



NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 22-059

Dear Colleague Letter: Ocean Technical Workforce Education

March 14, 2022

Dear Colleague:

ANNOUNCEMENT OF OPPORTUNITY

The National Science Foundation (NSF) anticipates increased investments in future ocean observing systems, including cabled and moored instrumentation systems, autonomous underwater vehicles (AUVs) and remotely operated vehicles (ROV). Development of new instrumentation, maintenance of equipment related to ocean observing systems, and data management efforts to ensure the quality and accuracy of the data and the analysis of large data sets generated by these systems all require a workforce with specialized training in ocean sciences, engineering, manufacturing, and data science. Therefore, the Division of Engineering Education and Centers (EEC), Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET), the Division of Ocean Sciences (OCE), and the Division of Undergraduate Education (DUE) are encouraging proposals to develop the workforce required to support current and future ocean technologies.

This Dear Colleague Letter (DCL) encourages proposals within two categories: 1) Curriculum Development proposals and 2) Student Engagement proposals. Proposal submissions for either category must respond to the existing funding opportunities listed below. The goal of the DCL is to expand technical capacity in the U.S. workforce in high-technology fields through training programs that educate the next generation of ocean technicians, data scientists, ocean engineers, and ocean scientists. Proposal topics of high priority include training in ocean instrumentation design, manufacturing and maintenance of marine-related hardware, and ocean data science and data analytics, with an emphasis on the inclusion of researchers, engineers and students from groups that are underrepresented in the marine science and mariner communities. Submissions are encouraged that target documented gaps in the U.S. technical workforce in marine instrumentation and manufacturing sectors, including those related to renewable energy, such as wave, tide, wind, and solar energy systems.

CURRICULUM DEVELOPMENT

The goal is to develop academic programs with hands-on opportunities for trainees that open career paths in ocean sensor instrumentation development, manufacturing and maintenance, renewable energy systems and data science. Proposals need to address how new course curricula, teaching modules and other products will be sustained beyond the duration of the award.

For curriculum development, NSF encourages proposals that:

- Demonstrate a clear connection to data streams or instrumentation used for the Ocean Observatories Initiative (OOI) <https://oceanobservatories.org/> or other NSF-funded ocean facilities.
- Target students at the early undergraduate levels for professional development in ocean data science, engineering, and science education.
- Educate the skilled technical workforce in response to industry needs and in partnership with industry.
- Support faculty to implement innovative teaching and training modules focused on experiential learning.
- Involve community colleges, Minority Serving Institutions, and/or institutions that serve veterans, first-generation students, students with different abilities, or other students from groups underrepresented in ocean sciences.
- Engage in relevant partnerships with (but not limited to) the maritime renewable energy sectors.

STUDENT ENGAGEMENT

The goal is to engage undergraduates, graduate students, teachers, and veterans in programs that provide training and hands-on experience with ocean technologies, ocean data science, and ocean engineering. Supplements to existing awards to support individual students will be accepted and should be discussed with the cognizant Program Officer before developing and submitting the request for supplemental funding. Proposals to support cohorts of students may be submitted via the Research Experiences for Undergraduates (REU) and Pathways into the Earth, Ocean, Polar and Atmospheric & Geospace Sciences (GeoPATHS) programs. Proposals that involve community colleges, Minority Serving Institutions, and/or institutions that serve veterans, first-generation students, students with different abilities, or other students from groups underrepresented in ocean sciences are encouraged.

For student engagement, NSF encourages proposals that:

- Demonstrate a clear connection to data streams or instrumentation used for the Ocean

Observatories Initiative (OOI) <https://oceanobservatories.org/> or other NSF-funded ocean facilities.

- Develop a skilled technical workforce in response to industry needs in the marine/blue economy sector and in partnership with industry, including (but not limited to) the maritime renewable energy sectors.
- Involve community colleges, Minority Serving Institutions, and/or institutions that serve veterans, first-generation students, students with different abilities, or other students from groups underrepresented in ocean sciences.

SUBMISSION OPTIONS AND INSTRUCTIONS FOR PARTICIPATING PROGRAMS

For all options described below, additional requirements, including submission deadlines, can be found within the opportunity links provided. Additionally, to call attention to responsiveness to this DCL, submissions should include "Ocean Technical Workforce Education DCL" at the beginning of the Project Summary (full proposals) or the Summary of Proposed Work (supplemental funding requests).

