biometrics for Fusion Quality and Identity; Audio/Image/Video Analytics and Analysis; Data Quality for Analytics and Machine Learning; Usability of Security and Privacy; Human Language Technology; Natural Language Processing; and Search and Retrieval Algorithms including Query and Indexing Technology.
25	Section I.6.g	Renumbers Section I.6.g as I.6.f	f. Software and Systems Division (SSD) works with industry, academia and other government agencies to accelerate the development and adoption of correct, reliable and testable software. This collaborative effort leads to increased trust and confidence in deployed software and methods to develop better standards and testing tools. SSD focuses on advances in state-of-the-art software testing and facilitates the transfer of applications and technologies into national infrastructures and commercial sectors. Specific objectives of interest in these areas of research include: Artificial Intelligence, Digital Forensics; Data Analytics; Data Storage; Cloud Computing; Health IT; High Performance Computing; Image Analytics; IoT for Health Applications; Material Genome Initiative; Medical Device Interoperability; Software Assurance; Systems Biology; Systems Interoperability.
26	Section I.6.h	Renumbers I.6.h as I.6.g language with language updated.	g. Statistical Engineering Division (SED) conducts fundamental and applied statistical research on problems in metrology; develops and applies best practices for the characterization of measurement uncertainty, in particular to enable the intercomparison of measurements in the context of interlaboratory studies and calibrations; and implements methods and techniques for experimental design, data analysis, statistical modeling and probabilistic inference in computer software. Specific objectives of interest in these areas of research include: Statistical Methods in Forensic Science; Statistics for Metrology; Statistical Aspects of Machine Learning and Artificial Intelligence; and Access of Statistical via Software.
27	Section I.8.c	Revises language under 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 advance materials technology and manufacturing processes, enabling those engaged in the materials science and engineering enterprise to create innovative, successful products that solve problems in areas such as microelectronics, transportation, civil infrastructure, biopharmaceuticals, energy, and the environment. Division programs support the development and application of soft materials, metal alloys, and inorganic functional materials to include: multi-phase fluids and gels along with constituent components such as polymeric molecules, nanoparticles, colloids, and fibers; the processing and manufacturing of polymers into functional forms that include thin films, nanostructures, and shaped bulk solids; the physical, chemical, and mechanical properties of solid polymers; the electrical, chemical, and magnetic properties of nanostructured inorganic materials including magnetic thin films and nanoparticles, and 2-dimensional

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			topological materials; electrochemical and surface science measurements and models for advancing wet chemical manufacturing and sustainable energy conversion technologies; mechanical properties and performance of advanced metal alloys, particularly as related to thermo-mechanical processing / manufacturing and application-relevant operating conditions; thermodynamic, physical property, and kinetic data, models, and associated experimental techniques, including density functional theory and interatomic potential calculations, and methods and data to predict phase transformations, microstructure evolution, and properties of advanced materials; additive manufacturing processes for metallic and polymeric materials; and infrastructure and tools to support the production, availability, and discovery of materials data including automated experimentation and artificial intelligence / machine learning (AI/ML) methods. The contact person for this division is Mark VanLandingham and he may be reached at (301) 975-8795 or by e-mail at mark.vanlandingham@nist.gov .
28	Sections I.10.b	Updates contact person for Office of Weights and Measures	The contact person for this office is Katrice Lipka and she may be reached at (301) 975-3116 or by e-mail at katrice.lipka@nist.gov .
29	Section I.10.f	Adds additional text to Quantum Measurement Division section "acoustics, vibration," and revises the spelling of contact person's name.	The primary objective is to collaborate with or conduct research consistent with division basic and applied research programs, including precision measurements; mass, force, acoustics, vibration, 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 photon devices, and quantum materials relevant to these systems; 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 Gerald FitzPatrick and he may be reached at (301) 975-8922 or by e-mail at gerald.fitzpatrick@nist.gov .
30	Section I.10.h.	Updates contact person for Quantum Electromagnetics Division.	The contact person for this division is William Rippard and he may be reached at (303) 497-3882 or by e-mail at william.rippard@nist.gov .
