

Centers for Chemical Innovation (CCI)

Phase I Awards and New/Renewal Phase II Centers

PROGRAM SOLICITATION

NSF 21-587

REPLACES DOCUMENT(S):

NSF 20-574



National Science Foundation

Directorate for Mathematical and Physical Sciences
Division of Chemistry

Preliminary Proposal Due Date(s) (*required*) (due by 5 p.m. submitter's local time):

August 23, 2021

Full Proposal Deadline(s) (due by 5 p.m. submitter's local time):

October 19, 2021

Phase II Full Proposals

February 22, 2022

Phase I Full Proposals, by invitation only

IMPORTANT INFORMATION AND REVISION NOTES

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) ([NSF 20-1](#)), which is effective for proposals submitted, or due, on or after June 1, 2020.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Centers for Chemical Innovation (CCI)
Phase I (center development) and Phase II (major research centers)

Synopsis of Program:

The Centers for Chemical Innovation (CCI) Program supports research centers focused on major, long-term fundamental chemical research challenges. CCIs that address these challenges will produce transformative research, lead to innovation, and attract broad scientific and public interest. CCIs are agile structures that can respond rapidly to emerging opportunities through enhanced collaborations. CCIs integrate research, innovation, education, broadening participation, and informal science communication.

The CCI Program is a two-phase program. Both phases are described in this solicitation. Phase I CCIs receive significant resources to develop the science, management and broader impacts of a major research center before requesting Phase II funding. Satisfactory progress in Phase I is required for Phase II applications; Phase I proposals funded in FY 2022 will seek Phase II funding in FY 2025.

The FY 2022 Phase I CCI competition is open to projects in all fields supported by the Division of Chemistry, and must have scientific focus and the potential for transformative impact in chemistry. The NSF Division of Chemistry particularly encourages fundamental chemistry projects aligned with articulated budget priorities, including Advanced Manufacturing, Artificial Intelligence, Biotechnology, Climate Research and Sustainability, and Quantum Information Science. More information on all of these is available in Section IX of this Program Solicitation.

The FY 2022 Phase II CCI competition is open to projects funded as Phase I awards in FY 2019.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Katharine J. Covert, telephone: (703) 292-4950, email: kcovert@nsf.gov
- Colby A. Foss, telephone: (703) 292-5327, email: cfoss@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.049 --- Mathematical and Physical Sciences

Award Information

Anticipated Type of Award:

Standard Grant or Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 4

In FY 2022, NSF anticipates making up to three new Phase I awards (each up to \$1,800,000 for 3 years) as standard or continuing grants. NSF also anticipates up to one new Phase II award (up to \$4,000,000 per year for 5 years) as a cooperative agreement. Both of these plans are pending availability of funds and submission of sufficient quality proposals.

Anticipated Funding Amount: \$9,400,000

in FY 2022, pending availability of funds and submission of sufficient quality proposals.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Who May Serve as PI:

While these proposals will reflect the research of many investigators, only the name of the Principal Investigator (PI) should appear on the Cover Sheet. All other investigators are considered Faculty Associates (non-coPI senior personnel). The PI must be affiliated with an eligible submitting organization.

An investigator may participate (as PI or Faculty Associate) in only one CCI preliminary proposal and one CCI full proposal (Phase I or Phase II) submitted to this competition. In cases where an individual appears in two or more proposals, any submitted proposals involving that person may be returned without review.

The Phase II eligibility is limited to teams from the Phase I awards initiated in FY 2019.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or co-PI: 1

An investigator may participate (as PI or Faculty Associate) in only one preliminary proposal and one full proposal (Phase I or Phase II) submitted in response to this solicitation. The PI must be affiliated with an eligible submitting organization.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full text of this solicitation for further information.
- **Full Proposals:**
 - Full Proposals submitted via FastLane: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
 - Full Proposals submitted via Grants.gov: *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov* guidelines apply (Note: The *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website

at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

Inclusion of voluntary committed cost sharing is prohibited.

