



**NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22230**

NSF 15-034

Dear Colleague Letter: I/UCRC Clusters for Grand Challenges, a Collaborative Opportunity for Research to Address Grand Challenges

Dear Colleagues:

The National Science Foundation (NSF) invites supplemental requests to establish collaborative research clusters between NSF Industry/University Cooperative Research Centers (I/UCRC). To this end, NSF is interested in supporting two types of activities: Planning Conferences and Collaborative Research Cluster Partnerships.

This Dear Colleague Letter (DCL) replaces the Collaborative Opportunity for Research between I/UCRCs (CORBI). The goal is to enable active I/UCRCs to leverage each other's expertise, research results, resources and existing networks and partnerships to establish a cross-center cluster that will tackle a cross-disciplinary, cross-sector portfolio of research projects that hold the potential to catalyze technology breakthroughs and advance national priorities. As appropriate, the cluster of existing I/UCRCs may team up with Engineering Research Centers (ERCs), Science and Technology Centers (STCs), and/or additional academic and industrial collaborators to advance these goals. The active participation of industry in the design and implementation of cluster research efforts is expected. Projects proposed under this mechanism must have industrial relevance as evidenced by the written approval of all of the Industry Advisory Boards (IABs) of the involved I/UCRCs. Research projects could be accelerated or scope enhanced with industry funds directed to the cluster. Additional industry and other sponsors external to IABs can participate in cluster research activities.

I/UCRCs planning to respond to this DCL may request funds to organize a preparatory conference with all stakeholders to identify research priorities and develop the portfolio of research projects prior to submission of a request for supplemental funding for a collaborative research cluster. A limited amount of funds are available for these conferences. Substantial industry presence and participation in the conference is critical.

In light of the recent call by the President to identify the most pressing challenges and transformative opportunities to improve the technologies, processes and products across multiple manufacturing industries, "Ensuring American Leadership in Advanced Manufacturing" (reference the President's Council of Advisors on Science and Technology report, Accelerating U.S. Advanced Manufacturing, Advanced Manufacturing Partnership 2.0 http://www.whitehouse.gov/sites/default/files/microsites/ostp/PCAST/amp20_report_final.pdf and <http://www.whitehouse.gov/the-press-office/2014/10/27/fact-sheet-president-obama-announces-new-actions-further-strengthen-us-m>), potential precompetitive research topics that are of particular interest include but are not limited to:

- Advanced sensing, controls, and platforms for manufacturing
- Visualization, informatics & digital manufacturing
- Advanced materials manufacturing (AMM)

Although Advanced Manufacturing has been highlighted, I/UCRC clusters addressing any precompetitive research areas identified among the science and technology priorities for the nation are welcome and will be fully considered.

Supplements for Planning Conferences

ELIGIBILITY AND FUNDING INFORMATION

- **Cluster Eligibility:** This opportunity is open to all existing I/UCRCs who continue to meet the criteria as outlined in the current Industry/University Cooperative Research Centers Program (I/UCRC) solicitation and:
 - Have maintained sufficient industrial memberships to meet program requirements for the past three years with in-kind limited to one full membership per site; and
 - Have disseminated current and accurate information to the public about their center via the NSF web site. NSF directory listings must be current and accurate by the supplement deadline date. Updates can be sent to the I/UCRC Program Director if needed.
- **Maximum Supplement Amount and Budget Information:** Requests should not exceed \$35,000 per planned cluster.
- **Duration:** Supplemental funding may be requested for one year, concurrent with the award.
- **Limit on the Number of Supplement Funding Requests:** An I/UCRC cannot participate in more than one planning conference supplemental funding request.
- **Estimated Number of Supplements:** Four or more conference award spending the availability of funds.

PREPARATION AND SUBMISSION INSTRUCTIONS

Potential proposers should contact an I/UCRC Program Director prior to submission of a cluster request for supplemental funding.

The cluster **MUST** designate a participating I/UCRC as the lead organization in the cluster.

An I/UCRC cluster who wishes to request funds to organize a preparatory conference may do so by submitting a supplement request via FastLane (content of the supplement should follow the guidelines provided for conference proposals which may be found here:

http://www.nsf.gov/pubs/policydocs/pappguide/nsf15001/aag_1.jsp#IE4).

The summary of proposed work should also include a brief description of the grand challenge, of the proposed I/UCRC cluster and of all its stakeholders, of its interdisciplinary and potential impact, and clearly demonstrate how the organization and conduct of the meeting will help identify the research priorities and develop the portfolio of research projects for the cluster. Proposers may refer to the instructions below for Collaborative Research Clusters for guidance. Requests for supplemental funding must demonstrate substantial industry presence and participation in the conference.

SUBMISSION DEADLINES

Conference requests can be submitted any time prior to the supplement for collaborative clusters due date, but are best submitted by early March to allow time to process the request and hold the conference.

REVIEW INFORMATION

All supplemental funding requests for conferences will be internally reviewed by Cognizant Program Officers.