31	Section I.11.b	Revises Greenhouse Gas (GHG) Measurements Research and Standards Program objective.	The primary objective of this program is to develop or extend internationally-recognized measurements, standards, and methods to accurately quantify greenhouse gas (GHG) emissions in urban and regional settings. Atmospheric methods utilize accurate measurement of GHG mole fractions in the atmosphere, while the analyses involved are often enhanced by additional measurements of interest in air quality research, e.g., carbon monoxide. Supported research aims to improve accuracy of science-based quantification of anthropogenic emissions and biogenic exchange of CO ₂ and CH ₄ with the atmosphere. Areas of interest include: 1) quantification of GHG emissions from stationary sources, 2) coordinated measurement and modeling tools to better quantify anthropogenic and biospheric atmospheric exchange, 3) remote sensing of atmospheric GHG concentrations and their attendant supporting analyses and observations, and 4) measurement capabilities to further understanding of GHG transport in the lower atmosphere. Additional information about the SPO GHG Research and Standards Program may be obtained at http://www.nist.gov/greenhouse-gas/index.cfm . The contact person for this program is James Whetstone and he may be reached at (301) 975-2738 or by e-mail at james.whetstone@nist.gov .

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32	Section II.3.a	Updates program's anticipated fiscal year of funding.	Associate Director for Innovation and Industry Services (ADIIS) Grant Program. In FY2022, the ADIIS anticipates funding individual projects in the \$5,000 - \$500,000 per year range and with project performance periods of up to 5 years, consistent with the multi-year funding policy (see Section II.2. of the NOFO).
33	Section II.3.b	Updates program's anticipated fiscal year of funding.	Associate Director for Laboratory Programs (ADLP) Grant Program. In FY 2022, the ADLP anticipates funding individual projects in the \$5,000 - \$5,000,000 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 NOFO).
34	Section II.3.c	Updates program's anticipated fiscal year of funding.	Communications Technology Laboratory (CTL) Grant Program. In FY 2022, the CTL anticipates funding individual projects in the \$3,000 - \$2,500,000 per year range and with project performance periods for up to five (5) years, consistent with the multi-year funding policy (see Section II.2. of this NOFO).
35	Section II.3.d	Updates program's anticipated fiscal year of funding.	Engineering Laboratory (EL) Grant Program. In FY 2022, the EL anticipates funding individual projects in the \$5,000 - \$500,000 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 NOFO).
36	Section II.3.e	Updates program's anticipated fiscal year of funding.	Fire Research (FR) Grant Program. In FY 2022, the FR Grant Program anticipates funding individual projects in the \$100,000 per year range and with project performance periods of up to three (3) years, consistent with the multi-year funding policies (see Section II.2. of this NOFO).
37	Section II.3.f	Updates program's anticipated fiscal year of funding.	Information Technology Laboratory (ITL) Grant Program. In FY 2022, the ITL anticipates funding individual projects in the \$10,000 - \$500,000 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 NOFO).
38	Section II.3.g	Updates program's anticipated fiscal year of funding.	International and Academic Affairs Office (IAAO) Grant Program. In FY 2022, the IAAO anticipates funding individual projects in the \$50,000 - \$200,000 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 NOFO).
39	Section II.3.h	Updates program's anticipated fiscal year of funding.	Material Measurement Laboratory (MML) Grant Program. In FY 2022, the MML anticipates funding individual projects in the \$5,000 - \$12,000,000 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 NOFO).
40	Section II.3.i	Updates program's anticipated fiscal year of funding.	NIST Center for Neutron Research (NCNR) Grant Program. In FY 2022, the NCNR anticipates funding new, individual projects in the \$10,000 - \$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 NOFO).

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41	Section II.3.j	Updates program's anticipated fiscal year of funding.	Physical Measurement Laboratory (PML) Grant Program. In FY 2022, the PML anticipates funding individual projects in the \$5,000 – \$250,000 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 NOFO).
42	Section II.3.k	Updates program's anticipated fiscal year of funding.	Special Programs Office (SPO) Grant Program. In FY 2022, the SPO anticipates funding individual projects in the \$5,000 - \$2,000,000 per year range with project performance periods of up to five (5) years, consistent with the multi-year funding policy (see Section II.2. of this NOFO).
