

National Institute of  
General Medical  
Sciences



## Glue Grant Outcomes Assessment

Analysis of Public Comments  
Final Report  
March 8, 2011



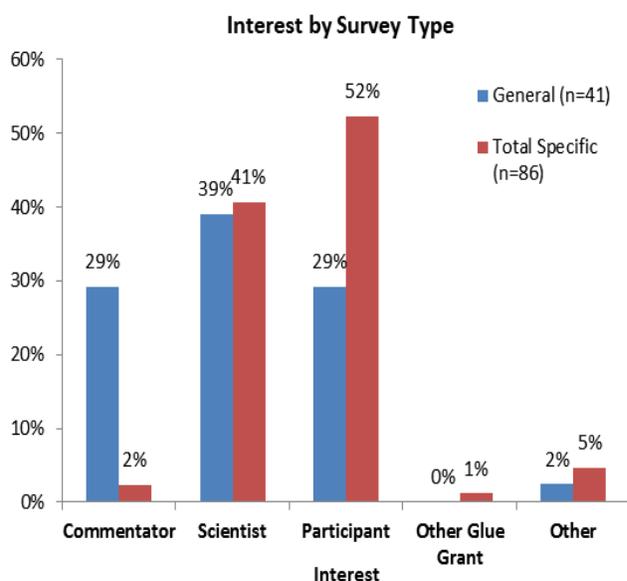
## EXECUTIVE SUMMARY

The National Institute of General Medical Sciences (NIGMS) sponsors the Large-scale Collaborative Project Awards (Glue Grant) Program, whose purpose is to support large scale scientific research initiatives to tackle complex biomedical problems negatively effecting public health. Over the past 11 years, NIGMS has invested \$368 million dollars in the program. As part of an overall outcomes assessment of the Glue Grant program, NIGMS solicited feedback from the scientific community through six on-line questionnaires that were available from November 4, 2010 – January 15, 2011 (the original survey templates are available in [Appendix A](#)). One survey asked for general input on the Glue Grant program as a whole; five surveys asked for specific input on each of the five glue grant programs that are nearing their end or have already ended:

1. [Alliance for Cellular Signaling “AFCS”](#)
2. [Cell Migration Consortium “TCMC”](#)
3. [Consortium for Functional Glycomics “CFFG”](#)
4. [Inflammation and the Host Response to Injury “IHRI”](#)
5. [Lipid Metabolites and Pathways Strategy \(LIPID MAPS\) “LMPS”](#)

NIGMS engaged Ripple Effect Communications to provide an independent analysis of the responses. Ripple Effect was established in 2006 to provide “Intelligent Project Management”™ to the Federal government, and is often called upon to provide support in one or more of the following areas: Technology, Public Policy, Communications, Conference & Event Management, Organization & Process Improvements, Project Management, and Research & Analysis. Ripple Effect assesses, plans, manages and executes projects that aid the Federal government (with the current focus on increasing transparency) in transforming into a “people-centric, results driven and forward thinking” organization.

A total of 863 responses were collected from 127 respondents through the surveys. Forty-one respondents completed the general questionnaire and 86 provided feedback through the specific surveys.

