

*National Science Foundation  
Industry/University  
Cooperative Research Centers*



*FINAL*

*August 2020*

*FY2019 Process Outcome Survey Results*

*Descriptive Statistics Compiled from  
Industry, Faculty & Student Surveys*

*L.C. McGowen, S. Schaible, & A. Stoica  
IUCRC Evaluation Project  
Department of Psychology  
North Carolina State University*

*Note: Please do not quote or cite without permission of the authors*

# **CONTENTS**

## **Overview**

Report Processing & Data Issues	3
Response Rates for Industry Surveys	4
Response Rates for Faculty and Student Surveys	4
Long Faculty Form vs. Short Faculty Form	4

## **Industry Results**

### **Pulse Survey**

Table 1. Satisfaction	5
Table 2. Areas for Improvement	5
Table 3. Renewal Intentions	5
Table 4. Member Descriptors	5

### **Benefits Inventory**

Part 1: Networking Benefits	
Table 4. New Connections & Partnerships	6
Table 5. Students Hired	6
Comments on the Value of Networking Benefits	6
Part 2: Research & Development Benefits	
Table 6. Research Relevance	7
Research Cost Avoidance	7
Table 7. Impact on Member Research & Development	8
Research Cost Savings	8
Stimulated Research	9
Comments on Value of R&D Benefits	9
Part 3. Technology Translation & Commercialization Benefits	
Table 8. Technology & Knowledge Transfer	10
Table 9. Commercial & Financial Benefits	10
Comments on the Value of Technology Translation & Commercialization Benefits	10
Part 4. Member Information	
Table 10. Member Descriptors	11

## **Faculty Results**

Table 1: Research	12
Table 2: Impact	12
Table 3: Commitment	13
Table 4: Satisfaction	13
Table 5: Areas for Improvement	13
Table 6: Qualitative Responses	13

## **Student Results**

Table 1: Training Opportunities	14
Table 2: General Evaluation	15
Table 3: Impact on Knowledge & Skill	15
Table 4: Career Outcomes	16
Table 5: Trainee Characteristics	17

## **REPORT PROCESSING & DATA ISSUES**

This report provides descriptive statistics on the IUCRC Process Outcome Questionnaires. Data were collected during the fall of 2019 and spring 2020 and refer to the Center activity for FY2019.

Since most evaluators use this report to benchmark their Center compared to a program-wide “norm”, we have reported “Center-level” means and standard deviations. That is, means (unweighted) for each center were used to calculate a Center-level mean. For forced choice questions, frequencies for individual respondents were also reported.

### ***Industry Questionnaires***

Starting in FY2017 year, data were collected using two industry surveys; A Pulse Survey and Benefits Inventory, administered at alternate semi-annual Center IAB meetings. See the IUCRC Evaluation project website for current and past versions of the surveys (<http://www.ncsu.edu/iucrc/ResourcesForEvaluators.htm#Surveys>).

### ***Faculty Questionnaires***

The faculty questionnaire includes two versions: a long version (13 items) that is used by centers during the first phase (in year 1-5) and a short version (6 items) that is used by centers during the second and third phase (in year 6-15) of NSF funding. Since both the faculty long and faculty short questionnaires share some of the same questions, data for these shared questions were pooled for analysis. In the tables below, questions only included in the long version are noted as follows: (L).

### ***Student Questionnaires***

The student questionnaire was implemented as a required instrument towards the end of FY2016. The student survey was substantially revised for FY2019. See the IUCRC Evaluation project website for current and past versions of the surveys (<http://www.ncsu.edu/iucrc/ResourcesForEvaluators.htm#Surveys>).

## RESPONSE RATES

### Industry

Category	Center Level		Member Level	
	Pulse	Benefits	Pulse	Benefits
<b>Response Frequency</b>				
Continuing Population from CD report	72	72	1212	1212
1 <sup>st</sup> Year Reporting Population from CD report	+1	+1	+6	+1
NCE/Retired/Defunct Centers	15	15	236	236
NCE/Retired/Defunct Centers Reporting <sup>1</sup>	+1	+2	+32	+28
COVID-19 Impacted Centers <sup>2</sup>	4	7	64	207
Population <sup>3</sup>	55	53	950	798
Centers That Did Not Return Data <sup>4</sup>	8	12	113	163
Available Population <sup>5</sup>	47	41	837	635
Data Received	47	41	281	289
Received/ Population	85.45%	77.35%	29.58%	36.22%
Received/ Available Population	100%	100%	33.57%	45.51%