43	Section II.3.l	Updates program's anticipated fiscal year of funding.	Standards Coordination Office (SCO) Grant Program. In FY 2022, the SCO anticipates funding individual projects in the \$5,000 - \$100,000 per year range and with project performance periods of up to three (3) years, consistent with the multi-year funding policy consistent with the multi-year funding policy (see Section II.2. of the NOFO).
44	Section IV.2.a.(1)	Subtext removed.	No new language added.
45	Section IV.2.a.(1)	Additional text added to SF-424 (R&R), Application for Federal Assistance.	The list of certifications and assurances referenced in Item 17 of the SF-424 (R&R) is contained in the Federal Financial Assistance Certifications and Representations (Certs and Reps) as part of the SAM.gov entity registration.
46	Section IV.2.a.(2)	Text revised in the Research & Related Budget (Total Fed + Non-Fed) section.	A separate detailed R&R Budget must be completed for each budget period during the proposed award (e.g. annual basis). To add additional budget periods (e.g. year 2), click "Add Period" embedded at the end of the form. Instructions for completing the Research & Related Budget (Total Fed + Non-Fed) form is available in the R&R Family Section of Grants.gov, as well as at the NIST Grants Management Division SF-424 Research & Related (R&R) Application Package Guidance
47	Section IV.a.(3)	Removes Section IV.2.a.(3) to delete requirement to use SF-424B.	No new language added.
48	Section IV.a..(3)	Renumbers Section IV.2.a.(4) as Section IV.2.a.(3) (original Section IV.2.a.(3) was removed).	(3) CD-511, Certification Regarding Lobbying. Enter "2021-NIST-MSE-01" in the Award Number field. Enter the title of the application, or an abbreviation of that title, in the Project Name field.
49	Section IV.2.a.(4)	Renumbers Section IV.2.a.(5) as Section IV.2.(4).	(4) Research and Related Other Project Information. Answer the highlighted questions and use this form to attach the Project Narrative (item (7) below), Resume(s) or CV(s) (item (8) below) the Indirect Cost Rate Agreement (item (10) below), the Data Management Plan (item (11) below), and the Current and Pending Support Form (item (13) below). Instructions for completing the Research and Related Other Project Information can be found in the Grants.gov R&R Forms Repository by scrolling down to Research And Related Other Project Information and clicking the Instructions link, as well as in the NIST Grants Management Division SF-424 Research & Related (R&R) Application Package Guidance .
50	Section IV.2.a.(5)	Renumbers Section IV.2.a.(6) as Section IV.2.a.(5)	(5) SF-LLL, Disclosure of Lobbying Activities (if applicable).

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51	Section IV.2.a.(6)	Renumbers Section IV.2.a.(7) as Section IV.2.a.(6)	(6) Project Narrative. The Project Narrative is a word-processed document responsive to the applicable program description(s) (see Section I. of this NOFO) and the evaluation criteria (see Section V.1. of this NOFO).
52	Section IV.2.a.(7)	Renumbers Section IV.2.a.(8) as Section IV.2.a.(7)	(7) Resume(s) or CV(s). <i>Resumes are required for all key personnel, including the principal investigator. Resumes are limited to two (2) pages per individual.</i>
53	Section IV.2.a.(8)	Renumbers Section IV.2.a.(9) as Section IV.2.a.(8); Link was embedded in "2 C.F.R Part 200"	(8) Budget Narrative and Justification. There is no set format for the Budget Narrative and Justification; however, the written justification should include the necessity and the basis for the cost, as described below. Proposed funding levels must be consistent with the project scope, and only allowable costs should be included in the budget. Information on cost allowability is available in the 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.
54	Section IV.2.a.(9)	Renumbers Section IV.2.a.(10) as Section IV.2.a.(9)	(9) 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. If the successful applicant includes indirect costs in the budget and has not established an indirect cost rate with a cognizant Federal audit agency, the applicant will be required to obtain such a rate in accordance with the Department of Commerce Financial Assistance Standard Terms and Conditions , dated November 12, 2020.