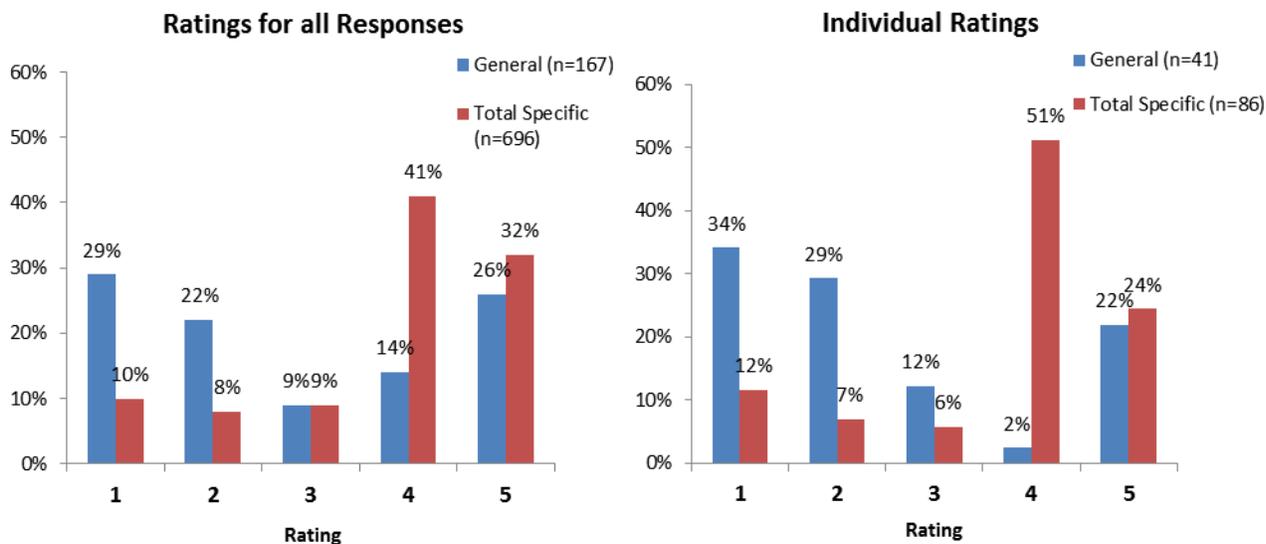


The majority of respondents reported an academic affiliation (n=118; 92%), while 5 reported a government affiliation, 2 industry and 2 other. Furthermore, the majority of respondents were participants and scientists (see graph at left). Glue Grant participants and scientists most frequently reported through one of the 5 specific surveys, while most of the general commentators responded through the general survey.

A strong response bias was present among general commentators and participants. Commentators primarily expressed disapproval and participants mostly frequently voiced support, hailing the Glue Grants as successful. As a group, scientists offered the most diverse, and potentially subjective, opinions.

To categorize the ideas and sentiment of each response, Ripple Effect used an iterative process for developing codes to each question within the framework of a five-point rating scale, where 5 was strongly

positive and 1 was strongly negative. After developing all the codes to rate each response, we engaged in a process of rating each individual across all of their responses. Indicated in the graph on the left, responses to the five specific surveys were predominantly positive (73% received a rating of 4 or 5); responses to the general survey were more diverse, but just more than half were negative (51% received a rating of 1 or 2). The graph on the right illustrates overall individual ratings. Respondents to the specific Glue Grant surveys were again mostly supportive (75% received a rating of 4 or 5), but the sentiment was slightly less strong when responses were considered within the context of the individual respondent. In contrast, the negative sentiment expressed by individuals reporting through the general survey were stronger (63% received a rating of 1 or 2).



#### General Findings:

- The majority of participants, and approximately half of the scientists, believed publications, both results and methods, had a moderately high impact on the field as a whole.
- The majority of participants, and approximately half of the scientists, believed that invaluable resources (e.g., databases), collaborations, and groundbreaking discoveries could only have been achieved through the Glue Grant funding mechanism.
- The majority of commentators disapproved of Glue Grants and did not believe accomplishments were commensurate with the investment.
- The majority of commentators, and less than half of the scientists, believed funding should be reallocated through the R01 grant mechanism.

In the current context of fiscal restraint, the Glue Grant mechanism was perceived as an unfair luxury that could no longer be enjoyed, especially by those less invested in the programs. Regardless of the perceived value of accomplishments, little direct support was voiced for continued funding, while a solid contingency spoke out in favor of reallocating funds through the R01 grant mechanism.

NIGMS may consider providing incentives for scientists in the field or Glue Grant participants to continue working on maintaining, improving, or conducting new research with the unique resources that have been generated under the Glue Grants. The incentive could be offered as a different grant mechanism that leverages the strengths of the Glue Grant mechanism, but requires the type of bottom-up motivation that inspires researchers to strike professional collaborations in the first place.

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## BACKGROUND

NIGMS sponsors a funding opportunity called the Large-Scale Collaborative Project Awards ([Glue Grant](#)) Program, whose purpose is to provide resources for currently funded scientists to form research teams to tackle complex problems that are of central importance to biomedical science and to the NIGMS mission, but that are beyond the means of any one research group. The problems identified must require a large-scale approach and should have reached a stage to be feasibly solved within a 10-year period. The self-assembled teams are expected to involve a number of independently funded investigators, selected for expertise and eminence and not location, who are already working on aspects of the selected biomedical problem. A strong leader and centralized project leadership are required.

