

Appendix A: CCI Principal Investigator and Co-Investigator Survey

Survey Invitation Email

Subject: Please share your experience with CCI!

Dear Dr. [LAST NAME OF PI/Co-I],

The National Science Foundation (NSF) seeks to understand your experiences related to your participation in a Centers for Chemical Innovation (CCI) Program grant. Because you are listed as a current or former [ROLE] of this program, NSF is requesting that you complete the [Survey Title].

Data from this survey will provide NSF with critical information about the CCI Program's progress in achieving its goals. These data will allow NSF to communicate the outcomes of the program to NSF stakeholders and the broader Chemistry community. These data will inform improvements in the CCI Program and may also inform Center-level design and operations.

1. **Duration:** The survey takes about [TIME] minutes to complete.
2. **Your responses will be confidential:** NSF has contracted with Abt Associates to conduct this survey. Although Abt will collect names of organizations and your role within those organizations, your responses will not be associated with you, your organization, or your grant when aggregated results are reported to NSF. During the study, the data will be stored and secured on a password-protected server. Your anonymity will be kept to the degree permitted by the technology used.
3. **Right to ask questions:** Please contact Ellen Bobronnikov (NSF_CCI@abtassoc.com) or Rebecca Kruse (rkruise@nsf.gov) with questions or concerns about this study.
4. **Voluntary participation:** Your decision to be included in this research study is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer.
5. **Deadline:** Please complete your survey study by [MONTH, DAY, YEAR].
6. **Next steps:** When you [click on this link](#), you will be directed to the [Survey Title].

Please print this form to keep for your records.

On behalf of NSF and the Abt Associates study team, thank you very much for your participation!

Sincerely,
Ellen Bobronnikov
CCI Study Director, Abt Associates

Survey Initial Reminder Email

Subject: NSF needs your input!

Dear Dr. [LAST NAME OF PI/Co-I],

I am writing to follow up on our invitation for you to participate in a survey we are administering to current and former Centers for Chemical Innovation (CCI) [ROLE GROUP] on behalf of the National Science Foundation (NSF). Your input will help NSF plan for the future of the CCI Program. Please complete the confidential web survey by clicking on the link below.

LINK

If you are willing to complete the survey, we would appreciate if you could do so by [enter date within 2 weeks]. If you have any questions regarding the study, e-mail Ellen Bobronnikov (NSF_CCI@abtassoc.com) or Rebecca Kruse (rkruise@nsf.gov). Thank you in advance for your assistance!

Sincerely,
Ellen Bobronnikov
CCI Study Director, Abt Associates

Survey Final Reminder Email

Subject: Last chance to participate in pilot test of NSF survey!

Dear Dr. [LAST NAME OF PI/Co-I],

We are writing to follow up about an e-mail we sent you recently, inviting you to participate in a survey about the Centers for Chemical Innovation (CCI) program. And as a current or past [ROLE GROUP] in a CCI Center, your responses can provide valuable feedback that will help strengthen the design and operation of the program.

You can access the confidential web survey by clicking on the link below.

LINK

If you choose to complete the survey, please do so by [enter date within 1 week]. If you would prefer not to complete the survey, please also let us know so we can take you off of our list. If you have any questions regarding the study, e-mail Ellen Bobronnikov (NSF_CCI@abtassoc.com) or Rebecca Kruse (rkruise@nsf.gov). Thank you in advance for your assistance.

Best,
Ellen Bobronnikov
CCI Study Director, Abt Associates

CCI Principal Investigator (PI) and Co-Investigator (Co-I) Survey

This survey solicits responses from all lead Principal Investigators and Co-Investigators participating in the National Science Foundation's (NSF) Centers for Chemical Innovation (CCI) Program. The goal of the survey is to inform the evaluation of the program. We are asking for information to supplement your annual reports. All data will be aggregated to not reveal individual respondents. The survey should take about 20 minutes to complete.