- **Indirect Cost (F&A) Limitations:**

Not Applicable

- **Other Budgetary Limitations:**

Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Preliminary Proposal Due Date(s) (required)** (due by 5 p.m. submitter's local time):

August 23, 2021

- **Full Proposal Deadline(s)** (due by 5 p.m. submitter's local time):

October 19, 2021

Phase II Full Proposals

February 22, 2022

Phase I Full Proposals, by invitation only

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria. Additional merit review criteria apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions:

Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements:

Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

The Centers for Chemical Innovation (CCI) Program supports research centers focused on major, long-term fundamental chemical research challenges. CCIs are agile structures that respond rapidly to emerging opportunities, promote synergy, enhance collaborations, and engage in potentially transformative research. CCIs integrate research, innovation, education, broadening participation, and informal science communication.

II. PROGRAM DESCRIPTION

CCI awards support the formation and development (Phase I) or sustained funding (Phase II) of research centers that can address major research challenges in fundamental chemistry. Successful centers will tackle challenges of large scope and impact, producing transformative research leading to innovation and enhanced economic competitiveness. CCI awards will bring researchers with shared and complementary interests into productive contact to foster synergy, potentially transformative research, and innovation.

The Division of Chemistry is considering new Phase I proposals and Phase II proposals in FY 2022. Both phases are described in this solicitation. There are no institutional limits on the number of preliminary proposals or proposals, however new Phase I preliminary proposals and proposals from institutions currently leading a CCI effort (Phase I or Phase II) are discouraged.

Investigators are strongly urged to contact a cognizant Program Officer (listed in Section VIII of this solicitation) when considering submitting a proposal.

A CCI is built around a compelling chemistry research challenge. The proposed research should be ambitious and have the potential for transformative impact. The CCI Program is intended to support science that cannot be effectively done by individual investigators or small teams, but requires the synergistic, coordinated efforts of a research center. The potential for synergy is explicitly evaluated during the review process. At the same time, Principal Investigators should ensure that their proposed project does not significantly overlap with ongoing Federally funded research for themselves or any of their team members. Developing a *distinct* and *distinctive* science portfolio is essential for any CCI.

Serving as the Principal Investigator of a center award requires scientific leadership and vision. It is also a significant commitment of time and will be a primary professional focus for the life of the Center. Similarly, all team members should expect the CCI to be a significant part of their professional efforts. For this reason, researchers are permitted to participate in only one CCI submission at each stage of the CCI review in response to this solicitation. Reviewers will be asked to evaluate the qualifications of the team and the resources available to the project, including researcher time and commitment.

CCIs are expected to integrate their research with activities that broaden the impact of their research. A Phase I team will pilot activities in these areas. A Phase II CCI is expected to implement broad, strategic, center-scale activities in each of the areas below:

- Innovation - A center-wide plan for innovation will demonstrate that the team is capable of translating their research to key non-academic stakeholders via intellectual property protection, licensing, entrepreneurship, or other knowledge transfer paths.
- Higher Education and Professional Development - center-wide plan for the education and professional development of undergraduate and graduate students supported by the grant, including co-mentorship or other collaborative training and continued professional development and mentoring for postdoctoral research associates. This may also include education in various aspects of innovation (intellectual property, entrepreneurship, etc.) and other higher education activities (i.e., new undergraduate- or graduate-level course materials or curricula).
- Broadening participation - center-wide plans for increasing engagement by underrepresented groups.
- Informal science communication - center-wide plans for communicating the CCI research to public audiences (outside the K-12 classroom).

Strategic planning is a key element of the CCI Program. These plans cover all aspects of a CCI, including research, broader impact activities (in the four areas noted above), management, diversity, and center-wide data approaches. Phase I Principal Investigators are required to complete strategic planning activities during their first year and submit their strategic plan to NSF within 15 months of the start of the award. All aspects of the strategic plan will be evaluated by external reviewers and NSF staff during Phase I post-award oversight and during Phase II proposal review and post-award oversight. Developing a strong strategic plan will require consultation with strategic planning experts. Phase I proposers will commit to strategic planning in their proposal (management plan section). Phase II proposers will discuss their approach to ongoing strategic planning activities.

Management Plans address leadership of centers, how decisions will be made, including the roles of any internal committees, and how synergy among projects and activities will be actively promoted in service of a center's vision. They include mechanisms for the ongoing assessment of research outcomes and broader impacts; development and implementation of strategic plans; allocation of resources; the ability to initiate new lines of research and terminate support for lower priority efforts; and approaches to encourage and promote effective communication throughout the center and with partners.

Diversity and Inclusion Plans outline the context, goals and specific actions for promoting diversity and Inclusion within the center's supported researchers (leadership, faculty, postdoctoral researchers, graduate students), partners, and advisers.