CURRICULUM DEVELOPMENT OPPORTUNITIES

1. Ocean Education Program

Proposals may be submitted to the Division of Ocean Sciences' (OCE), [Ocean Education](#) program at any time using instructions in the *NSF Proposal & Award Policies & Procedures Guide (PAPPG)*. OCE anticipates 3-4 awards for curriculum development with budgets that range between \$100,000 and \$600,000 for up to three years. The categories of proposers eligible to submit proposals to NSF are identified in PAPPG Chapter I.E. Institutions of higher education, including 2-year colleges, technical schools, maritime academies, and Minority Serving Institutions are encouraged to submit proposals.

2. Advanced Technology Education (ATE) program

Proposals may be submitted to the Advanced Technology Education (ATE) program in the Directorate for Education and Human Resources. ATE supports the education of the skilled technical workforce. Proposals must be prepared in accordance with the guidance in the solicitation. The prospective PI should consult with a Program Officer to determine the correct program track for submission. Please see the ATE solicitation ([NSF 21-598](#)) for details: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf21598.

3. Research in the Formation of Engineers (RFE) program

Proposals that seek to develop and test new approaches in the following areas related to this topic can be submitted as Design and Development Projects to the Research in the Formation of Engineers (RFE) program in the Directorate of Engineering (see

<https://beta.nsf.gov/funding/opportunities/research-formation-engineers-rfe>):

- Graduate education.
- Transitions between education levels, e.g. high school to two year college, high school to 4 year college/university, two year college to 4 year college/university, undergraduate to graduate school, education settings to the workforce or professoriate, etc.

Proposals in this category should propose the design and development of new approaches that are informed by existing literature and theory. There should be clear objectives and the evaluation plan should be designed to determine if those objectives have been met. Projects cannot be solely demonstration projects but must add to the engineering education literature to inform future work. For more guidelines on this category option, please see "NSF 13-121, Common Guidelines for Education Research and Development" at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13126.

STUDENT ENGAGEMENT OPPORTUNITIES

Proposals for student engagement may be submitted to the programs that are participating in this DCL. Requests for co-review by multiple programs may be indicated on the proposal cover page in the box labeled "**FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S)**".

1. Research Experiences for Undergraduates (REU)

For more information on eligibility, preparation of REU Site proposals or REU Supplement requests, and deadlines, please see the REU solicitation ([NSF 19-582](#)) at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf19582.

2. Pathways into the Earth, Ocean, Polar and Atmospheric & Geospace Sciences (GEOPaths)

The primary goal of the GEOPaths funding opportunity is to increase the number of students pursuing undergraduate and/or postgraduate degrees through the design and testing of novel approaches that engage students in authentic, career-relevant experiences in geoscience. In order to broaden participation in the geosciences, engaging students from historically excluded groups or from non-geoscience degree programs is a priority. For the purposes of this DCL, proposals must be submitted to the Undergraduate Preparation (UP) or the Graduate Opportunities (GO) track of the GEOPaths solicitation. See the GEOPaths program solicitation ([NSF 22-555](#)) for more details: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf22555.

3. Non-Academic Research Internships for Graduate Students (INTERN) Supplemental Funding Opportunity

Please see publication [NSF 21-013](#) for other information required to submit an INTERN

supplemental funding request.

4. Research Experiences for Teachers (RET) in Engineering and Computer Science

For more information, including proposal preparation instructions, eligibility requirements, and program deadlines, please see the RET program solicitation (NSF 21-606) at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf21606.

5. Veterans Research Supplement (VRS) Program

The Veterans Research Supplement (VRS) program seeks to engage veterans in engineering research by providing supplements to active awards in the following Directorate for Engineering (ENG) Divisions/Offices:

- [Chemical, Bioengineering, Environmental and Transport Systems \(CBET\)](#); and
- [Engineering Education and Centers \(EEC\)](#).

For more information on eligibility, supplemental funding request preparation, and deadlines, please see the VRS Dear Colleague Letter at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf20111.

6. A New Supplemental Funding Opportunity for Skills Training in Advanced Research & Technology (START)

This supplemental funding opportunity provides students, faculty, and student/faculty teams in two-year Institutions of Higher Education (2-yr IHEs) with experiential learning opportunities through research internships that involve IUCRC Centers and associated Center research projects.

For more information, on eligibility, supplemental funding request preparation, and target dates, please see the START Dear Colleague Letter at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf21076.

Proposers are encouraged to contact the program officers prior to submitting proposals or requests for supplemental funding. For questions about this DCL, please contact Elizabeth (Lisa) Rom - elrom@nsf.gov in the Division of Ocean Sciences, Jumoke Ladeji-Osias - jladejio@nsf.gov in the Directorate of Engineering, or V. Celeste Carter - vccarter@nsf.gov in the Division of Undergraduate Education.

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