55	Section IV.2.a.(10)	Renumbers Section IV.2.a.(11) as Section IV.2.a.(10); Link removed & embedded in text "Information for Applicants and Awardee"	(10) Data Management Plan. Consistent with NIST Policy 5700.00¹, <i>Managing Public Access to Results of Federally Funded Research</i>, and NIST Order 5701.00², <i>Managing Public Access to Results of Federally Funded Research</i>, applicants proposing projects that include the conduct of research must include a Data Management Plan (DMP). 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). The DMP must include, at a minimum, a summary of proposed activities that are expected to generate data; a summary of the types of data expected to be generated by the identified activities; a plan for storage and maintenance of the data expected to be generated by the identified activities, including after the end of the award's period of performance; and a plan describing whether and how data generated by the identified activities will be reviewed and made available to the public

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			A template for the DMP, an example DMP, and the rubric against which the DMP will be evaluated for sufficiency is available at: Information for Applicants and Awardees. An applicant is not required to use the template as long as the DMP contains the required information. ¹ https://www.nist.gov/system/files/documents/2018/06/19/final_p_5700.pdf ² https://www.nist.gov/system/files/documents/2019/11/08/final_o_5701_ver_2.pdf
56	Section IV.2.a.(11)	Renumbers Section IV.2.a.(12) as Section IV.a.(11), Text and Link deleted in the “Subaward Budget Form” section. Additional text added to the section.	(11) Subaward Budget Form. The Research & Related Subaward Budget Attachment Form is required if sub-recipients and contractors are included in the application budget. Instructions for completing subaward budget forms are available by visiting the R & R Family section of the Grants.gov Forms Repository and scrolling down to the R & R Subaward Budget Attachment(s) Form and selecting “Instructions.”
57	Section IV.2.a.(12)	Renumbers Section IV.2.a.(13) as Section IV.a.(12).	(12) Current and Pending Support Form. Any application that includes investigators, researchers, and key personnel must identify all sources of current and potential funding, including this proposal. Any current project support (e.g. Federal, state, local, public or private foundations, etc.) must be listed on this form. The proposed project and all other projects or activities requiring a portion of time of the Principal Investigator (PI), co-PI, and key personnel must be included, even if no salary support is received. The total award amount for the entire award period covered, including indirect costs, must be shown as well as the number of person-months per year to be devoted to the project, regardless of the source of support. Similar information must be provided for all proposals already submitted or that are being submitted concurrently to other potential funders. Applicants must complete the Current and Pending Support Form, using multiple forms as necessary to account for all activity for each individual identified in the PI, co-PI and key personnel roles. A separate form should be used for each identified individual. Applicants must download the Current and Pending Support Form from the NIST website and reference the guidance provided as it contains information to assist with accurately completing the form.
58	Section IV.2.b.	Text added to the “Attachment of Required Documents” section in replace of old text that was deleted.	Applicants are strongly advised to use Grants.gov’s “Download Submitted Forms and Applications” option found at https://www.grants.gov/help/html/help/Applicants/CheckApplicationStatus/DownloadSubmittedFormsAndApplications.htm to check that their application’s required attachments were contained in their submission.

Update #:	Revised Section:	What revisions were made?	How does the new text now read?
			After submitting the application, check the status of your application here: CHECK APPLICATION STATUS. If any, or all, of the required attachments are absent from the submission, follow the attachment directions found above, resubmit the application, and check again for the presence of the required attachments. If the directions found on the Grants.gov Online Help page are not effective, please contact the Grants.gov Help Desk immediately. If calling from within the United States or from a U.S. territory, please call 800-518-4726. If calling from a place outside the United States or a U.S. territory, please call 606-545-5035. E-mails should be addressed to support@grants.gov. 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. <i>Applicants can track their submission in the Grants.gov system by following the procedures at the Grants.gov Track My Application page. It can take up to two business days for an application to fully move through the Grants.gov system to NIST.</i>
59	Section IV.2.c.(4)	Remove reference to SF-424B from sub- section "Page limit excludes"	(4) Page limit excludes: SF-424 (R&R) Application for Federal Assistance; SF-LLL Disclosure of Lobbying Activities; CD-511 Certification Regarding Lobbying; Resume(s) or CV(s); Budget Narrative; Indirect Cost Rate Agreement; Data Management Plan; and Current and Pending Support Form.
60	Section IV.2.f.	Removes Subsection f. related to Certifications Regarding Federal Felony and Federal Criminal Tax Convictions, Unpaid Federal Tax Assessments and Delinquent Federal Tax Returns.	No new text added.