Data Management Plans will describe how all center researchers will store, access, share and archive data, with emphasis on data-sharing across collaborative teams. This is a particularly challenging prospect as the Center expands, so proposals should address features such as how each team member will gain access to data in real time, how data will be validated and archived and how, as the team expands, new members will be integrated into the data management plan in ways that enhance collaboration and synergy. New approaches to and pilot activities in data management are encouraged during Phase I and center-wide implementation is expected during Phase II.

CCIs may collaborate with researchers from industry, government laboratories, and international organizations. CCIs are encouraged to send CCI faculty, their students, and their postdoctoral research associates to conduct collaborative research with these partners, and CCI funding may be used to support travel and research costs associated with such collaborative activities. CCI funds may not be used to support industrial or international researchers. NSF does not normally support research or education activities by scientists, engineers or educators employed by Federal agencies or Federally Funded Research and Development Centers (FFRDCs). A CCI considering funding research activities by a partner in a Federal agency or FFRDC must provide a compelling argument that their proposed funded collaboration can make unique contributions to the CCI project. International and non-academic partners must provide a letter of collaboration in the supplementary documents section of the Phase I or Phase II proposal (see PAPPG, Chapter II.C.2.j for recommended format). Details of their contributions to the project may also be discussed in the Facilities, Equipment and Other Resources section of the proposal.

Phase I Centers for Chemical Innovation

The FY 2022 Phase I CCI competition is open to projects in all fields supported by the Division of Chemistry, and must have scientific focus and the potential for transformative impact in chemistry. The NSF Division of Chemistry particularly encourages fundamental chemistry projects aligned with articulated budget priorities, including Industries of Tomorrow (including Advanced Manufacturing, Artificial Intelligence, Biotechnology, and Quantum Information Science) and Climate Research and Sustainability.

A Phase I awardee must engage in research, broader impact activities, and center development activities over the three-year duration of this award. The research activities may build on pre-existing efforts, but new, collaborative results attributed to the CCI award are expected. The Phase I award will also develop broader impact activities in the four required areas (see below), including piloting and developing center-scale activities. Center development includes the development of a strategic plan covering all aspects of a CCI (see below).

The team of investigators for a Phase I proposal must include at least four senior researchers with complementary expertise. While there is no upper limit on the number of Phase I investigators, proposers are cautioned to avoid teams that are too large to collaborate effectively. The available resources should also be carefully considered in assembling the team. CCIs may collaborate with researchers from industry, national laboratories and international organizations. See detailed guidance above for non-U.S. or non-academic researchers.

Key milestones during Phase I include submission of the strategic plan (15 months); mandatory oversight review (16-18 months after the start of the Phase I award); submission of a Phase II proposal (approximately 25 months after the start date of the Phase I award); and a review of the Phase II proposal conducted at NSF Headquarters involving the participation of up to 15 center researchers (approximately 30 months after the start of the Phase I award). The Phase I award should include sufficient budget to engage in all of these required activities in an effective and timely way. Additional information is provided in the proposal preparation guidance for a Phase I full proposal.

Phase II Centers for Chemical Innovation

In FY 2022, CHE will consider new Phase II proposals resulting from Phase I awards initiated in FY 2019. There is no minimum or maximum number of investigators in a Phase II proposal. The teams may include investigators from other disciplines, but the CCI should retain a clear focus in scientific areas supported by the NSF Division of Chemistry.

Key milestones during Phase II include site visits and other oversight. The initial Phase II award is made for five years (contingent on acceptable progress). A proposal and thorough review are required for renewal of up to five additional years (for a total of up to 10 years funding at Phase II). Additional information is provided in the proposal preparation guidance for a Phase II full proposal.

III. AWARD INFORMATION

In FY 2022, NSF anticipates making up to three new Phase I awards (each up to \$1,800,000 for 3 years) as standard or continuing grants. NSF also anticipates up to one new Phase II award (up to \$4,000,000 per year for 5 years) as a cooperative agreement. Both of these plans are pending availability of funds and submission of sufficient quality proposals.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Who May Serve as PI:

While these proposals will reflect the research of many investigators, only the name of the Principal Investigator (PI) should appear on the Cover Sheet. All other investigators are considered Faculty Associates (non-co-PI senior personnel). The PI must be affiliated with an eligible submitting organization.