A high level of funds may be requested to allow participating investigators to form a consortium to address the research problem in a comprehensive and highly integrated fashion. NIGMS has invested \$368 million over the past 11 years in this program, through the following announcements: [RFA-GM-99-007](#), [NOT-GM-00-001](#), [RFA-GM-01-004](#), [RFA-GM-02-007](#), [RFA-GM-04-001](#), [PAR-04-128](#), [PAR-07-412](#). Responses to these announcements have resulted in 15 Phase I awards and seven Phase II awards. Five of those Phase II awards resulted in a second Phase II award, and those five projects have either ended or will be ending in July 2011-2013. NIGMS is conducting an outcomes assessment for the Glue Grants program in general, with a specific focus on the following Phase II awards.

- [Alliance for Cellular Signaling](#) “AFCS”
- [Cell Migration Consortium](#) “TCMC”
- [Consortium for Functional Glycomics](#) “CFFG”
- [Inflammation and the Host Response to Injury](#) “IHRI”
- [Lipid Metabolites and Pathways Strategy \(LIPID MAPS\)](#) “LMPS”

Phase I awards were supported by the R24 Resource-Related Research Project mechanism of support, which is used in a variety of ways to provide resources for problems where multiple expertise is needed to focus on a single complex problem in biomedical research or to enhance research infrastructure. Phase II awards were supported by the U54 Specialized Center Cooperative Agreement mechanism of support, which is used to support any part of the full range of research and development from very basic to clinical, and may involve ancillary supportive activities to comprise a multidisciplinary attack on a specific disease entity or biomedical problem area. In contrast to other types of Center support, such as the Research Program Projects and Centers (P) awards, the U54 centers are cooperative agreements that receive continuous attention from NIH staff, and assistance in identifying appropriate priority needs.

The goal of the assessment is to determine whether the outcomes of the five awards that have ended or are nearing an end have been commensurate with the scope of these awards and the level of investment. NIGMS prepared two venues for collecting input from stakeholders:

- An online questionnaire (open November 4, 2010 – January 15, 2011)
- Expert panel review to occur March 21-22, 2011.

### **The Role of Ripple Effect Communications, Inc.**

Ripple Effect Communications, Inc. was engaged by NIGMS to perform an analysis of the data received through the outcomes assessment online questionnaires. As an independent contractor, Ripple Effect is not invested in the Glue Grant program and therefore has no bias toward the outcomes of the assessment.

In addition, Ripple Effect provides an external perspective to the responses, one which does not include intimate knowledge of the program, therefore allowing value and expression for all opinions and ideas. Ripple Effect was established in 2006 to provide “Intelligent Project Management”™ to the federal government, and is often called upon to provide support in one or more of the following areas: Communications, Program & Policy, Technology, Conference & Events Management, Organization & Process Improvement, Research & Analysis and Project Management. We assess, plan, manage and execute projects that aid the government (with the current focus on increasing transparency), in transforming into a “people-centric, results driven and forward thinking” organization.

## METHODS FOR ANALYSIS

### About the Data

As part of the on-line questionnaire process, NIGMS collected data from 135 individuals through 6 different survey types: a general survey covering the Glue Grant program as a whole, and five surveys about the individual Glue Grant programs (Alliance for Cellular Signaling [AFCS], The Cell Migration Consortium [TCMC], Consortium for Functional Glycomics [CFFG], Inflammation and the Host Response to Injury [IHRI], and Lipid Metabolites and Pathways Strategy [LMPS]). The data from the general survey remained separate from the five “specific” surveys throughout the analysis and reporting process.

### Respondents

Of the 135 surveys submitted through the online questionnaire process, eight were removed from the data set. One was non-responsive (it included one response, but failed to communicate a message) and seven were submitted without responses to any questions and were assumed to be false starts (i.e., respondent began the survey, quit for unknown reasons, and accidentally submitted a form). In total, 127 surveys comprise the data set; Table 1 provides a breakdown of the total number of surveys received by affiliation and survey type.