CONSENT

Participation in the survey is voluntary, and nonparticipation, discontinuing the survey, or skipping questions will have no impact on you. All information that would permit identification of an individual respondent will be held in confidence, will be used by only persons engaged in and for the purpose of the survey, and will not be disclosed or released to others for any purpose except as required by law. Information from the survey will only be reported in the aggregate at the program level, combined with other responses. While there are no direct benefits of your participation in this survey, your frank and open responses will help the National Science Foundation to strengthen the design and operation of the program. The evaluation will also communicate the outcomes of the CCI Program to the chemistry community. Hence, we encourage you to respond candidly about your experiences. We anticipate that the survey will take about 20 minutes to complete.

INSTRUCTIONS

- Please use the survey's navigation buttons ("Back" and "Next") to move through the questionnaire.
- You may exit the survey at any time by pressing the "save and continue later" button. When you re-open the survey, you will be able to continue where you left off.
- Once you reach the last question in the survey, you will see a "submit" button. After clicking this button, your survey will be complete and you may close your browser. Once submitted, you will not be able to return to the survey without contacting our team.
- If you have any questions regarding the survey, you can contact us at CCISurvey@abtassoc.com.

The OMB control number for this project is 3145-**NEW**. Public reporting burden for this collection of information is estimated to average 20 minutes per respondent, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspects of this collection of information, including suggestions for reducing this burden, to Suzanne H. Plimpton, Reports Clearance Officer, National Science Foundation, 2415 Eisenhower Ave, Alexandria, VA 22314 or send e-mail to splimpto@nsf.gov.

[Verification]

1. Is your name: [First Name, Middle Name/Initial, Last Name]?

- Yes, this is correct
- No, my name has changed or is misspelled. My name is: _____
- No, I'm not the person named above → Exit the survey

2. All of the questions in the survey refer to your participation in the following NSF Center for Chemical Innovation (CCI): [CCI name].

Please note that when first established, the program was called the Chemical Bonding Centers.

- I have participated in this CCI → 3
- I have not participated in this CCI, but I have participated in a different CCI → A → 3
- I have not participated or I am not sure whether I participated in the CCI program → Exit

A. Please select from the list of options.

If you participated in more than one CCI, please select the CCI with which you have been most extensively involved and limit your answers to this CCI only.

[pull-down menu of CCIs]

3. For how long have you been or were you associated with the CCI program?⁸

- <3 months
- 4 to 6 months
- 7 to 11 months
- 1 year
- 2 to 4 years
- 5 to 6 years
- 7 or more years
- Uncertain/do not recall

⁸ Adapted from STC Faculty Survey, item 3

[Project characteristics]

- 4. On a scale of 1-5, where 1 indicates “not at all” and 5 indicates “very,” to what extent does the research conducted by your CCI have the following characteristics? Enter one response per row.**

| | 1-5 |
|------------------------------------------------------------------------------------------------------------|-----|
| Addresses important societal problem | |
| Focuses on major scientific challenge(s) in fundamental chemistry | |
| Has the potential to radically change our understanding of an important scientific or engineering concepts | |
| Interdisciplinary ⁹ | |
| High-risk ¹⁰ | |
| Requires a coordinated effort from diverse experts | |
| Requires large investment of funds | |

[Pre-existing collaboration and role of CCI in collaboration]

- 5. Had you collaborated with any or all of the CCI partners before the center was established? Select one.**

- None of the partners → 8
- Some of the partners → 6
- Half or more of the partners → 6

- 6. To what extent has participation in CCI influenced these pre-existing collaborations? Select one.**

- Not at all
- To some extent
- To a considerable extent

- 7. Have you continued or do you expect to continue collaborating with CCI partners after the end of the grant? Select all that apply.**

- No
- I maintained or expect to maintain some CCI collaborations after the grant ends
- I maintained or expect to maintain most or all CCI collaborations after the grant ends
- Uncertain