An investigator may participate (as PI or Faculty Associate) in only one CCI preliminary proposal and one CCI full proposal (Phase I or Phase II) submitted to this competition. In cases where an individual appears in two or more proposals, any submitted proposals involving that person may be returned without review.

The Phase II eligibility is limited to teams from the Phase I awards initiated in FY 2019.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or co-PI: 1

An investigator may participate (as PI or Faculty Associate) in only one preliminary proposal and one full proposal (Phase I or Phase II) submitted in response to this solicitation. The PI must be affiliated with an eligible submitting organization.

Additional Eligibility Info:

Teams of investigators from eligible organizations may submit Phase I CCI proposals.

The Phase I CCIs initiated in FY 2019 are eligible to compete for new Phase II funding in response to this solicitation.

No CCI funds may be awarded or subawarded to industry or international organizations. NSF does not normally support research or education activities by scientists, engineers or educators employed by Federal agencies or Federally Funded Research and Development Centers (FFRDCs).

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals (required): Preliminary proposals are required and must be submitted via the NSF FastLane system, even if full proposals will be submitted via Grants.gov.

Preliminary proposals (Phase I, required) must be submitted via FastLane by 5:00 p.m. submitter's local time on the due date indicated elsewhere in this solicitation. Preliminary proposals must conform to the format restrictions noted in the NSF Proposal & Award Policies & Procedures Guide (PAPPG) and contain only the permitted sections listed below. Note that no supplementary documents are allowed in a CCI Preliminary Proposal.

Cover Sheet. Please indicate the solicitation number, select "CCI Phase I" as Unit of Consideration and also check the "Preliminary proposal" box. The title format is *CCI Phase I: NSF Center for* Only the PI's name should appear on the Cover Sheet, with other investigators listed as Faculty Associates. The budget request should read \$1 or \$2 (whichever is required of local software and templates).

Project Summary. Follow PAPPG guidelines.

Project Description. Limited to 7 pages. CCI preliminary proposals are likely to be read and evaluated by non-specialists during the review process. It is therefore particularly important that they be written to emphasize their impact on chemistry in a broad context and respond to the solicitation specific review criteria described in Section VI. The project description should include the following:

- Table of Investigators (1 page), including the names, institutions and expertise (keywords) of the PI and all Faculty Associates. Non-funded collaborators may also be included on this table but should be clearly marked as such.
- Narrative (6 pages), including the center vision, potential for transformative impact in chemistry, potential for synergy; summary of Phase I research plan; and summaries of center-wide plans for required broader impacts.

The first page of the project description contains only the table of investigators with brief keyword descriptions of expertise (as described in the first bullet above). Within the page and formatting guidelines, submitters should strive to present sufficient substance in the Narrative section to allow for thoughtful evaluation using the review criteria given in Section VI.

Reference Section. Up to 15 key references.

Biographical Sketches for PI and all senior personnel, using the current PAPPG format.

Current and Pending Support for PI and all senior personnel using the current PAPPG format.

Single Copy Documents. Single Copy Documents are used by NSF staff, but are not available to the reviewers.

- Collaborators and Other Affiliations for the PI and senior personnel (required), see PAPPG;
- Suggested Reviewers and Reviewers Not to Include (optional).

Preliminary Proposals will be merit reviewed by ad hoc and/or panel review. The PIs of preliminary proposals judged to be particularly promising will be invited to submit Phase I full proposals (described below).

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal & Award Policies & Procedures Guide (PAPPG)*. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

Phase I Proposals

Full Proposals submitted, by invitation only, in response to this program must originate from Principal Investigators whose projects are successful in the Preliminary Proposal competition described above and must be based on those projects. All proposals not meeting this requirement will be returned without review. Proposers are strongly encouraged to consult the proposal preparation and submission instructions in the NSF Proposal & Award Policies & Procedures Guide (PAPPG) or NSF Grants.gov Application Guide as they prepare their proposal. Proposals not compliant with the proposal preparation guidelines, as supplemented by the following instructions, may be returned without review.

Cover Sheet. Select "CCI Phase I" as Unit of Consideration. Grants.gov users should refer to Section VI.1 of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration. Make sure that the Preliminary Proposal box is un-checked, and enter the NSF number for the invited preliminary proposal. The title format is *CCI Phase I: NSF Center for* The amount requested should be \$1,800,000, and the expected start date is September 1, 2022. Only the PI's name should appear on the Cover Sheet, with other investigators listed as Faculty Associates.

