



NATIONAL SCIENCE FOUNDATION
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Dear Colleague Letter: Engineering Research to Advance Solutions for Environmental PFAS (ERASE-PFAS)

June 2, 2020

Dear Colleagues:

The Environmental Engineering program in the Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET) in the Directorate for Engineering (ENG) announces a special funding focus on new science and technologies for the treatment and remediation of per- and polyfluoroalkyl substances (PFAS) to improve and protect public and environmental health. We are excited by the opportunities in this research area and encourage researchers to contribute to our sustainable future by participating in this important funding investment area.

The objective of the Environmental Engineering program at NSF is to support research on the prevention, minimization, mitigation, and/or remediation of environmental pollution to protect human and ecological health. To achieve this objective, the program has long funded research projects on the environmental fate, transport, mitigation, and remediation of contaminants of emerging national interest by researchers across the United States.

The many fluorine atoms throughout PFAS impart its unique oil- and water-repelling properties; however, the relative inertness of carbon-fluorine bonds to chemical reactions contributes to the persistence of PFAS in the environment and in living organisms. [\[1\]](#) [\[2\]](#) [\[3\]](#) The widespread use of PFAS in applications such as food packaging, commercial household products (e.g., nonstick pans and stain-repellant fabrics), electronics manufacturing, and aqueous film forming foams (AFFFs) used in fire-fighting has led to the contamination of soil and water. [\[1\]](#) [\[4\]](#) Exposure of humans to PFAS can lead to adverse health effects, making the removal of PFAS from environments a critically important goal. [\[1\]](#) [\[5\]](#)

While significant advances in our understanding of the environmental fate of PFAS have been made through research supported by NSF and other agencies and foundations, there remains a critical national need to develop effective, feasible, and sustainable remediation

technologies to degrade, destroy, and/or permanently sequester PFAS in soil, sediment, aquatic systems, and waste streams. The challenge in developing these technologies lies in the extreme chemical stability of many PFAS compounds, including perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), that results in recalcitrance to biodegradation, photo-oxidation, direct photolysis, and hydrolysis. [2] [3] Recognizing the need for new methods to remediate PFAS in the environment, the NSF intends to fund topically relevant proposals submitted to the CBET Environmental Engineering program.

Priority topics for this special funding focus include:

- Research that enables the development of technologies for mitigation, remediation, and/or treatment of PFAS in the environment;
- Research that elucidates the underlying limitations of PFAS transformation reactions that could lead to potentially transformative, feasible technologies for PFAS remediation; and
- Research that identifies biological, chemical, and/or physical reaction mechanisms for the treatment of fluorotelomer-based fluorosurfactants in AFFFs and other products.

The most competitive proposals will address fundamental engineering science that leads to advances in the mitigation, remediation, and/or treatment of PFAS in the environment. Although inclusion of a full technical economic analysis (TEA) in submissions is not necessary, proposers should provide a basis of comparison to existing technologies using preliminary data, theoretical arguments, and/or modeling to provide evidence of sustainability and feasibility.

Proposals addressing PFAS fate and transport, while also important, do not fall under this Dear Colleague Letter (DCL), which focuses on treatment and remediation.

This special opportunity on the treatment and remediation of per - and polyfluoroalkyl substances is funded in part by an unrestricted gift to the National Science Foundation from DuPont de Nemours Inc.

PROCESS

Proposals relevant to this special funding focus should be submitted to the CBET Environmental Engineering program (1440). Proposals are welcome from single or multiple investigators. Interdisciplinary proposals are also welcome. Please refer to the [Environmental Engineering program description](#) for further information regarding the typical budget and duration of CBET-funded projects. See [recent award abstracts](#) for examples of typical unsolicited Environmental Engineering awards.

The proposal title should start with "ERASE-PFAS" followed by a colon and then the rest of the title.

Proposals must be prepared in accordance with the current *NSF Proposal & Award Policies & Procedures Guide (PAPPG)* or [Grants.gov](https://www.grants.gov) Application Guide. Submitted proposals must conform to the formatting, page limitations, and other proposal preparation requirements specified. All proposals must be submitted electronically to NSF via [FastLane](https://www.fastlane.gov), [Research.gov](https://www.research.gov) or [Grants.gov](https://www.grants.gov).

Proposals will be reviewed in accordance with the standard NSF merit review criteria of intellectual merit and broader impacts and are subject to the availability of funds.

Individuals interested in submitting a proposal relevant to this special funding focus are strongly encouraged to contact the cognizant Program Officer(s) for the [Environmental Engineering program](#).

Sincerely,

Dawn Tilbury, Ph.D.
Assistant Director
Directorate for Engineering

REFERENCES

[1] U.S. Environmental Protection Agency (EPA). Basic Information on PFAS. 2018. <https://www.epa.gov/pfas/basic-information-pfas>

[2] Buck, R.; Franklin, J.; Berger, U.; Conder, J.; Cousins, I.; Voogt, P. d.; Jensen, A.; Kannan, K.; Mabury, S.; van Leeuwen, S. Perfluoroalkyl and polyfluoroalkyl substances in the environment: terminology, classifications, and origins. *Integr Environ Assess Man* 2011, 7, 513.

[3] Krafft, M. P.; Riess, J. G. Per- and polyfluorinated substances (PFAS): Environmental challenges. *Curr Opin Colloid In* 2015, 20, 192-212.

[4] Field, J.; Higgins, C.; Deeb, R.; Conder, J. FAQs regarding PFASs associated with AFFF use at U.S. military sites. Environmental Security Technology Certification Program (ESTCP). 2017. 1-35.

[5] Krafft, M. P.; Riess, J. G. Selected physicochemical aspects of poly- and perfluoroalkylated substances relevant to performance, environment and sustainability-Part one. *Chemosphere* 2015, 129, 4-19.