⁹ INSPIRE PI Survey, item 4D

¹⁰ INSPIRE PI Survey, item 4B¹¹ Adapted from STC faculty Survey, item 9¹² Adapted from STC Faculty Survey, item 14¹³ Adapted from STC Current Student Survey, item 1b¹⁴ Adapted from STC Current Student Survey, item 1

[Benefits of CCI participation: research, personal visibility, and infrastructure for the community]

8. Please indicate whether participation in the CCI has benefited your research program. Select one response per row.¹¹

| | No benefit due to CCI | Some benefit due to CCI | Large benefit due to CCI | Not applicable |
|--------------------------------------------------------------------------------------------------|-----------------------|-------------------------|--------------------------|----------------|
| Use of new theoretical models | | | | |
| Use of new/additional instrumentation or technology | | | | |
| Use of new/additional data sources | | | | |
| Use of new/additional theoretical or experimental models | | | | |
| Ability to generate new and/or better ideas | | | | |
| Ability to more quickly/effectively respond to scientific developments | | | | |
| Ability to take your research in a new direction | | | | |
| Access to resources at partner institutions | | | | |
| Access to resources at your institution | | | | |
| Ability to attract better qualified or more diverse students and postdocs to your research group | | | | |
| Ability to obtain additional funding to support your research | | | | |

9. Have any of the following changes occurred in your publication patterns, research interests, and/or professional visibility since you began participating in CCI? Select one response per row.

| | Decreased due to CCI participation | Decreased, but not due to CCI participation | Has not changed/ Too early to tell | Increased, but not due to CCI participation | Increased due to CCI participation |
|--------------------------------------------------------------------------|------------------------------------|---------------------------------------------|------------------------------------|---------------------------------------------|------------------------------------|
| Number of papers published per year | | | | | |
| Journal quality | | | | | |
| Publishing in a broader range of journals | | | | | |
| Publishing with industry | | | | | |
| Funding from industry | | | | | |
| Interest in commercialization | | | | | |
| Participation in new professional conferences, associations or societies | | | | | |
| Number of speaking invitations | | | | | |

¹¹ Adapted from STC faculty Survey, item 9¹² Adapted from STC Faculty Survey, item 14¹³ Adapted from STC Current Student Survey, item 1b¹⁴ Adapted from STC Current Student Survey, item 1

| | Decreased due to CCI participation | Decreased, but not due to CCI participation | Has not changed/ Too early to tell | Increased, but not due to CCI participation | Increased due to CCI participation |
|----------------------------------------------------------------------------|------------------------------------|---------------------------------------------|---------------------------------------|---------------------------------------------|------------------------------------|
| Requests to serve on dissertation committees outside your home institution | | | | | |
| Requests to serve on advisory panels | | | | | |
| Requests to serve on editorial boards of journals | | | | | |
| Requests to serve as a peer reviewer | | | | | |
| Requests to provide policy advice or testimony | | | | | |
| Receipt of awards, fellowships, or chaired positions | | | | | |
| Diversity of research problems on which you work | | | | | |

10. Which of the following resources/infrastructure created or improved by CCI, if any, are being used by researchers not affiliated with the center? Select all that apply.

- Methods
- Reagents
- Data
- Communication infrastructure
- Data management system
- Educational or outreach materials
- Facilities
- Equipment
- Lessons learned for how to run a large center
- New partnerships
- Other resources. Please specify: _____
- I am not aware of any resources created or improved by CCI that are being used by researchers not affiliated with the center

[Benefits of CCI participation: broader impacts]

11. Please indicate whether your CCI developed or improved the following educational or outreach opportunities.

- Courses/seminars in chemistry
- Training programs in chemistry

- Research and teaching experiences for students and postdocs
- Programs for educating the public about chemistry
- Mechanisms for recruitment and/or retention of individuals from underrepresented groups [hyperlink defining URGs]
- Mechanisms for mentorship of individuals from underrepresented groups
- Engagement with organizations with expertise supporting underrepresented groups in the scientific community
- Engagement with organizations focused on STEM-related outreach and advocacy
- I do not know whether my CCI developed or improved these types of opportunities → 13

[URGs include women, members of racial and ethnic minorities, persons with disabilities, and persons with low socio-economic status]

12. Current grants: Please indicate whether you expect to be able to sustain the following programs and activities after the grant ends.