Project Summary. Follow PAPPG guidelines.

Project Description. CCI Phase I proposals are likely to be read and evaluated by non-specialists at some stage of the review process. It is therefore particularly important that they be written to emphasize their impact on chemistry in a broad context. The Project Description may be up to 26 pages in total. The first page must contain only the Table of Investigators. The remaining subsections are all required, but the length and order can be adjusted at the PI's discretion.

- Table of Investigators (1 page), including the names, institutions, expertise and proposed contributions of the PI and all Faculty Associates. Non-funded collaborators may also be included on this table but should be clearly marked as such.
- Center Overview, suggested 1 page, including the center vision, potential for transformative impact in chemistry, and potential for synergy.
- Research Plan. Narrative, suggested 15 pages, consisting of the following:
 - A description of the research proposed in Phase I, in sufficient detail for the reviewers to be able to evaluate the feasibility of the proposed work, potential for collaboration and synergy, and potential for transformative impact;
 - A justification for why the CCI mode of research is appropriate (compared with individual or collaborative awards); and
 - A discussion of how the Phase I research efforts can lead to a much larger Phase II effort. A discussion of the needed expertise or skills for Phase II is appropriate, but do not name specific individuals or institutions.
- Plan for center development and management, suggested 2 pages, including how decisions will be made regarding the project; the roles of internal leadership; how individual research efforts will be integrated synergistically to achieve the Center's vision; the coordination of the CCI effort and partnerships, including how new members of the center will be identified and integrated into the Phase II effort; how the CCI research and broader impact programs will be monitored, evaluated and altered as needed; and the approach to be used during the Phase I period to develop a strategic plan for the potential Phase II Center, including the development of center-wide data management and diversity plans.
- Broader Impact Components. suggested 4 pages overall, including discussion of how these activities will be integrated with the research and other activities of the CCI. The following integrative components must be included:
 - Innovation, including identification of research that has the potential for innovation, resources available to assist with innovation efforts, and the overall strategy the CCI will use to promote innovation.
 - Higher Education and Professional Development, including co-mentorship or other collaborative training of undergraduate and graduate students; education in various aspects of innovation (intellectual property, entrepreneurship, etc.); and any other developmental activities. (Note: Each proposal that requests funding to support postdoctoral researchers must also include, as a supplementary document, a description of the professional development and mentoring activities that will be provided for such individuals).
 - Broadening Participation of Underrepresented Groups, including the CCI goals, plans for achieving those goals, and a discussion of how progress will be measured.
 - Informal Science Communication, describing the CCI approach to communicating chemistry research to public audiences and possible ways to evaluate the impact of these outreach efforts. Partnerships with informal science education organizations are encouraged.
- Results of Prior Support. Suggested 3 pages, describing intellectual merit and broader impacts of prior NSF funding. See PAPPG for detailed guidance. In cases where the PI or senior personnel has received more than one NSF award, they need only report on the one award most closely related to the proposal.

An external advisory board is optional during Phase I. The proposal may describe the role of the Advisory Board, but may not name prospective members of the external advisory board or include letters of commitment from prospective members in the Phase I proposal.

References Cited. References should include all authors and full titles of articles and book chapters cited. This section should include bibliographic citations only and must not be used to provide parenthetical information outside of the Project Description. Indicate with an asterisk (*) references co-authored by two or more proposal investigators.

Biographical Sketches for PI and all senior personnel, using the current PAPPG format.

Budget. The aggregate three-year budget for a Phase I CCI should total \$1,800,000. The budget should include funding for center development activities (website, strategic planning, travel for reverse site visits, etc.) in addition to research and broader impact activities. The annual budgets can vary in amount; a cumulative budget will be automatically generated by Fast Lane. A detailed budget justification should document proposed expenses. Multi-institutional proposals should use the award-sub award proposal mechanism (see PAPPG guidelines).

Current and Pending Support for PI and all senior personnel, using the current PAPPG format.

Facilities, Equipment & Other Resources. This section catalogs the resources and facilities (including laboratories, computational facilities, data infrastructure and other tools that support collaboration) that will be available to the project, including resources and facilities accessed through collaboration.

