



NATIONAL SCIENCE FOUNDATION  
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ALEXANDRIA, VIRGINIA 22314

NSF 19-078

## Dear Colleague Letter: Supplemental Funding Opportunity to Support Student Design Projects Directly Related to NSF Research

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July 22, 2019

Dear Colleagues:

The [mission](#) of NSF is to advance the national health, prosperity, and welfare of the US. Fostering the growth of a more capable and diverse research workforce and advancing the scientific and innovation skills of the Nation are [strategic objectives](#) of NSF. To support its mission and this objective, NSF continues to invest in programs that directly advance the nation's Science, Technology, Engineering, and Mathematics (STEM) workforce. As part of this effort, a supplemental funding opportunity is being made available starting in FY 2019 to provide support for mentored, student-led design projects that are directly related to currently funded NSF awards from the Engineering Directorate. This Dear Colleague Letter (DCL) describes a new opportunity for principal investigators to expand the Broader Impact of their awards through a Design Supplement.

### BACKGROUND

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Engineering, by its very nature, involves design - creating solutions to real world problems. While the design process can take place based on existing technologies and well-established science, engineering innovation often requires a connection to cutting-edge science. One way to prepare future engineering professionals to interact with researchers and push the frontiers of engineering innovation is to introduce this connection to engineering students. While Research Experiences for Undergraduates (REU) supplements allow individual students to be integrated into a research laboratory experience, the research and design processes are very different.

As defined by ABET, the accrediting organization for engineering programs in the US, engineering design is a process of devising a system, component, or process to meet desired needs and specifications within constraints<sup>1</sup>. It is an iterative process that involves identifying

opportunities, developing requirements, performing analysis, generating multiple solutions, evaluating those solutions against the requirements, considering risks, and making trade-offs - all for the purpose of obtaining a high-quality solution under the given circumstances. All students in an accredited engineering program must complete a culminating design experience. Providing a mechanism to connect students' design education to the research conducted in NSF-funded laboratories will create a bridge between the discovery of research and the translational potential of design.

## **SUPPLEMENTAL FUNDING OPPORTUNITY**

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NSF will consider supplemental funding requests to support student design projects connected to active NSF grants. The goals of these supplements are the following:

1. To connect student design projects to innovative, NSF-supported research and the latest advances in engineering science.
2. To expose students to the discovery process of research while preparing them for their roles in the engineering workforce.
3. To provide a team of students with the funds necessary to pursue the design process, from need finding, industry and customer discovery, through prototyping and validation.

## **DESCRIPTION OF ACTIVITIES SUPPORTED**

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The PI of an active NSF award (see below for the participating Divisions) may request supplemental funding to support a mentored, student-led design project that is connected to their NSF award. To be eligible, the design-research connection should meet one of the following two criteria:

1. A project that builds on scientific advances from the research by applying that knowledge to solve a current challenge.
2. A project that challenges students to design a technology, device, or system to complement or augment the methods or aims of the research project.

In addition, eligible projects are expected to meet the following requirements:

1. Projects must be conducted by students, preferably as a team.
2. The solution to the challenge should not be pre-determined (i.e. the students are not simply implementing a design developed by the PI), so that the students go through the complete engineering design process - including development of a prototype or system simulation, as appropriate.
3. The project should require students to consider relevant standards and realistic constraints.
4. Project support from the supplement must be used to support the design process,

including need finding, industry and customer discovery, prototyping, and validation/verification, not student time.

## REQUIREMENTS

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PIs must describe how the design project will be mentored and assessed. The project may be part of a capstone design course or an independent project course, both of which have mentoring and assessment frameworks. Please see the list below for the participating divisions that will consider these supplemental funding requests.

### Participating Divisions - Directorate for Engineering

Chemical, Bioengineering, Environmental and Transport Systems (CBET)

Civil, Mechanical, and Manufacturing Innovation (CMMI)

Electrical, Communications, and Cyber Systems (ECCS)

## SUPPLEMENTAL FUNDING REQUEST PREPARATION INSTRUCTIONS

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Individual programs may or may not accept Design Supplement requests at a given time. PIs are strongly encouraged to contact their cognizant program director in advance of preparation of and before submitting the supplement request to confirm their willingness to accept Design Supplement requests and to identify other specific factors relevant to that field of engineering. Each supplemental funding request must include:

1. A description of the overall design goal, envisioned use case, and rationale that will be presented to the student team (e.g. design a process to scale up laboratory-level throughput of process X to translatable levels or design a device to improve the accuracy of measurements of Y).
2. An explanation of how the overall design goal relates to activities of the active NSF award.
3. A description of the formal mechanism through which the project will be mentored and assessed. If these are done through a course, a copy of the course syllabus should be included as a supplemental document.
4. A description of how the student team will be identified and matched with the project.
5. A description of results from previous Design Supplements received by the PI.
6. A budget and budget justification.

## SUPPLEMENTAL FUNDING AMOUNT

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The maximum amount of funding per supplement will be \$4,000. If the PI's institution has an established program with documented requirements for minimum funding levels for capstone projects, including from internal and not-for-profit sponsors, then higher amounts for these supplements may be considered. PI's must discuss this in advance with the program director and must include a signed letter from the department chair or dean describing these requirements.

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## **ALLOWABLE COSTS UNDER THIS DCL**

All funds provided under this activity are considered trainee costs and may be used to support: travel of student team members to off-site locations for need finding, industry and customer discovery, or consultation with experts; tools (including software), supplies, or manufacturing for development and validation of a prototype system; and travel or fees associated with validation and verification testing using equipment available to the PI and student team. Consultation fees are not appropriate for this activity and may not be included as a cost; only travel fees to meet with an expert may be included. All costs must be entered as participant support costs and the number of participants to be supported must be entered in the parentheses on the budget. Indirect costs (F&A) are not allowed on participant support costs, unless provided for in the proposing entity's federally negotiated indirect cost rate agreement.

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## **PERIOD OF SUPPORT**

Supplements may be requested annually.

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## **DUE DATES**

Supplemental funding requests may be submitted at any time. However, sufficient time must be allowed (e.g. a minimum of 8 weeks) to permit review and recommendation in advance of the project's initiation.

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## **SUBMISSION AND REVIEW**

Requests for supplemental funding must be submitted electronically via FastLane. Requests for supplemental funding in response to this DCL will be reviewed internally by NSF Program Officers. All supplemental funding requests are subject to the availability of funds and review of the quality of the supplemental funding request.

Sincerely,

Dawn M. Tilbury  
Assistant Director  
Directorate for Engineering

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<sup>1</sup> ABET (Accreditation Board for Engineering and Technology, Inc.), Criteria for Accrediting Engineering Programs, 2019 - 2020, <https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2019-2020/>