### Faculty and Students

Category	Center Level		Individual Level	
	Faculty	Students	Faculty	Students
<b>Response Frequency</b>				
Continuing Population from CD report	72	72	1053	1908
1 <sup>st</sup> Year Reporting Population from CD report	+0	+0	+0	+0
NCE/Retired/Defunct Centers	15	15	179	332
NCE/Retired/Defunct Centers Reporting <sup>2</sup>	+0	+2	+0	+10
COVID-19 Impacted Centers <sup>3</sup>	5	14	75	267
Population <sup>4</sup>	52	43	799	1319
Centers That Did Not Return Data <sup>5</sup>	16	19	212	457
Available Population <sup>6</sup>	36	26	587	862
Data Received	36	26	192	251
Received/ Population	70.59%	60.46%	24.03%	19.02%
Received/ Available Population	100%	100%	32.71%	29.11%

## LONG FACULTY FORM VS. SHORT FACULTY FORM

	Long Form	Short Form
# of items	13	6
# of questions in common	6	6
# of unique questions	7	0
# of Centers using form	20	17
Sample size	113	79

<sup>2</sup> Retired/defunct Centers and Centers on no-cost extension (NCE) are not required to submit data, but some do. If so, those data were included in the analysis.

<sup>2</sup> COVID-19 Impacted Centers include centers that reported inability to collect information due to rescheduled meetings, virtual formats, or center leadership decisions to postpone collection until less stressful times.

<sup>4</sup> Population was defined as centers that were at least 1 year old, did not report COVID-19 impacts, and/or were not classified as NCE, graduated, or retired.

<sup>5</sup> Centers were excused for reasons such as being in the midst of center restructuring, high respondent turnover, and respondent refusal to complete surveys.

<sup>6</sup> Numbers based on population minus excused and not returned counts.

# Industry Results: FY2019

## *Pulse Survey*

**Table 1. Satisfaction**

1. Please rate your level of satisfaction with the following:

	<b>Individual Frequencies</b>										<b>Center Level</b>		
	Not Satisfied (1)		Slightly Satisfied (2)		Somewhat satisfied (3)		Quite Satisfied (4)		Very Satisfied (5)		Missing Data N	Mean	S.D.
	N	%	N	%	N	%	N	%	N	%			
a. Center Research	0	0.0	4	1.4	40	14.4	128	46.2	105	37.9	6	4.22	0.37
b. Center Administration	1	0.4	3	1.1	21	7.6	97	35.3	153	55.6	8	4.44	0.36
c. Center Meetings	0	0.0	6	2.2	21	7.6	136	49.5	112	40.7	8	4.30	0.39

**Table 2. Areas for Improvement**

3. How can the Center improve? Please mark areas that need improvement.

	<b>Individual Frequencies</b>	
	N of Responses	% of Respondents <sup>^</sup>
a. Planning the Research Program	42	16.2
b. Project Selection	56	21.5
c. Project Development and Management	53	20.4
d. Project Results Reporting	71	27.0
e. Dissemination of Results via Publications	22	8.6
f. Technology Transfer	56	21.4
g. Intellectual Property Management	34	13.1
h. Fundraising & Recruiting New Members	79	29.5
i. IAB Meetings	25	9.7
j. Communication	51	19.8
k. Center Personnel	2	0.8
l. Other	17	6.6

*“It would be worthwhile for new project ideas to be sent out to the IAB earlier to allow for more time to review within their respective companies. Sometimes the projects go a little off track relative to the initial proposal, and it feels that the IAB sponsors are left out of that decision making process.”*

*“Regular reports from the individual projects would be appreciated, so that its not just an update twice a year. Monthly progress reports would be very helpful and help identify areas of interest or where feedback could be useful before we are 50 to 100% through the project.”*

<sup>^</sup> Respondents were encouraged to check as many boxes as applied. Therefore, the percentage across all items may total to greater than 100%.

**Table 3. Renewal Intentions**

5. Will your organization renew its membership?\*

										<b>Center Level</b>		
<b>Individual Frequencies</b>										Missing Data N	Mean	S.D.
Definitely Not (1)		Probably Not (2)		Uncertain (3)		Probably Yes (4)		Definitely Yes (5)				
N	%	N	%	N	%	N	%	N	%	N	Mean	S.D.
2	0.7	4	1.5	20	7.4	139	51.7	104	38.7	14	4.25	0.34

**Table 4. Member Descriptors**

6. How many years has your organization been a member in this center?

<b>Member Level</b>				<b>Center Level</b>			
Mean		S.D.		Mean		S.D.	
4.35		4.20		4.79		2.83	

  

7. Organization Type/Size

	<b>Individual Frequencies</b>	
	N	%
1. For-Profit Large (> 500 Employees)	170	62.0
2. For-Profit Small (11- 500 Employees)	38	13.9
3. For Profit-Micro (< 10 Employees)	11	4.0
4. Government (Federal/State/Local)	38	13.9
5. Non-Profit / Other	17	6.2
Total Reported	283	100.0

# Benefits Inventory

## Part 1: Networking Benefits

**Table 4. New Connections & Partnerships**

1. Please indicate which of the following networking benefits listed below, if any, were realized by your organization, during the current membership year.