Supplementary Documents. Supplementary materials are available to reviewers and may include:

- Postdoctoral Mentoring Plan (required if requesting funds for postdoctoral researchers). This plan should reflect center-wide mentoring efforts. See PAPPG for further guidance.
- Data Management Plan (required). This plan must address data sharing among collaborative teams in the Phase I center and build into a center-wide data management effort. See PAPPG and CHE Guidance for developing data management plans.
- Letters of collaboration, including those from industrial, government and/or international partners. See PAPPG for recommended format. Letters of recommendation or general support are not permitted. Do not name potential Phase II members or potential advisory board members in the Phase I

- proposal.
- Quotes for the purchase of instrumentation or other budget documentation.

Single Copy Documents. Single Copy Documents are used by NSF staff, but are not available to the reviewers. Relevant Single Copy Documents include:

- Collaborators and Other Affiliations Information for the PI and senior personnel (required, see PAPPG for further guidance)
- Suggested Reviewers and Reviewers Not to Include (optional)

Phase II Proposals

The FY 2022 Phase II eligibility is limited to teams funded by the Phase I awards initiated in FY 2019. Proposals not meeting this requirement will be returned without review.

Proposal authors are strongly encouraged to consult the proposal submission checklist included in the PAPPG as they prepare their proposal. Proposals not compliant with the proposal preparation guidelines, as supplemented by the following instructions, will be returned without review.

The items outlined below pertain to the corresponding sections in the PAPPG.

Cover sheet: Select CHE Centers as the Unit of Consideration. Grants.gov users should refer to Section VI.1 of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration. The title format is *NSF Center for* The amount requested should total \$20,000,000 over five years and the suggested start date is September 1, 2021. Only the PI's name should appear on the Cover Sheet, with other investigators added as Faculty Associates.

Project Summary. One page limit. Follow PAPPG guidelines.

Project Description. The Project Description may be up to 38 pages in total. The first page must contain only the Table of Investigators. The remaining subsections are all required, but the length and order can be adjusted at the PI's discretion.

- Table of Investigators (1 page), including the names, institutions and expertise of the PI and all Faculty Associates. Non-funded collaborators may also be included on this table but should be clearly marked as such.
- Center Overview (suggested 1 page), Articulate the center vision, potential for transformative impact in chemistry, and potential for synergy.
- Results of Prior CCI Support. (suggested 5 pages). Report on the results from prior CCI funding (Phase I). This must include discussion of the outcomes of the broader impacts components. No results from other prior NSF support should be included.
- Proposed CCI Research. (suggested 18 pages) Describe the proposed research and the contribution to be made by each senior investigator.
- Plan for Center Management (suggested 3 pages). Describe how decisions will be made regarding the project, including the roles of internal leadership and any external advisory groups; careful evaluation of the research and broader impacts; promotion and evaluation of synergy in center activities; development and implementation of strategic plans, including center-wide data management and diversity plans; allocation of resources; the ability to initiate new lines of research and terminate support for lower priority efforts; and communication throughout the center and with partners.
- Diversity Plan (suggested 2 pages total) Center-wide plan to ensure diverse center-supported researchers at all levels, in leadership and in advisory groups.
- Broader Impact Components (suggested 8 pages total), including discussion of how these activities will be integrated with the research and other activities of the CCI:
 - Innovation that includes identification of promising research from the CCI's research portfolio that can and will be translated into innovations; identification of university and external resources, expertise, and stakeholders, as well as other potential partners to aid in the translation of the research to innovations; discussion of how intellectual property will be developed and managed; and plans for monitoring and evaluating efficacy of the plan for innovation.
 - Higher Education and Professional Development, including co-mentorship or other collaborative training of undergraduate and graduate students; education in various aspects of innovation (intellectual property, entrepreneurship, etc.); and any other developmental activities. (Note: Each proposal that requests funding to support postdoctoral researchers must also include, as a supplementary document, a description of the professional development and mentoring activities that will be provided for such individuals).
 - Broadening participation by underrepresented groups, describing the broadening participation goals to be addressed; plans for achieving those goals, including explanation of resources to be used and anticipated impacts; and plans for monitoring and evaluating efficacy of the plan for broadening participation.
 - Informal science communication, describing plans to disseminate the results of the Center's work and achievements to a broader public audience; plans to increase the visibility and public appreciation of chemistry; any partnerships with informal science organizations; and plans for monitoring and evaluating efficacy of the plan for informal science communication.