Supplements for Collaborative Research Cluster Partnerships

ELIGIBILITY AND FUNDING INFORMATION

- **Maximum Supplement Amount and Budget Information:**
 - Up to \$750,000 per year for a cluster with up to \$150,000 per year per I/UCRC. Each cluster must consist of two or more existing I/UCRCs.
 - Any non-I/UCRC research partner(s) either will be budgeted for a subaward above and beyond the \$150,000 per year per I/UCRC or will bring their own funding to the partnership.
 - In the case of a partnership with a federally-funded National Laboratory or Federally Funded Research and Development Center, that center or agency must co-fund its portion of the effort.
 - A minimum of one co-PI or co-advisor from an industry partner is required; however, NSF funds cannot be used by the industrial research partners. Letters from industrial partners are required to confirm the participation of a co-PI or co-advisor. If applicable, the letter must also state the degree of industry participation and detail of any support the industry partner is providing to the academic partners. The industry partners must include existing Industry Advisory Board (IAB) members, as well as any participating non-IAB member companies and trade organizations or associations specifically recruited by the cluster.
- **Duration:** Supplemental funding may be requested for up to two years, concurrent with the award.
- **Limit on the Number of Supplement Funding Requests:** An I/UCRC cannot participate in more than one cluster supplemental funding request.
- **Estimated Number of Supplements:** Two or more supplements to support collaborative research clusters, pending the availability of funds.

PREPARATION AND SUBMISSION INSTRUCTIONS

Potential proposers should contact an I/UCRC Program Director prior to submission of a cluster request for supplemental funding.

The cluster MUST designate a participating I/UCRC as the lead organization in the cluster. The designation of lead I/UCRC must be identified along with the description of the cluster organizational structure in a memorandum of understanding (MOU) amongst all parties involved in cluster research activities. The supplemental funding request is submitted by the Center Director of the lead I/UCRC (complete guidelines may be found here:

http://www.nsf.gov/pubs/policydocs/pappguide/nsf15001/aag_1.jsp#IE4).

A request for supplemental support must be submitted electronically via FastLane and must include:

A. A summary of the proposed work which should address the following:

1. **Cluster:** The request for supplemental funding from the lead I/UCRC must clearly describe the role of each I/UCRC forming the cluster and the skill set brought by that I/UCRC to the cluster. Additionally, the request must describe how all other research partners were selected to add complementary skill sets to the proposed cluster so that proposed research projects, which neither party could address as well or rapidly alone, accelerate solutions in response to national priorities and are transferred to industry for further development and commercialization.
2. **Industry Participation:** It is expected that the research and education projects proposed by the cluster are jointly designed and implemented by I/UCRCs, and industry engineers and

scientists. Research projects must demonstrate measurable industry collaboration and involvement to accelerate research outcomes.

3. **Interdisciplinarity:** Requests for supplemental funding must address questions at the interfaces of the I/UCRCs involved in the cluster, as opposed to incorporating individual center contributions additively. Requests for supplemental funding must identify and justify how the project spans across the I/UCRCs forming the cluster, for example by:
 - Combining concepts/methods from multiple fields in new, innovative ways;
 - Proposing problem-driven research that requires a comprehensive and integrative approach;
 - Raising new fundamental questions or interesting new directions for research at the interface of the centers; or
 - Making major changes in understanding by integrating existing concepts or methods in new ways to address industry-inspired complex scientific and engineering challenges.
4. **Potential Impact:** Requests for supplemental funding should include clear statements as to why the proposed research projects have the potential to catalyze innovation to promote sustainable economic growth, enhance U.S. global competitiveness, and to prepare a strong workforce with industry-relevant skill sets.
5. **Expected Outcomes:** The intended outcomes (deliverables) from the cluster and its collaborative project(s) must be clearly indicated. The short-term and long-term impact on the advancement of the specified national priority must be described. The expected outcomes should include feasibility studies, proof of concept, prototypes, models, decision support tools, demonstration and case studies, or scalable and sustainable solutions. Proposers are encouraged to provide evidence that the proposed research and innovation have a path to commercialization and will attract investments.

B. A Budget and Budget Justification

A single supplemental funding request should be requested by the lead I/UCRC with subawards to be administered by the lead I/UCRC for all other I/UCRCs forming the cluster (up to \$150,000 a year per I/UCRC) and all non-I/UCRC research partner(s) requesting funding. Care must be taken to ensure that the cluster supplemental funding request does not exceed \$750,000 per year.

C. Other Supplementary Documents

- **Project Management:** Proposed cluster research projects must be well planned with professional project management principles applied to help assure project success. As such, the supplemental funding request must use the Project Proposal Form in Appendix B, similar to the Project Proposal Form that the center should be using in its IAB meetings (Gray and Walters, Managing the Industry/University Cooperative Research Center: A Guide for Directors and Other Stakeholders, p. 181, 1998), to detail each cluster research project in order to be considered responsive to this DCL. All fields of this form must be completed.
- **Sponsor Research Office (SRO) membership certifications for each I/UCRC and for the previous three years** provided on the form shown in Appendix A, one form per I/UCRC.
- **A memorandum of understanding (MOU) is a binding agreement among all parties involved in cluster research activities with appropriate signatures. The MOU must address the following:**
 - The designation of lead I/UCRC along with the description of the cluster organizational structure and management,

- It is the responsibility of the award recipients to discuss intellectual property (IP) strategies and practices, including patent disclosures and filings, with all academic and industry partners. NSF is not responsible for the type of agreement reached among grantees and all other parties involved in the cluster. Documentation outlining cluster IP agreements should be submitted with the MOU (a cooperative research agreement can follow the example from the I/UCRC membership agreement or from the Small Business Innovation Research / Small Business Technology Transfer [SBIR/STTR] program), and the signed agreement must be submitted before NSF funding will be released.