Forty-one surveys were received through the General Questionnaire (32% of the total surveys), while 87 (68% of the total surveys) were received through the specific surveys. Of the specific surveys, LMPS received the most (27% of the total surveys) and AFCS the least (3% of the total surveys). The vast majority of survey respondents (92%) reported an academic affiliation.

Table 1: Total number of respondents per Affiliation by Glue Grant Questionnaire

Affiliation	General	LMPS	CFFG	IHRI	TCMC	AFCS	Total
Academic	37	32	29	11	5	4	<b>118 (92%)</b>
Industry	1	1	-	-	-	-	<b>2 (2%)</b>
Government	2	-	2	-	1	-	<b>5 (4%)</b>
Other	1*	1 <sup>†</sup>	-	-	-	-	<b>2 (2%)</b>
<b>Total</b>	<b>41 (32%)</b>	<b>34 (27%)</b>	<b>31 (24%)</b>	<b>11 (9%)</b>	<b>6 (5%)</b>	<b>4 (3%)</b>	<b>127 (100%)</b>

\*None reported

<sup>†</sup>Private research institute

Self-reported interest is illustrated in Table 2. A full 85% of the respondents were either participants or scientists in the Glue Grant area (45% and 40% respectively). Only 11% of survey respondents were general commentators; they mostly provided feedback through the general questionnaire.

Table 2: Total number of respondents per Interest by Glue Grant Questionnaire

Interest	General	LMPS	CFFG	IHRI	TCMC	AFCS	Total
Commentator*	12	1	-	-	-	1	<b>14 (11%)</b>
Participant <sup>+</sup>	12	9	26	6	3	1	<b>57 (45%)</b>
Scientist <sup>^</sup>	16	21	5	4	3	2	<b>51 (40%)</b>
Other GG <sup>~</sup>	-	-	-	1	-	-	<b>1 (1%)</b>
Other	1	3	-	-	-	-	<b>4 (3%)</b>
<b>Total</b>	<b>41 (32%)</b>	<b>34 (27%)</b>	<b>31 (24%)</b>	<b>11 (9%)</b>	<b>6 (5%)</b>	<b>4 (3%)</b>	<b>127 (100%)</b>

\*Commentator was defined as “General Commentator with no specific interest in any Glue Grant Project.”

<sup>+</sup>Participant was defined as “Participant in one or more of the Glue Grant Projects” for the general survey and “Participant in this Glue Grant” for the specific surveys.

<sup>^</sup>Scientist was defined as “Scientist in the field of any Glue Grant, but not a participant” for the general survey and “Scientist in the field of this Glue Grant, but not a Participant in this glue grant project” for the specific surveys.

<sup>~</sup>Other GG was defined as “Participant or scientist with specific interests in another Glue Grant Project” for the specific surveys.

Note that no one chose option “d” on the specific survey, which was “Participant or scientist with specific interests in another Glue Grant project”.

## Responses

From the 127 surveys submitted, a total of 863 individual responses were collected in response to all the questions (167 responses from the general survey and 696 from the specific surveys). As illustrated in table 3, it was unusual for respondents to provide feedback to all of the questions; generally, the open ended questions received the fewest responses.

Table 3: Total number of responses per question by Glue Grant Questionnaire

Question	General	LMPS	CFFG	IHRI	TCMC	AFCS	Total
<b>3</b>	36	30	23	9	6	4	<b>108 (13%)</b>
<b>4</b>	28	28	22	8	6	3	<b>95 (11%)</b>
<b>5</b>	25	-	-	-	-	-	<b>25 (3%)</b>
<b>5a</b>	-	28	28	7	6	4	<b>73 (8%)</b>
<b>5b</b>	-	27	28	9	6	1	<b>71 (8%)</b>
<b>5c</b>	-	26	28	10	6	4	<b>74 (9%)</b>
<b>5d</b>	-	3	7	2	2	-	<b>14 (2%)</b>
<b>6</b>	23	-	-	-	-	-	<b>23 (3%)</b>
<b>6a</b>	-	30	22	9	5	3	<b>69 (8%)</b>
<b>6b</b>	-	29	20	10	5	2	<b>66 (8%)</b>
<b>6c</b>	-	28	22	9	5	3	<b>67 (8%)</b>
<b>6d</b>	-	4	3	3	1	-	<b>11 (1%)</b>
<b>7</b>	29	27	22	9	5	3	<b>95 (11%)</b>
<b>8</b>	26	21	13	6	4	2	<b>72 (8%)</b>
<b>Total</b>	<b>167 (19%)</b>	<b>281 (33%)</b>	<b>238 (28%)</b>	<b>91 (11%)</b>	<b>57 (7%)</b>	<b>29 (3%)</b>	<b>863</b>