61	Section IV.4.	"All NIST MSE Research Grant Programs" section updated Fiscal year to "2022"	To ensure consideration in the Fiscal Year 2022, applications must be received by 5:00 p.m. Eastern Time on May 31, 2022. Applications received after this deadline may be processed and considered for funding in Fiscal Year 2022 or in the next fiscal year, subject to the availability of funds.
62	Section IV.7.a.	Additional text added to section.	a. Applications must be submitted electronically; paper applications will not be accepted.
63	Section IV.7.a.(1)	Text was modified in (a) to update contact information; (b) and (c) were removed..	(a) Applicants 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 an application is received <u>does not provide information about whether attachments have been received</u> . For further information or questions regarding applying electronically for the 2021-NIST-MSE-01 announcement, contact the Grants.gov Help Desk at 800-518-4726.
64	Section VI.2.f.	Updates text for "Use of Federal Government-Owned Intellectual Property" section.	f. Use of Federal Government-Owned Intellectual Property. If the applicant anticipates using any Federal Government-owned intellectual property, in the custody of NIST or another Federal agency, to carry out the work proposed, the applicant should clearly identify such intellectual property in the

Update #:	Revised Section:	What revisions were made?	How does the new text now read?
			proposal. This information will be used to ensure that no Federal 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 the Federal Government-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 C.03 of the Department of Commerce Financial Assistance Standard Terms and Conditions, dated November 12, 2020. Questions about these requirements may be directed to the Chief Counsel for NIST, (301) 975-2803, nistcounsel@nist.gov. Any use of Federal Government-owned intellectual property by a recipient of an award under this announcement is at the sole discretion of the Federal Government and will need to be negotiated on a case-by-case basis by the recipient and the Federal agency having custody of the intellectual property 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 a license from the applicable Federal agency. If any inventions made in whole or in part by a NIST employee arise in the course of an award made pursuant to this NOFO, the United States Government may retain its ownership rights in any such invention. Licensing or other disposition of the Federal Government's rights in such inventions will be determined solely by the Federal Government, through NIST as custodian of such inventions, and include the possibility of the Federal Government putting the intellectual property into the public domain.
65	Section VI.2.h.	Updates text for "Research Activities Involving Human Subject, Human Tissue, Data, or Recordings Involving Human Subjects Including Software Testing.	h. Research Activities Involving Human Subjects, Human Tissue, Data or Recordings Involving Human Subjects Including Software Testing. This section summarizes the requirements for applications that potentially involve research involving human subjects. Additional information that describes the NIST review process for such applications and provides details regarding the documentation required is available here: https://w3auth.nist.gov/oaam/grants-management-division/nist-nofo-information/nist-notice-funding-opportunity-requirements. Both this summary and the additional information provided at the link will be incorporated into any award made under this NOFO. 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 27.³ Research activities involving human subjects that 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

Update #:	Revised Section:	What revisions were made?	How does the new text now read?
			requirements of the applicable subpart(s). In addition, any such application that includes research activities on these subjects must comply 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 (FDA), and other Federal agencies on these topics, and all Executive Orders and Presidential statements of policy on applicable topics. The website of the Office of Human Research Protection (OHRP) in the DHHS contains the applicable regulatory, policy and guidance and (includes links to FDA, but may not include all applicable FDA regulations and policies. If the application is accepted for [or awarded] funding, organizations that have an Institutional Review Board (IRB) are required to follow the procedures of their organization for approval of exempt and non-exempt research activities that involve human subjects. The IRB must be currently registered with OHRP that is linked to the engaged organization. Organizations that do not have an IRB must demonstrate the ability to expeditiously contract with a commercial IRB to conduct a review of the proposed activities. Also, all engaged organizations must possess a currently valid Federalwide Assurance (FWA) on file from OHRP. The NIST IRB is unable to serve as the IRB for financial assistance recipients. The NIST Research Protections Office (RPO) reserves the right to conduct an administrative review of all applications that potentially include research involving human subjects and were approved by an authorized non-NIST institutional entity (an IRB or entity analogous to the NIST RPO) under 15 C.F.R. § 27.112 (Review by Institution). Conducting an “administrative review” means that the NIST RPO will review and verify the performing institution’s determinations made under the Common Rule and all documentation that support such determinations. All applications involving human subjects 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. Some documents may be requested for a pre-review 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 live vertebrate animals shall be initiated or costs incurred for those activities under the award until the NIST Grants Officer issues written approval. In addition, all re-approvals, amendments, modifications, changes, annual reports and closure will be reviewed by NIST. This summary and the information provided here https://www.nist.gov/oaam/grants-management-division/nist-nofo-information/nist-notice-funding-opportunity-requirements reflect 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.