An external advisory board will be required to provide guidance and advice to the Phase II CCI on all activities. Continuing and prospective members of the external advisory board should provide letters of commitment in the supplementary documents.

References Cited. References should include full titles of articles and book chapters cited. This section should include bibliographic citations only and must not be used to provide parenthetical information outside of the Project Description. Indicate with an asterisk (*) references acknowledging previous CCI funding. Collaborative publications with more than one CCI-supported senior investigator should also be clearly indicated.

Biographical Sketches for PI and all senior personnel, using the current PAPPG format.

Budget. Include five annual budgets of up to \$4,000,000, one for each year of the duration of the award. The budget should include funds for CCI personnel to participate in site visits or reverse site visits in the second, fourth and fifth years of the award. A cumulative budget will be automatically generated by FastLane. Multi-institutional proposals should use the award-subaward proposal mechanism. Subaward budgets should be included with this proposal, although proposers may, at their discretion, elect to submit detailed subaward budgets for only the first year of the requested award period. A detailed budget justification should document proposed expenses (see PAPPG guidelines).

Current and Pending Support for PI and all senior personnel, using the current PAPPG format.

Facilities, Equipment & Other Resources. This section catalogs the resources and facilities (including laboratories, computational facilities, data infrastructure and other tools that support collaboration) that will be made available to the project, including resources and facilities accessed through collaboration.

Supplementary Documents. Supplementary materials are available to reviewers and may include:

- Postdoctoral Mentoring Plan (center-wide, required if requesting funds for postdoctoral researchers). See PAPPG for further guidance.

- Data Management Plan (required, up to 2 pages). This plan will be center-wide and promote collaboration and synergy.
- Letters of collaboration, including those from industrial, government and/or international partners. Letters of commitment from continuing and prospective members of proposed advisory boards. See PAPPG for required format. Letters of recommendation or general support are not permitted.
- Quotes for the purchase of instrumentation or other budget documentation.

Single Copy Documents. Single Copy Documents are used by NSF staff, but are not available to the reviewers. Relevant Single Copy Documents include:

- Collaborators and Other Affiliations Information for the PI and senior personnel (required, see PAPPG for further guidance)
- Suggested Reviewers and Reviewers Not to Include (optional).

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Multi-institutional proposals should use the award-subaward mechanism discussed in the PAPPG, Chapter II.D.3.a. A single proposal and budget should be submitted, with subawards administered by the lead institution.

Budget Preparation Instructions:

The aggregate budget for a Phase I CCI should total \$1,800,000 over three years. The budget should clearly include funding for center development activities (website, strategic planning, development of data management plans and diversity plans, travel for reverse site visits, etc.) in addition to research and broader impact activities. The annual budgets can vary in amount; a cumulative budget will be automatically generated by FastLane. A detailed budget justification should document proposed expenses (see PAPPG guidelines).

Phase II CCI awards are up to \$4,000,000 per year for five years. Phase II proposals should include funds in the budget for CCI personnel to participate in oversight events (site visits or reverse site visits) in the second, fourth and fifth years of the project.

C. Due Dates

- **Preliminary Proposal Due Date(s) (required)** (due by 5 p.m. submitter's local time):

August 23, 2021

- **Full Proposal Deadline(s)** (due by 5 p.m. submitter's local time):

October 19, 2021

Phase II Full Proposals

February 22, 2022

Phase I Full Proposals, by invitation only

D. FastLane/Research.gov/Grants.gov Requirements

For Proposals Submitted Via FastLane or Research.gov:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html. For FastLane or Research.gov user support, call the FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov or rgov@nsf.gov. The FastLane and Research.gov Help Desk answers general technical questions related to the use of the FastLane and Research.gov systems. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: <https://www.grants.gov/web/grants/applicants.html>. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via FastLane or Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via

Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in PAPPG Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: https://www.nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (PAPPG Chapter II.C.2.d(i). contains additional information for use by proposers in development of the Project Description section of the proposal). Reviewers are strongly encouraged to review the criteria, including PAPPG Chapter II.C.2.d(i), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in

which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
 - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and other underrepresented groups in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

In addition to the National Science Board merit review criteria, reviewers will be asked to apply the following criteria when reviewing Phase I preliminary proposals:

- To what extent is the scientific vision and scope commensurate with a center investment?
- To what extent is there the potential for transformative impact in chemistry?
- To what extent is there potential/evidence for synergy or outcomes that would not be likely with individual investigator awards?