## Analysis Process

To provide a comprehensive analysis of the responses, a unique method for developing and assigning codes was used. In standard qualitative fashion, we followed an inductive approach for developing codes that captured the main idea of the responses to each question across survey types. The unique aspect of our analysis was to place code development within the framework of a 5-point rating scale, where 5 was equal to strongly positive and 1 was equal to strongly negative, for each question. For example, there were eleven codes that were applied to the responses to question 4 of the general survey, two of them were classified with a rating of 1, three were classified with a rating of 2, and so on (for full details on the codes and their associated rating, visit [Appendix B](#)).

The organizational framework for code development served three main purposes: (1) it laid the foundation for both a deductive and inductive approach to code development, (2) facilitated the development of definitions for the ratings scale that were responsive to the data, and (3) provided maximum flexibility for assessing responses/analysis.

## Development of Codes and the 5-Point Rating Scale

The integrative process of developing codes within a 5-point rating scale occurred by survey type and question. Seven of the twelve questions NIGMS posed on the specific surveys used a 3-point scale to prompt respondents; we reorganized the scale into 5-points. For example, in question 3 on the specific surveys, NIGMS asked about the relative impact of the Glue Grant award on the field of science (major impact, some impact, minimal impact). After reading a set of responses, we defined 5 as major impact, 4 as some impact, 3 as neutral, ambivalent or uncertain, 2 as minimal impact, and 1 as no impact at all. When a 3-point scale was not available within the question information, the scale was defined by the nature of the question and the language used by respondents to answer the question. After initially defining the rating, an iterative process for developing codes continued until a set of codes had been developed for each question across all survey types.

## Comprehensive List of Codes

In total, 58 codes were developed and applied to the data. Due to the nature of the coding process, it was not uncommon for a code to reoccur across different questions and also to appear with different ratings. For example, the code “Insufficient return on investment” was used in concert with a rating of 1 but also with a rating of 2 because, although the idea was the same, the overall tone of the respondents differed. A comprehensive list of codes is provided below. In total, 30 codes were positive (occurred with a rating of either 4 or 5) and were applied to 587 of the responses (68%), 6 were neutral (occurred with a rating of 3) and were applied to 70 responses (8%), and 22 were negative (occurred with a rating of either 1 or 2) and were applied to 206 responses (24%).

### Positive Codes (rating of either 4 or 5)

1. Data is useful
2. Unlikely to have happened without GG
3. Good distribution of outcomes/resources to community
4. Unique/prominent strength/success of the program
5. Accelerated discovery
6. Continue funding and tackle challenges
7. Questions and research are more complex/unique
8. Continue funding
9. High quality/useful resources produced

10. Accomplishments greatly facilitated by the GGs
11. Good Collaboration
12. Valuable methods and technologies made available/gaining traction in the community
13. Strong publications
14. Broad/multidisciplinary research
15. Contributions advanced understanding
16. Impressive leadership/organization
17. Personal use of GG resources
18. Longlasting value to community
19. Broad and valuable resources for the scientific community
20. Exceptional tools have been developed and being used
21. Invaluable collaborations, only possible because GG
22. Annual meetings of outstanding value
23. Invaluable Resources
24. Absolutely continue funding GG
25. Invaluable collaborations/personal use of GG resources
26. Outstanding developments in technologies and methods
27. Accomplishments only possible because of GG mechanism
28. Groundbreaking discoveries; shifting paradigms
29. High impact/benchmark publications
30. Innovative, excellent, awesome, outstanding