Completed grants: Please indicate whether the following programs and activities are still in place.

- Courses/seminars in chemistry
- Training programs in chemistry
- Research and teaching experiences for students and postdocs
- Programs for educating the public about chemistry
- Mechanisms for recruitment and/or retention of individuals from underrepresented groups [hyperlink defining URGs]
- Mechanisms for mentorship of individuals from underrepresented groups
- Engagement with organizations with expertise supporting underrepresented groups in the scientific community
- Engagement with organizations focused on STEM-related outreach and advocacy

[URGs include women, members of racial and ethnic minorities, persons with disabilities, and persons with low socio-economic status]

13. Please indicate whether the following improvements have occurred as a result of CCI funding. Select one response per row.

| | No improvement due to CCI | Some improvement due to CCI | Large improvement due to CCI | N/A |
|----------------------------------------------------------------------------------|---------------------------|-----------------------------|------------------------------|-----|
| Increased participation of underrepresented groups in your lab | | | | |
| Increased participation of underrepresented groups at your institution | | | | |
| Improved ability of students and postdocs to obtain a position after leaving CCI | | | | |
| Improved quality of education in chemistry | | | | |

| | No improvement due to CCI | Some improvement due to CCI | Large improvement due to CCI | N/A |
|------------------------------------------------------------------------------------------|---------------------------|-----------------------------|------------------------------|-----|
| Increased interest in/understanding of chemistry among the public you were able to reach | | | | |

14. Please indicate whether the CCI delivered any of the following benefits to industry. Select one response per row.

I am not aware of any partnerships between my CCI and industry → 15

| | No benefit due to CCI | Some benefit due to CCI | Large benefit due to CCI | Uncertain |
|---------------------------------------------------------|-----------------------|-------------------------|--------------------------|-----------|
| New or improved ideas for commercial product or process | | | | |
| New or improved product or process | | | | |
| Reduction in environmental impact | | | | |
| Ability to meet regulatory requirements | | | | |
| Access to personnel | | | | |
| Increase in sales | | | | |
| Cost savings | | | | |
| Other benefits. Please specify: _____ | | | | |

[Center organization and function]

15. On a scale of 1-5, where 1=least and 5=most, how satisfied are you with the following elements of CCI?

| | N/A | 1 Least | 2 | 3 | 4 | 5 Most |
|---------------------------------------------------------------|-----|------------|---|---|---|-----------|
| Requirement to develop a strategic plan | | | | | | |
| Distribution of resources among partners | | | | | | |
| Sharing of credit among partners | | | | | | |
| Intellectual contribution of partners | | | | | | |
| Productivity of meetings among partners | | | | | | |
| Frequency of meeting among partners | | | | | | |
| Communication tools | | | | | | |
| Data sharing tools | | | | | | |
| Professional development opportunities for students/postdocs | | | | | | |
| Broadening participation activities and programs | | | | | | |
| Public outreach activities and programs | | | | | | |
| Leadership of the center | | | | | | |
| Overall direction of the center | | | | | | |
| Funding level for Phase I <i>(Display for Phase I only)</i> | | | | | | |
| Funding level for Phase II <i>(Display for Phase II only)</i> | | | | | | |

| | N/A | 1 Least | 2 | 3 | 4 | 5 Most |
|-----------------------------------------------------------|-----|------------|---|---|---|-----------|
| Duration of Phase I (<i>Display for Phase I only</i>) | | | | | | |
| Duration of Phase II (<i>Display for Phase II only</i>) | | | | | | |