	<u>Member Level</u>		<u>Center Level</u>	
	N	%	Mean %	S.D.
In the current membership year, has your organization established any new, valuable connections with other Center participants (industry, government, faculty, students, others)?	260	90.0	90.34	12.99

2. In the current membership year, has your organization started to explore or initiated a partnership with any of the following individuals or groups, as a result of your involvement in the center? Check all that apply.

	<u>Member Level</u>		<u>Center Level</u>	
	N	%	Mean %	S.D.
a. Developed partnerships with other IAB members (e.g., research partnership, collaboration, joint investment)	98	33.9	35.91	25.74
b. Developed partnerships with university faculty or research scientists (e.g., one-to-one research contract, collaboration on a grant, consulting)	172	59.5	59.75	27.98
c-1. Hired any students working on center research projects as a full-time employee, contractor, or intern.	47	16.4	15.71	19.08
d. Other	20	6.9	6.03	9.60
e. None of these	62	21.5	24.02	26.13

**Table 5. Students Hired <sup>^</sup>**

2c-2. If “yes” to “Hired any students working on center research projects as a full-time employee, contractor, or intern.” How many students hired? *Sample: N of members = 356; N of centers = 54*

<u>Member Level Scores</u>	<u>Member Level</u>	
	Mean	S.D.
Number of students hired per respondent organization	0.30	0.96
<u>Center Level Scores</u>	<u>Center Level</u>	
Number of students hired per respondent organization per center	0.35	0.55
Number of students hired by respondent organizations per center	2.14	3.11
<u>Program Level Scores</u>	<u>Program Level</u>	
Total number of students hired by respondent organizations	88	

<sup>^</sup> Member and center level statistics exclude one outlier that reported 25 student interns hired. Those 25 interns are included in the program level total.

3. How have these new connections and partnerships benefited your organization (e.g., new business opportunities, access to resources or information, enhanced research capability, etc.)? (quotes)

*“The connections with universities and professors have been great for hiring students that are prepared for work in industry. The research has potential for influence in industry, but nothing has yet directly made it into our industry work.”*

*“We have been able to enter completely new areas through connections with other industrial members and with students through the universities.”*

*“New partnership created which is resulting in the sale of one of our assets to the another IAB member”*

*“Allowed more cross-collaboration between companies and to work on mechanistic models that address industry concerns using the consortium. High value add!”*

*“The commercial partnerships have resulted in project business at a modest multiplier to membership fee paid to the center (i.e. immediate ROI). Additionally, networking has lead my company to access academics and fellow commercially researchers to complete testing/projects for my organization at a much accelerated speed and lower cost than identifying a previously unknown or new technical consultant or shop.”*

## Part 2: Research & Development Benefits

**Table 6. Research Relevance**

4. Please indicate the R&D benefits your organization has received from access to Center research, by estimating what percentage of the projects funded during the current membership year, fall into each of the following categories (Total must sum to 100%):

	Member Level		Center Level	
	Mean %	S.D.	Mean %	S.D.
a. <u>Not Relevant Research</u> : % of projects that are probably not relevant to your organization's current or future needs	27.62	23.60	25.29	10.76
b. <u>Adjacent Research</u> : % of projects that are potentially relevant to your organization's current or future needs, but in an area that is outside your organization's current focus	27.96	17.63	28.97	8.21
c. <u>Core Research</u> : % of projects so relevant to your organization's current or future needs that your organization would almost certainly have conducted or contracted out a similar project within the next couple years	28.26	21.62	28.88	12.02
d. <u>Transformational Research</u> : % of projects that are potentially relevant to your organization's current or future needs, but too risky/blue sky for internal investment	13.85	15.53	15.06	7.61

### Research Cost Avoidance Estimates:\*\*

Research Cost avoidance (RCA) is defined as savings a member obtains by having “necessary” research projects performed by a center rather than performing them internally. The following RCA calculations are based on a member’s report of the number of projects they consider a “high enough priority they would conduct internally” (Q1c), number of scientist months it would take to complete a typical center project (Q1b), the cost of a scientist month (based on archival data), and cost of center membership (archival data). For a more detailed explanation of how this estimate is calculated see Appendix A.