For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. When contacting FastLane, inform the technician that you are required to apply for this opportunity as a supplement.

SUBMISSION DEADLINES

The second Monday in June, annually, by 5:00 PM, submitter's local time.

REVIEW INFORMATION

All supplemental funding requests for collaborative research clusters will be peer reviewed by a panel of external experts.

CONTACT PERSONNEL

Please contact one of the following program officials if you have questions about this I/UCRC supplemental funding opportunity for a Planning Conference or Collaborative Research Clusters or are interested in submitting a request:

- Raffaella Montelli, Program Director, ENG/IIP, Telephone (703)-292-2421, email: rmontell@nsf.gov
- Rita Rodriguez, Program Director, CISE/CNS, Telephone: (703) 292-8950, email: rrodrigu@nsf.gov
- Thyaga Nandagopal, Program Director, CISE/CNS, Telephone (703) 292-4550, email: tnandago@nsf.gov

Appendix A - SRO membership certification form

Appendix B - One page overall project proposal form

Dr. Pramod Khargonekar
Assistant Director
Directorate for Engineering

Dr. James Kurose
Assistant Director
Directorate for Computer and Information Science and Engineering

APPENDIX A

Certification of Membership

Each I/UCRC in a cluster must submit its own certification Printed on Academic Institution Letterhead.

Instructions in Italic font can be removed. If certifying for multiple sites, please indicate respective site.

Project Title (original I/UCRC award): I/UCRC for

Grant No. IIP-

Project dates:

Today date:

Member	Type	Year 1	Year 2	Year 3	Year 4	Year 5
<p>In Cash Member:</p> <ul style="list-style-type: none"> List Company name, government agency with branch, and trade organizations or associations For Small Business that received NSF SBIR Phase II matching, only the contribution of the company must be entered. You can enter NSF contribution under the "Others" section found below Trade organization and associations must sign membership agreement and addendum to be eligible members <p>Type:</p> <ul style="list-style-type: none"> Specify level of membership based on membership agreement based on agreement (Full/Associate/Observer) If Government, indicate [Level]/[MIPRID]-ID or [IAA]-ID/[IIP supplement ID] or [Level]-signed if they signed the membership agreement If members are buying more than one memberships in any given year please indicate number next to type (example: company A buys 2 full memberships for year 1, indicates 2-Full) <p>Year x:</p> <ul style="list-style-type: none"> Enter membership amount under correspondent year If member buys multiple years, you must enter each year membership amount under the correspondent year (example: company A buys 3 years memberships in year 1 equivalent to \$150k, you must enter 50k in year 1, 50k in year 2 and 50k in year 3) 						
<p>In Kind</p> <p>List name of members that provided in kind contributions.</p> <p>In the first year of any phase, in kind contributions do not count towards the minimum membership requirement and are to be addressed in the annual report or entered under the section "Others" below. However, with NSF's approval, Phase I can be granted an exception for in-kind totaling to no more than one full membership fee. After the first year of any phase, the Industry Advisory Board must approve all in-kind contributions for membership fees. If in kind contributions are listed, annual report must include IAB certification of approval.</p>						

Annual funds certified towards minimum membership requirement**						
** Minimum membership requirement is \$400K AND 8 full members for a single site center, \$150k AND 3 full members per site in a multi-site Phase I center, or \$175k AND 3 full members per site in a multi-sites Phase II and III						
Others <i>List NSF SBIR Phase II contribution, In-Kind contributions that do not count towards the minimum membership requirement, Institution contributions, and any other source of funding that Site Director wishes to list to demonstrate financial status of the site.</i>						
Site Overall Total Funds (sum of annual funds certified and all other funds)						

Provided and signed by

APPENDIX B

I/UCRC Cluster Research Project Proposal Form (Executive Summary) (one form per research project in the cluster)		
Supplement requesting center:		
Collaborating centers (and additional academic and industrial collaborators): Center name:		
Primary Proposal No.:	Project Head (PI):	
Total NSF Request: \$	Other Agencies: \$	Industry: \$
Project Title:		
Project Description:		

Experimental Plan:	
Related Work Elsewhere:	
How this collaborative project is different from ongoing projects at the respective I/UCRCs in the cluster:	
Milestones (with target dates)*:	
Deliverables (listed for each year of the project duration)*:	
How the project may be transformative:	
How this collaborative project will contribute to advance national priorities:	
Research areas of expertise needed for project success (including complete list of project personnel):	
Estimated Start Date:	Estimated Knowledge Transfer Date:

* It is recommended that a Gantt chart be attached to illustrate the project schedule