Center to Accelerate Recipe Development for Additive Manufacturing Of Metals
(CARDAMOM†)

Request for White Papers

Due date: August 16, 2024 by 5:00 pm Central Time

A. **DESCRIPTION:** CARDAMOM† is a recently awarded (through a planning grant) National Science Foundation (NSF) Industry-University Cooperative Research Center (IUCRC; http://iucrc.nsf.gov). CARDAMOM is planned as a multi-site IUCRC between the University Nebraska-Lincoln (UNL), the University of Alabama (UA), and the University of Texas Rio Grande Valley (UTRGV). The purpose of IUCRCs is to connect university researchers with industry to drive innovation in a specific focus area. CARDAMOM will address key research needs to allow further expansion of metal additive manufacturing (AM).

B. **SOLICITATION:** CARDAMOM is soliciting white papers for an upcoming Planning Workshop (September 25-26, 2024) to lay the foundation for a successful Phase I proposal. The goal is to propose 1-year research projects that are of interest to prospective industry members of CARDAMOM who comprise the target audience. Successful concepts will address problems that are broadly recognized by multiple industry partners in sectors that include aerospace, automotive, power generation, AM original equipment manufacturers, component manufacturers (i.e., injection molding, die casting), powder/material suppliers, and government research laboratories. The IUCRC program is designed to bridge the knowledge gap between fundamental research and commercial applications. At the Planning Workshop, industry invitees will review and provide feedback on each concept. Projects are typically driven by short-term deliverables that engage industry and serve as seed funding for larger programs. Projects that span multiple university sites are especially encouraged.

C. **RESEARCH THRUSTS**: Several research thrusts have been identified for this solicitation. These include:
   a. Process and materials development for component repair utilizing metal AM,
   b. Metal AM mold and die research projects, including thermal performance, conformal cooling designs, experiments within a planned testbed, and material degradation studies,
   c. New metal alloy exploration and development within powder application platforms of powder bed fusion, directed energy deposition, cold spray, and digital light processing,
   d. New approaches for rapid certification and qualification of metal AM processes and components,
   e. Other topics that would appeal to industry sponsors.

D. **RESEARCH TEAM**: Each research team proposing a project concept includes the Principal Investigator (PI) and other Co-Investigators, who are current faculty members of UNL, UA, and/or UTRGV holding a tenured, tenure-track (e.g., Assistant, Associate, or Professor), or nontenure-track faculty appointment (e.g., Research Assistant, Research Associate, or Research Professor).

†An NSF awardee at the planning stage

E. **WHITE PAPER INSTRUCTIONS**: Submissions that do not adhere to the guidelines will not be considered. The white paper consists of one page of text (8.5" by 11" paper; 11-point font minimum; 0.75" margins minimum) plus a maximum of one page of supporting figures.
   a. The one page of text should include the following components arranged in this order:
      i. Title (15 word maximum) and Thrust Area (see Item C above),
      ii. PI (and Co-I) name, university, department, and e-mail address,
      iii. Goal and motivation,
      iv. Research approach and methods,
      v. Targeted industry sector and expected impact for industry partners,
      vi. Deliverables and potential for follow-on research,
      vii. Rough, order-of-magnitude (ROM) budget, including description of personnel, for a 1-year project.
   b. The one page of figures should be captioned appropriately and cited within the text.
   c. Budget expectations are on the order of ~$65,000 for a single-PI, single-site project; ~$85,000 for a multi-PI, single-site project, and ~$145,000 for a multi-PI, multi-site project. Support for graduate students is the top priority. **For your budget estimate, please use an F&A rate of 10 %, the NSF-prescribed rate for IUCRCs.**
   d. Please include an NSF Biosketch for each investigator.

F. **SUBMISSION INSTRUCTIONS:** E-mail a **single PDF**, including the white paper and all biosketches, by the deadline to CARDAMOM@unl.edu.

G. **SELECTION**: White papers will be evaluated with respect to their suitability for presentation (10-12 oral presentations; poster presentations) to potential CARDAMOM members at the Planning Workshop in Lincoln, Nebraska on September 25-26, 2024. Applicants will be notified by e-mail near the end of August with further instructions provided as appropriate.

H. **Q&A**: A Question-and-Answer Forum will be held by Zoom (https://unl.zoom.us/j/99028315957) on Friday, July 26, 2024, from 10:00-12:00 Central Time.

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