Sample: *N* of respondents = 288, *N* of centers = 40

#### Average Research Cost Avoidance (RCA)

Member Level Scores	Mean	Median	S.D.
a. Average dollar value (in thousands) of avoided projects per respondent organization Av.RCA member = (N of projects considered core (Q4c) * Median of months * Median cost per scientistmonth) – Primary Fee	744.13	554.52	777.77*
Center Level Scores	Mean	Median	S.D.
b. Average dollar value (in thousands) of avoided projects per respondent organization	5,357.76	3,085.75	6,703.55*
Program Level Scores	Sum		
c. Total dollar value of avoided projects by respondent organizations	\$214,310,563		

\*31 members (11%) have negative RCA that results in large standard deviation.

\*\* It is worth noting that since only 36% of members completed the questionnaire; this is a very conservative estimate of the value of accelerated/avoided projects supported by members.



**Table 7. Impact on Member Research & Development**

5. Consider the center's research portfolio and specifically the projects in which your organization is most interested. In which of these ways, if any, have the center's research findings and outputs (including those from this year and any prior years) affected your organization's internal R&D in the current membership year? Check all that apply.

	<b>Member Level</b>		<b>Center Level</b>	
	<b>N</b>	<b>%</b>	<b>Mean %</b>	<b>S.D.</b>
a. Helped accelerate the pace and/or completion of some R&D projects now underway at (or contracted by) your organization	104	36.2	34.54	25.68
b. Helped your organization decide against starting one or more new R&D projects that otherwise would have been initiated	87	30.3	29.62	23.10
c. Triggered development of new R&D projects, or significantly redirected pending projects within your organization	91	31.5	32.61	22.86
d. Helped advanced the Technology Readiness Level of technology being developed within your organization	112	38.8	41.07	28.76
e. None of these	69	23.9	23.19	21.95

**Research Cost Savings**

If yes[to Q5a or Q5b], taking into account personnel, facility and related costs how much would you estimate *your organization saved by shortening project completion-time, reducing costs and/or by choosing not to start new research?*

Sample: all respondents: N of respondents = 188; N of Centers = 38

<b>Member Level Scores</b>	<b>Mean</b>	<b>Median</b>	<b>S.D.</b>
a. Dollar value of accelerated/avoided projects (in thousands) per respondent organization	102.98	0.00	734.79*
<b>Center Level Scores</b>	<b>Mean</b>	<b>Median</b>	<b>S.D.</b>
b. Dollar value of accelerated/avoided projects (in thousands) per center	509.47	0.00	1831.24
<b>Program Level Scores</b>	<b>Sum</b>		
c. Total dollar value of accelerated/avoided projects supported by respondent organizations	\$19,360,000**		

\* One member reported \$10 Million in Research Cost Savings, resulting in a much larger than usual standard deviation.

\*\*It is worth noting that since only 36% of members completed the questionnaire; this is a very conservative estimate of the value of accelerated/avoided projects supported by members.

**Interpreting Research Cost Savings**

- The average member saved \$103K in R&D costs in the last year as a result of participation in the IUCRC program.
- Centers have an average of 17 members. The average Center saved its members \$802K in R&D costs in the last year as a result of participation in the IUCRC program.
- There were 68 active Centers, serving 1227 members in FY2015-2016. The IUCRC program saved participating companies a total of \$43.3M in R&D costs in the last year as a result of participation in the IUCRC program.
- These figures are based on feedback from firms responding to this survey. Member response rate was 34% (366 out of the available population of 996 responded to the survey) from 58 centers included in the data collection. Therefore, these are conservative estimates of the Research Cost Savings at the member, center and program levels.

## Stimulated Research

If yes[to Q5c], taking into account personnel, facility and related costs, please estimate how much money invested in new/redirected projects

Sample: all respondents: N of respondents = 188; N of Centers =

Member Level Scores	Member Level		
	Mean	Median	S.D.
b. Dollar value of center-stimulated projects (in thousands) per respondent organization Sample: all respondents: N of respondents = 227; N of Centers =	73.46	0.00	798.24*
Center Level Scores	Center Level		
	Mean	Median	S.D.
g. Dollar value of center-stimulated projects (in thousands) per center Sample: all respondents: N of respondents = 227; N of Centers =	406.71	0.00	1969.94*
Program Level Scores	Program Level		
i. Total dollar value of center-stimulated projects supported by respondent organizations Sample: all respondents: N of respondents = 227; N of Centers =	\$16,675,000**		

\* \* One member reported \$12 Million in Stimulated Research, resulting in a much larger than usual standard deviation.

\*\*It is worth noting that since only 36% of members completed the questionnaire; this is a very conservative estimate of the value of center stimulated projects supported by members.

6. Thinking about the R&D benefits experienced by your organization, what has been the most important or significant impact? Please describe. If possible, provide a quantifiable measure of the economic value of that benefit (e.g., time saved, \$ saved, \$ invested, etc.).