16. To what extent have these elements contributed to the success of your center?

| | None | Some | Considerable |
|-----------------------------------------------------------------|------|------|--------------|
| Requirement to develop a strategic plan | | | |
| Distribution of resources among partners | | | |
| Sharing of credit among partners | | | |
| Intellectual contribution of partners | | | |
| Productivity of meetings among partners | | | |
| Frequency of meeting among partners | | | |
| Communication tools | | | |
| Data sharing tools | | | |
| Professional development opportunities for students/postdocs | | | |
| Broadening participation activities and programs | | | |
| Public outreach activities and programs | | | |
| Leadership of the center | | | |
| Overall direction of the center | | | |
| Funding level for Phase I (<i>Display for Phase I only</i>) | | | |
| Funding level for Phase II (<i>Display for Phase II only</i>) | | | |
| Duration of Phase I (<i>Display for Phase I only</i>) | | | |
| Duration of Phase II (<i>Display for Phase II only</i>) | | | |

17. Overall, how would you rate your experience in the CCI? Select one.¹²

- Very satisfied
- Satisfied
- Neutral
- Dissatisfied
- Very dissatisfied

18. Has your CCI experienced the following challenges? Select all that apply.

- Technical or experimental
- Meeting administrative requirements
- Sharing of credit for discovery
- Communication between partners
- Coordination of activities between partners

¹² Adapted from STC Faculty Survey, item 14¹³ Adapted from STC Current Student Survey, item 1b¹⁴
Adapted from STC Current Student Survey, item 1

- Contributions by partners to the center
- Delays in progress of research
- Staffing of the center
- Access to needed resources
- Seeding new projects
- Terminating unsuccessful projects
- Other challenge. Please specify: _____

19. To what extent have these challenges been resolved?

| Challenge | Not at all | To some extent | Fully |
|---------------------------------------------|------------|----------------|-------|
| Technical or experimental | | | |
| Meeting administrative requirements | | | |
| Sharing of credit for discovery | | | |
| Communication between partners | | | |
| Coordination of activities between partners | | | |
| Contributions by partners to the center | | | |
| Delays in progress of research | | | |
| Staffing of the center | | | |
| Access to needed resources | | | |
| Seeding new projects | | | |
| Terminating unsuccessful projects | | | |
| Other challenge. Please specify: | | | |

20. Phase II only: To what extent has participation in Phase I contributed to the success of your Phase II center? Select one.

- I did not participate in Phase I → 23
- Not at all
- To some extent
- To a considerable extent

21. Have any of the following occurred as a result of your participation in Phase I? Select all that apply.

- Advanced your research program
- New direction for your research program
- Formed new or cemented old collaborations
- Obtained additional funding to support your research
- Gained experience participating in or running a center
- Developed center policies and procedures
- Developed educational or public outreach programs
- Provided training or career development opportunities for students or postdocs

- Other benefits. Please describe:_____
- No benefits of participation in Phase I

22. Phase I only: Have you been able to continue working on the CCI-funded projects? Select one.

- Yes
- No

23. In your view, which of the following are the advantages of the 2-phase model? Select all that apply.

- It enables selection of better Phase II centers by NSF
- It allows participants to determine whether they like the experience
- It allows selection of the right partners
- It allows the centers to refine their research goals and approach
- It allows the centers to pilot activities and programs
- It allows the centers to develop and test policies and procedures
- No advantages
- Other advantages. Please specify:_____

24. In your view, what are the disadvantages of the 2-phase model? Select all that apply.

- Some strong applicants may be discouraged from applying
- Insufficient resources for Phase I grantees not selected for Phase II to continue their research
- Time burden to submit a Phase II application
- Delay in tackling time-sensitive topics
- Other disadvantages. Please specify:_____
- No disadvantages

25. On balance, is a 2-phase center model preferable to a single phase? Select one.

- Yes, 2-phase model is preferable
- No, 1-phase model is preferable
- Uncertain