Update #:	Revised Section:	What revisions were made?	How does the new text now read?
			For more information regarding research projects involving human subjects, contact Anne Andrews, Director, NIST Research Protections Office (e-mail: anne.andrews@nist.gov; phone: (301) 975-5445). ³ NIST uses the Common Rule definitions for research and human subjects research contained in 15 C.F.R. § 27.102.
66	Section VI.2.i.	Updates text for “Research Activities Involving Live Vertebrae Animals or Pre-Existing Cell Lines/Tissues from Vertebrate Animals” section.	i. Research Activities Involving Live Vertebrate Animals or Pre-Existing Cell Lines/Tissues from Vertebrate Animals. This section summarizes the requirements for applications that potentially involve research involving live vertebrate animals or pre-existing cell lines or tissues from vertebrate animals. Additional information that describes the NIST review process for such applications and provides details regarding the documentation required is available here: https://w3auth.nist.gov/oaam/grants-management-division/nist-nofo-information/nist-notice-funding-opportunity-requirements. Both this summary and the additional information provided at the link will be incorporated into any award made under this NOFO. Any application that proposes research activities involving live vertebrate animals that are to be cared for, euthanized, or used by award recipients to accomplish research goals, teaching, or testing must meet the requirements of the Animal Welfare Act (AWA) (7 U.S.C. § 2131 et seq.), and the AWA final rules (9 C.F.R. Parts 1, 2, and 3), and if appropriate, the Good Laboratory Practice for Nonclinical Laboratory Studies (21 C.F.R. Part 58). In addition, such research activities should be in compliance with the “U.S. Government Principles for Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training” (Principles). NIST reserves the right to conduct an administrative review of all applications that potentially include research activities that involve live vertebrate animals, or custom samples from, or field studies with live vertebrate animals. Conducting an “administrative review” means that the NIST RPO will review and verify the performing institution’s determinations made under the applicable legal and policy requirements and all documentation that support such determinations. Some documents may be requested for a pre-review 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 live vertebrate animals shall be initiated or costs incurred for those activities under the award until the NIST Grants Officer issues written approval. In addition, all re-approvals, amendments, modifications, changes, annual reports, and closure will be reviewed by NIST.

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			The applicant should clearly indicate in the application, 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. In addition, the applicant should indicate any activity/task that involves an excluded or custom collection from vertebrate animals, or a field study with animals. This summary and the information provided here https://www.nist.gov/oaam/grants-management-division/nist-nofo-information/nist-notice-funding-opportunity-requirements reflect the existing NIST policy for Research Involving Live Vertebrate Animals. 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 live vertebrate animals, contact Anne Andrews, Director, NIST Research Protections Office (e-mail: anne.andrews@nist.gov; phone: 301-975-5445).
67	VI.3.a.(2)	Adds language to "Research Performance Progress Report (RPPRs)" in VI.3.a.(2)	(2) Research Performance Progress Report (RPPRs). Each award recipient will be required to submit a RPPR 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. The RPPR shall conform to the requirements in 2 C.F.R. § 200.329 and Department of Commerce Financial Assistance Standard Terms and Conditions, Section A.01.
68	VII.	Updates Points of Contact for Programmatic and Technical Questions for ADIIS, ADLP, CTL and FR (EL remains the same).	ADIIS: Sheena Simmons Phone: 301-975-3597 E-mail: sheena.simmons@nist.gov ADLP: Stephanie Shaw Phone: 301-975-2667 E-mail: stephanie.shaw@nist.gov CTL: Suzanne Griesel Phone: 301-975-3833 E-mail: suzanne.griesel@nist.gov EL: Millie Glick Phone: 301-975-5962 E-mail: millie.glick@nist.gov FR: Jiann Yang Phone: 301-975-4167 E-mail: jiann.yang@nist.gov