*"[The Center] enables us to peer 'behind the curtain' of academic research and the research interests of our customers. This is immeasurable in most ways, though could be considered in cost terms to save us \$100-200k per year of projects we did not have to run that would be dead-ends, or staff we didn't need to hire."*

*"Developing experienced students, grad students, and professors as potential resources, future hires, or research partners - \$500K."*

*"Many of the center projects use our software tools (which we provide in-kind), and we benefit by being able to use the results as case-studies in our marketing and potential customer conversions - which increases our sales and enables us to make further developments and improvements to our software."*

*"Primary benefit has been access to and collaboration with experts in our domain. We expect this to result in a new product line to be offered for sale in 2021 by our company."*

*"The time and capital equipment saved through this project has been significant. Time saved: 2 weeks. Capital equipment savings - too large to quantify."*

*"The center has allowed us to invest into research that we were interested in without having to invest in time from our own company employees which has then led to us focusing on other project we wouldn't have been able to beforehand."*

## Part 3: Technology Translation & Commercialization Benefits

**Table 8. Technology & Knowledge Transfer**

7. During the current membership year, has your organization realized any technology or knowledge transfer benefits related to your participation in the Center? Check all that apply.

	Member Level		Center Level	
	N	%	Mean	S.D.
a. Accessed capabilities and insights (e.g., center facilities, equipment, faculty or student capabilities, insights from other members, etc.) to which your firm would not otherwise have access	159	55.0	53.45	26.32
b. Licensed center's IP	18	6.2	4.66	11.30
c. Produce your own IP related to research at the center	31	10.7	9.52	14.96
d. Helped your org. identify new applications for technology trying to develop	121	41.9	38.71	25.83
e. Helped your org. anticipate or address some regulatory issues in your industry	47	16.3	16.57	20.29
f. None of these	57	19.7	21.31	22.38

**Table 9. Commercial & Financial Benefits**

8a. During the current membership year, has your organization realized any commercial or financial benefit that involved the translation of the center's current or prior years' research findings and outputs? Check all that apply.

	Member Level		Center Level	
	N	%	Mean %	S.D.
a1. Launch new products or services based on what you learned from the center	24	8.3	7.37	12.84
a2. Improve existing products or services based on what you learned from the center	63	21.8	21.78	19.84
a3. Improve operational or manufacturing processes based on what you learned from the center	47	16.3	16.08	18.00
a4. None of these	174	60.2	60.40	20.23

8b. *[If yes to any]* Would these commercial or financial benefits have been realized in the absence of the center?

Individual Frequencies						Center Level				
No, the center played a critical role in realizing these benefits (1)	Yes, but the benefits would have been delayed without the center's involvement (2)	Yes, the center had only limited influence on our ability to realize these benefits (3)		N/A	Missing Data	Mean	S.D.			
N	%	N	%	N	%	N				
38	13.8	50	18.1	10	3.6	178	64.5	13	1.68	0.51

	Member Level		Center Level	
	N	%	Mean %	S.D.
9. Have any of these technology translation-related benefits contributed to the addition of new jobs at your organization?	49	17.6	18.00	21.36

10. Thinking about the technology translation benefits experienced by your organization, what has been the most important or significant impact? Please describe. If possible, provide a quantifiable measure of the economic value of that benefit (e.g., \$s saved, time saved, waste/scrap reduced, etc.).

*A reduction in the unknowns and a better understanding of the challenges associated with the approach being researched. Economic value is in terms of a reduction in the time until the approach might be commercially realisable.*

*From the technology we've adopted from [Center] research, it has given us 140x faster time to a solution with higher accuracy.*

*We have primarily been leveraging external expertise from the center to accelerate our research portfolio, so the main savings to us is in terms of employee time and salary. I estimate about 1-2 man-years of full-time equivalent at a value of \$250-\$500k.*

*We learn how our tools are/can be used in different and new applications - we also benefit by transferring knowledge and training the students to use our software. The next generation of students graduate knowing the benefit of our tools, and that can translate to sales for us down the road, and the use of our tools for R&D in other organizations helps them save time and money.*

## *Part 4: Member Information*

**Table 10. Member Descriptors**

12. How many years has your organization been a member in this center?			
<b>Member Level</b>		<b>Center Level</b>	
<b>Mean</b>	<b>S.D.</b>	<b>Mean</b>	<b>S.D.</b>
4.43	4.29	4.30	3.01

  

13. Organization Type/Size		
	<b>Individual Frequencies</b>	
	<b>N</b>	<b>%</b>
1. For-Profit Large (> 500 Employees)	156	58.2
2. For-Profit Small (11- 500 Employees)	49	18.3
3. For Profit-Micro (< 10 Employees)	14	5.2
4. Government (Federal/State/Local)	35	13.1
5. Non-Profit / Other	14	5.2
Total Reported	268	100.0

# Faculty Results: FY2019

**Table 1. Research**

1. Compared to the research projects that you typically conduct outside the Center, would you describe your Center funded research as: (L)\*

<u>Individual Frequencies</u>											<u>Center Level</u>	
Much more basic (1)		More basic (2)		Same (3)		More Applied (4)		Much more applied (5)		Missing Data	Mean	S.D.
N	%	N	%	N	%	N	%	N	%	N		
1	0.9	3	2.8	40	37.0	47	43.5	15	13.9	2	3.68	0.79

\* Indicates a question that is unique to the long version of the faculty questionnaire.