In addition to the above, reviewers will also be asked to consider the following criteria for Phase I full proposals

- To what extent is there potential/evidence for innovation (enhanced economic and societal competitiveness)?
- To what extent will the center leadership and the management plan foster sound decisions regarding the project, including the roles of internal leadership and any external advisory groups; careful evaluation of the research and broader impacts; promotion and evaluation of synergy in center activities; development and implementation of strategic plans, including center-wide data management and diversity plans; allocation of resources; the ability to initiate new lines of research and terminate support for lower priority efforts; and communication throughout the center and with partners?

In addition to the above, reviewers will also be asked to apply the following criterion for CCI Phase II proposals:

- To what extent is progress demonstrated in the scientific productivity, innovation and other broader impacts commensurate with the previous CCI funding?

Note that site visit reports and other information from previous award periods may be used in the review and recommendation of proposals submitted to this program.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, Site Visit Review, or Reverse Site Review.

Phase I Preliminary Proposals will be evaluated in panel, with *ad hoc* reviews requested as necessary.

Phase I Full Proposals will be evaluated by a combination of *ad hoc* and panel review.

Phase II Full Proposals will be evaluated by a combination of *ad hoc* and panel review, potentially including a reverse site visit.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement

signed by the NSF Grants and Agreements Officer does so at their own risk.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Special Award Conditions:

Phase I awards must complete strategic plans, including a diversity plan and data management plan, within 15 months of the start date of the award. These plans will be provided to the cognizant NSF Program Director and evaluated during a post-award oversight review.

Awardees will be required to participate in program-level evaluation by which NSF can assess implementation processes and progress toward program level outcomes. NSF, an NSF contractor, or a grantee on behalf of NSF, may periodically conduct program evaluations or special projects that necessitate access to project level staff and data. This activity may occur at any time during the grant period and could occur after the grant has ended. Project-level participation includes responding to inquiries, interviews and other methods of common data collection and/or aggregation across individual grants. In addition, PIs and project-level evaluators will be asked to assist in developing a program evaluation that will mutually benefit the agency and program participants.

TBD - Programmatic Terms and Conditions:

For Phase II awards, draft CCI-specific Programmatic Terms and Conditions are available on the CCI Program Page (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13635&org=CHE). Note that these may be modified as a result of the merit review and/or negotiation between NSF and the awardee.

TBD - Financial and Administrative Terms and Conditions:

For Phase II awards, the current Cooperative Agreement Financial and Administrative Terms can be found at https://www.nsf.gov/awards/managing/co-op_conditions.jsp?org=NSF

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

A draft set of additional reporting elements is available on the CCI Program Page, (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13635&org=CHE). Note that these are likely to change as a result of a recent program evaluation, and all additional reporting requirements are subject to clearance by OMB.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Katharine J. Covert, telephone: (703) 292-4950, email: kcovert@nsf.gov
- Colby A. Foss, telephone: (703) 292-5327, email: cfoss@nsf.gov

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188
- FastLane Help Desk e-mail: fastlane@nsf.gov.
- Research.gov Help Desk e-mail: rgov@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

Administrative Program Support: Nancy Carey: ncarey@nsf.gov or (703) 292 - 5109

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on [NSF's website](#).

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at <https://www.grants.gov>.

Related Programs:

More information and funding opportunities are frequently added. Please check the [CHE website](#) for the most current information.

Budget Priorities for Chemistry (MPS):

- Climate Research and Sustainability
- Advanced Manufacturing
- Artificial Intelligence
- Biotechnology
- Quantum Information Science

CCI Program Page: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13635

CHE Guidance on Data Management Plans: <https://www.nsf.gov/bfa/dias/policy/dmpdocs/che.pdf>

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <https://www.nsf.gov>

- **Location:** 2415 Eisenhower Avenue, Alexandria, VA 22314
- **For General Information**
(NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

Send an e-mail to: nsfpubs@nsf.gov
or telephone: (703) 292-8134
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See [System of Record Notices](#), NSF-50, "Principal Investigator/Proposal File and Associated Records," and NSF-51, "Reviewer/Proposal File and Associated Records." Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Policy Office, Division of Institution and Award Support
Office of Budget, Finance, and Award Management
National Science Foundation
Alexandria, VA 22314

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