



Billing Code: 3510-13

DEPARTMENT OF COMMERCE

National Institute of Standards and Technology

NIST Consortium for Metrology of Additive Construction by Extrusion (MACE)

AGENCY: National Institute of Standards and Technology

ACTION: Notice

SUMMARY: The National Institute of Standards and Technology (NIST), an agency of the United States Department of Commerce, is establishing the Metrology of Additive Construction by Extrusion (MACE) Consortium and invites organizations to participate in this Consortium. The Consortium will study the measurement science needs for the successful adoption of additive manufacturing by the construction industry. Participation in this Consortium is open to all eligible organizations, as described below. Participants will be required to sign a Cooperative Research and Development Agreement (CRADA).

DATES: NIST will accept responses for participation in this Consortium until May 15th, 2018. The Consortium's activities will commence on June 1, 2018 (“Commencement Date”). Acceptance of participants into the Consortium after the Commencement Date will depend on eligibility, as determined by NIST based on information provided, and the availability of NIST resources.

ADDRESSES: Information submitted in response to this notice and request for additional information about the Consortium can be directed via mail to the NIST Consortium Manager, Dr. Scott Jones, Materials and Structural Systems Division of NIST's Engineering Laboratory, 100 Bureau Drive, Gaithersburg, Maryland 20899-8312, or via electronic mail to scott.jones@nist.gov.

FOR FURTHER INFORMATION CONTACT: For further information about opportunities to join the MACE Consortium, or about the terms and conditions of NIST's Cooperative Research and Development Agreement (CRADA), please contact Jeffrey DiVietro, CRADA Officer, National Institute of Standards and Technology's Technology Partnerships Office, by mail to 100 Bureau Drive, Mail Stop 2200, Gaithersburg, Maryland 20899, by electronic mail to *jeffrey.divietro@nist.gov*, or by telephone at (301) 975-8779.

SUPPLEMENTARY INFORMATION: Additive construction by extrusion (ACE) has the potential to revolutionize construction by eliminating the need for formwork and enabling architectural or structural designs that cannot be achieved by standard practices. As ACE is in its early stages of development, this Consortium will study the measurement science needs for the successful adoption of ACE by the construction industry. The objective of this consortium will be to identify and then translate cementitious material measurements to in-line or in-process measurements for quality control and quality assurance of the ACE process. The MACE consortium will undertake the following tasks over a three-year renewable period:

Task 1 will focus on correlating off-line measurements of fresh and hardening cement paste with measures of print quality. The objectives will be to determine material performance characteristics that are critical to the success of ACE.

Task 2 will focus on developing in-situ and in-process measurements that can be used to provide feedback into the control of the ACE process. The objective will be to implement material property measurements in line to the ACE process.

Task 3 will focus on scaling paste and mortar measurements to the concrete scale, including a proper consideration of field issues. This includes, but is not limited to, hardened property measurements; studies on curing practices and finishing procedures; and development of numerical simulations of material deposition. The objectives will be to measure hardened properties of 3-D printed structures and investigate how paste and mortar measurements can inform concrete-based ACE through the use of numerical simulations.

No proprietary information will be shared as part of the Consortium.

Process:

Interested parties with relevant ACE capabilities (see below), products, and/or technical expertise to support this Consortium should contact NIST using the information provided in the ADDRESSES section of this notice.

Eligibility will be determined by NIST using the information provided by an organization in response to this notice based on the information requested below, and upon the availability of necessary resources to NIST. An eligible member must be involved in current or future efforts to advance ACE, either through commercial technology development or academic research.

An organization responding to this notice should provide the following information to NIST's Consortium Manager by email.

1. Description of organization's interest in ACE and current activities prompting the development of ACE.

2. Topics of interest from the statement of work. There is no limit on the number of areas of participation.
3. List of interested party's anticipated participants.
4. For non-profit institutions, anticipated in-kind donations and cost equivalency.

A responding organization should not include any business proprietary information in its response to this request for information. NIST will not treat any information provided in response to this request as proprietary information.

NIST will notify each organization of its eligibility. In order to participate in this Consortium, each eligible organization must sign a CRADA for this Consortium. All participants to this Consortium will be bound by the same terms and conditions.

Participation fees will be at least \$20,000 annually. For non-profit institutions, in-kind donations equivalent to the membership fee may be accepted, subject to the discretion of NIST and justification of cost equivalency. NIST does not guarantee participation in the Consortium to any organization.

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