2. During the past year, how satisfied were you with the following?

	<u>Individual Level</u>											<u>Center Level</u>	
	Not Satisfied (1)		Slightly Satisfied (2)		Somewhat Satisfied (3)		Quite Satisfied (4)		Very Satisfied (5)		Missing Data	Mean	S.D.
	N	%	N	%	N	%	N	%	N	%	N		
a. Quality of the Center-supported research program	0	0	7	3.6	18	9.4	71	37.0	94	49.0	2	4.33	0.80
b. Relevance of the Center's research program to my professional goals	8	4.2	4	2.1	10	5.2	72	37.5	95	49.5	2	4.26	1.02

**Table 2. Impact**

4. During the past year, what impact has participation in the Center had for YOU in the following areas? (L)\*

	<u>Individual Level</u>											<u>Center Level</u>	
	No Impact (1)		Somewhat Positive Impact (2)		Moderately Positive Impact (3)		Very Positive Impact (4)		Extremely Positive Impact (5)		Missing Data	Mean	S.D.
	N	%	N	%	N	%	N	%	N	%	N		
a. The feeling of accomplishment I get from the research I do.	3	2.8	8	7.4	7	6.5	46	42.6	42	38.9	2	4.09	1.01
b. Opportunities for research contracts/grants.	3	2.8	6	5.6	16	14.8	36	33.3	45	41.7	2	4.08	1.03
c. Recognition I receive for the work I do.	3	2.8	8	7.4	21	19.4	46	42.6	28	25.9	2	3.83	1.0
d. Access to useful equipment.	29	26.9	8	7.4	20	18.5	26	24.1	22	20.4	2	3.04	1.50
e. Ability to support graduate students.	7	6.5	6	5.6	12	11.1	40	37.5	41	38.0	2	3.96	1.15
f. Ability to publish my work in quality proceedings and journals.	9	8.3	10	9.3	20	18.5	32	29.6	33	30.6	2	3.65	1.27

\* Indicates a question that is unique to the long version of the faculty questionnaire.

**Table 3. Commitment**

5. Which option best expresses your current intentions?

	<b>Individual Frequencies</b>										<b>Center Level</b>		
	Definitely Not		Probably Not		Uncertain		Probably Yes		Definitely Yes		Missing Data	Mean	S.D.
	(1)	(2)	(3)	(4)	(5)	(5)							
	N	%	N	%	N	%	N	%	N	%	N		
Next year I will submit my best research ideas in a center funded proposal	0	0	7	3.6	18	9.4	71	37.0	94	49.0	4	4.11	1.05

**Table 4. Satisfaction**

6. During the past year, how satisfied were you with center administrative operations?

	<b>Individual Frequencies</b>										<b>Center Level</b>		
	Not Satisfied		Slightly Satisfied		Somewhat Satisfied		Quite Satisfied		Very Satisfied		Missing Data	Mean	S.D.
	(1)	(2)	(3)	(4)	(5)								
	N	%	N	%	N	%	N	%	N	%	N		
	3	1.6	5	2.6	20	10.4	48	25.0	112	58.3	4	4.39	0.90

**Table 5. Areas for Improvement**

7. How can the Center improve? Please mark areas that need improvement.

	<b>Individual Frequencies</b>	
	<b>N of Responses</b>	<b>% of Respondents<sup>^</sup></b>
	a. Communication	39
b. Planning & development of research program	39	20.3
c. Management of projects	20	10.4
d. Project selection	26	13.5
e. Proposals & publications	27	8.9
f. Technology transfer	26	13.5
g. Intellectual property	21	10.9
h. Fundraising	62	32.2
i. Other	22	11.5

<sup>^</sup> Respondents were encouraged to check as many boxes as applied. Therefore, the percentage across all items may total to greater than 100%.

**Table 6. Qualitative Responses**

<b>7b. How can the area(s) be improved?</b>	<b>7c. Are there any features of the administration and operations you are particularly pleased with?</b>
“We can do a better job of cajoling our industry partners in the development of new proposals. We can meet more frequently for group project meetings between the Project Updates to the IAB..”	“One of the center's great strengths is the collegiality and cooperatively between research groups; this leads to a truly synergistic effort...”
“It would be nice to engage more industry members, but I understand that the Center has been working very hard on this matter.”	“Great support in getting things done in time. Support for other grant applications.”
“More collaboration across sites. Selection of focus areas... More collaboration would allow for pooling of limited funds and a have greater overall impact.”	“Our face to face meetings are very engaging and we are seeing excellent participation by our member companies.”
“It would be nice for the center to have a broad scope with respect to its research projects, since the field is quickly evolving with new technologies and concepts coming out every day.” “More money per project and longer time frame per project.”	“Communication is great, especially when new approaches to information dissemination are tried. Leadership is very transparent and democratic in its navigation of potential adjustments.”

# Student & Postdoc Results: FY2019

**Table 1. Training Opportunities**

1. Please indicate whether your Center experience has included the following opportunities:

	Individual Frequencies							Center Level					
	Not available (1)		Available, but did not participate (2)		Available, and did participate (3)		Missing Data	Not available (1)		Available, but did not participate (2)		Available, and did participate (3)	
	N	%	N	%	N	%		N	Mean %	S.D.	Mean %	S.D.	Mean %
a. Work on innovative or leading-edge research projects	5	2.9	22	12.7	146	84.4	66	1.91	7.35	11.87	18.50	63.72	41.89
b. Pursue research questions that address “real-world” problems	7	4.1	11	6.4	154	89.5	67	3.34	14.53	4.37	9.45	69.56	43.89
c. Engage in experiential “hands-on” learning	10	5.8	15	8.7	147	85.5	67	3.75	12.20	6.07	10.15	67.15	42.82
d. Stay informed about Center projects related to your research interests	7	4.1	29	17.0	135	78.9	68	2.91	6.35	14.58	21.84	59.19	39.86
e. Have access to scientific data, tools, techniques, expertise, equipment, software, or other resources that are not otherwise available to you	13	7.5	20	11.6	140	80.9	66	5.31	10.59	8.21	16.26	63.99	42.15
f. Collaborate with government or industry scientists	12	6.9	52	30.1	109	63.0	66	6.52	17.55	25.87	27.10	45.12	35.64
g. Collaborate with faculty or students from other institutions	10	6.1	62	37.8	92	56.1	75	5.01	14.16	20.08	25.42	50.56	41.23
h. Work with people from different demographic or disciplinary backgrounds	11	6.7	23	13.9	131	79.4	74	5.01	17.12	9.25	12.50	61.93	41.99
i. Attend Center IAB meetings	12	7.4	23	14.1	128	78.5	76	3.35	10.18	7.17	12.02	64.91	42.47
j. Present research at Center IAB meetings	11	6.9	34	21.3	115	71.9	79	3.05	9.99	13.86	16.93	55.31	40.91
k. Participate in other professional development opportunities offered through the Center	40	24.5	61	37.4	62	38.0	76	20.98	26.02	28.62	28.22	25.40	24.55

**Table 2. General Evaluation**

2. Overall, how satisfied are you with your experience participating in this Center?											<u>Center Level</u>	
<u>Individual Frequencies</u>										Missing Data	Mean	S.D.
Not satisfied (1)		Slightly satisfied (2)		Somewhat satisfied (3)		Quite satisfied (4)		Very satisfied (5)				
N	%	N	%	N	%	N	%	N	%			
6	3.8	6	3.8	7	4.4	58	36.3	83	51.9	79	4.25	0.84

**Table 3. Impact on Trainee Knowledge & Skills**

5. Please indicate how impactful your Center experience has been for you in the following areas:														
	<u>Individual Frequencies</u>											<u>Center Level</u>		
	No Impact (1)		Slightly Positive Impact (2)		Moderately Positive Impact (3)		Positive Impact (4)		Very Positive Impact (5)		Not Sure (9)	Missing Data	Mean	S.D.
	N	%	N	%	N	%	N	%	N	%				
a. Improved my technical knowledge and skills	0	0.0	1	0.6	6	3.9	52	33.8	95	61.7	0	85	4.52	0.28
b. Improved my oral communication skills	1	0.7	6	3.9	14	9.2	54	35.3	78	51.0	0	86	4.29	0.45
c. Improved my written communication skills	3	1.9	5	3.2	19	12.3	67	43.5	60	39.0	0	85	4.06	0.47
d. Improved my project management skills, like setting and meeting timelines and deliverables	6	3.9	8	5.2	27	17.6	65	42.5	47	30.7	1	85	3.90	0.47
e. Improved my ability to work as a member of a team	4	2.6	7	4.6	22	14.4	54	35.3	66	43.1	1	85	4.19	0.41
f. Improved my ability to publish papers in academic journals or conferences	6	3.9	8	5.3	14	9.2	60	39.5	64	42.1	3	84	4.20	0.49
g. Improved my understanding of how research applies to "real-world" problems	0	0.0	5	3.3	9	5.9	53	34.9	85	55.9	2	85	4.47	0.43
h. Improved my understanding of industry research trends and needs	5	3.2	9	5.8	22	14.3	56	36.4	62	40.3	1	84	4.01	0.46
i. Improved my awareness of career paths in industry	16	10.5	19	12.5	23	15.1	40	26.3	54	35.5	2	85	3.31	0.86
j. Improved my awareness of internship or job openings at Center member organizations	18	12.4	9	6.2	25	17.2	46	31.7	47	32.4	4	90	3.52	1.03



**Table 4. Career Outcomes**

6a. What is your career goal?	Individual Frequencies		Center Level	
	N	%	Mean %	S.D.
Work in academia (1)	31	19.1	18.99	19.42
Work in industry (2)	92	56.8	38.62	28.04
Work in government (3)	11	6.8	2.51	4.76
Work at a non-profit/foundation (4)	0	0.0	0	0.0
Start my own company (5)	7	4.3	2.12	5.41
Undecided (6)	19	11.7	8.02	13.69
Other (please specify) (7)	2	1.2	1.49	5.56
Missing Data	77			

6b. *[If starting own company]* Will your company be based on an idea from your Center research?

Individual Frequencies									Center Level					
Yes (1)		No (0)		Unsure (2)		Not Applicable	Missing Data	Yes (1)		No (0)		Unsure (2)		
N	%	N	%	N	%	N	N	Mean %	S.D.	Mean %	S.D.	Mean %	S.D.	
2	28.6	2	28.6	3	42.9	155	77	13.33	23.09	66.67	57.74	20.00	34.64	

6c. Has your career goal changed as a result of your Center participation?

Individual Frequencies								Center Level					
Yes (1)		No (0)		Unsure (2)		Missing Data		Yes (1)		No (0)		Unsure (2)	
N	%	N	%	N	%	N	N	Mean %	S.D.	Mean %	S.D.	Mean %	S.D.
36	24.0	112	74.7	2	1.3	89		11.73	17.50	53.04	41.41	1.91	8.72

**Table 5. Trainee Characteristics**

7. How long have you been involved with the Center?												Center Level	
Individual Frequencies											Missing Data	Mean	S.D.
Less than 6 months (0.5)	1 Year (1)	2 Years (2)	3 Years (3)	4 Years (4)	5 or More Years (5)								
N	%	N	%	N	%	N	%	N	%	N	%	N	%
33	16.9	45	23.1	48	24.6	40	20.5	20	10.3	9	4.6	44	
											2.09	0.67	

8. Have you been funded by the Center with which you are affiliated?				
	Individual Frequencies		Center Level	
	N	%	Mean %	S.D.
No, not funded (0)	5	3.3	1.98	6.40
No, funded by other sources (1)	10	6.7	6.24	10.20
Yes, partially funded (2)	38	25.3	19.94	24.79
Yes, fully funded (3)	90	60.0	33.80	33.14
Other (9)	7	4.7	3.90	9.21
Missing Data	89			

9. Will your thesis, dissertation, or postdoc research be based on a Center project?				
	Individual Frequencies		Center Level	
	N	%	Mean %	S.D.
No (0)	25	12.9	12.71	17.45
Yes (1)	117	60.3	51.97	31.99
Don't know yet / Not approved yet (2)	40	20.6	16.01	15.13
Not applicable to my degree/training (9)	12	6.2	3.93	7.36
Missing Data	45			

10. What degree/training are you currently pursuing?				
	Individual Frequencies		Center Level	
	N	%	Mean %	S.D.
Bachelor's degree (1)	14	7.0	4.93	7.72
Master's degree (2)	52	26.0	17.49	17.19
Doctoral degree (3)	123	61.5	59.68	31.90
Postdoc (4)	6	3.0	0	0.01
Other (9)	5	2.5	1.86	5.60
Missing Data	39			

12. What is your gender?				
	Individual Frequencies		Center Level	
	N	%	Mean %	S.D.
Male (0)	143	72.6	60.05	34.17
Female (1)	51	25.9	27.84	28.62
Another gender identity (2)	3	1.5	1.43	4.54
Prefer not to say (9)	3		0.37	1.28
Missing Data	39			

13. What is your citizenship status?				
	Individual Frequencies		Center Level	
	N	%	Mean %	S.D.
US citizen/permanent resident (1)	122	61.9	45.48	37.60
International student/postdoc (2)	73	37.1	43.22	37.63
Other (3)	2	1.0	0.62	1.94
Prefer not to say (9)	2		0.11	0.48
Missing Data	40			