#### Neutral Codes (rating of 3)

1. Value Unclear/Additional Assessment Necessary
2. Unsure if would have happened without GG
3. Modest use/intent to use resources/data/databases
4. Quality depends on program
5. Good/needs improvement
6. Personally unaffected

#### Negative Codes (rating of either 1 or 2)

1. Allocate funds back to RO1
2. Artificial or unproductive collaborations
3. Database Insufficient
4. Do not fund again
5. Regular funding mechanisms could/would have produced same/more
6. Mechanism inefficient and/or inappropriate
7. No use of resources
8. None whatsoever
9. Nothing uniquely positive/not fundamentally different
10. GG is a waste of resources
11. No impact/progress or advancement of the field
12. Insufficient return on investment
13. Would have occurred without GG

14. Collaborations too limited
15. Access to data (e.g., the interface) obscured utility
16. Could have been done without the GG
17. Did not meet expectations
18. Little/No Direct Use
19. Did not extend far enough into the community
20. No significant impact/progress or advancement of the field
21. Data not qualitatively different
22. Limited distribution of outcomes/resources

### *Definitions of each of the five ratings*

A description of each of the five ratings is provided below, along with a quote to demonstrate the definition.

#### *Strongly approve (5)*

Value added over the individual grant approach; groundbreaking, paradigm shifting, outstanding outcomes that would not have been possible without this funding. High impact.

*The project (LMC) revolutionized the state-of-the-art in the field of lipid research, opening the way for finally understanding how lipids affect cell functions in health and disease. Invaluable information was gathered in regards to the lipidome of the macrophage, the first ever quantitative map of all lipids in a single tissue. The resulting publications led to groundbreaking discoveries, shifting existing paradigms, and generating novel ideas that will impact basic and clinical research for years.*

~ Scientist (GNQN)

#### *Approve (4)*

Value added over the individual grant approach; have benefited from, or appreciate the results/methods/materials/data/databases produced. Outcomes are beneficial or significant for the field.

*The research that led to these materials was in large part stimulated by the collaborative interactions in the glue grant. Without that, I believe the majority of the material products would not exist.*

~Participant (TCMC)

#### *Neither Approve nor Disapprove (3)*

Outcomes may be interesting and useful, but there is no opinion about whether the results justify the spending. Respondents may be ambivalent, uncertain, or suggest the need for formal assessment.

*I believe the value of this Glue Grant to the community needs to be assessed on a regular basis as you are doing.*

~Scientist (LMPS)

#### *Disapprove (2)*

No value added over the individual grant approach. The outcomes may be interesting and useful, but they have had minimal or modest impact on the community.

*There were clearly new results produced from the glue grants but it is not at all clear whether the synergy hoped for led to more new science than would have been seen from that many RO1's. My sense is that the RO1's would have produced more.*

~ Scientist (GNQN)

### Strongly Disapprove (1)

No value added over the individual grant approach. Regardless of the utility and/or scope of outcomes, they were insufficient based on the investment. Glue Grant funding should be discontinued.

*The GLUE grant program, while a worthwhile experiment, has failed its original mission to solve any problem in 10 years. Furthermore, it has also failed to produce any scientific knowledge beyond the scope of what we would expect from other, considerably less expensive, mechanisms. These initial GLUE grants have conclusively proven that this is not an efficient or even an appropriate mechanism to support science.*

~ Commentator (GNQN)

### Rating Individuals on a 5-point scale

After all of the responses had been coded and rated, responses were placed back into the context of the individual as a whole and each respondent's full set of responses was analyzed and assigned one overall rating per person. The process for rating individuals across all of their responses followed a different logic from the rating scale as defined for each question. A hierarchy of conventions was developed based on the overall goal of the assessment: to determine if the outcomes of the awards surveyed have been commensurate with the scope and investment. The first step was to tally ratings across all of the individual's responses. If one rating occurred more frequently than any other rating, it was considered dominant and was assigned to the individual. In the absence of a dominant rating, the logic followed a slightly different path depending on the type of survey. If it was a general survey, the hierarchy numbered below was engaged, but for the specific surveys one more step was assessed before referring to the hierarchy: questions 5a-5d and 6a-6d were tallied independent of the overall set of codes, given one rating, and placed back in context of the entire set of ratings and re-tallied. If, after that process, there was still no dominant rating, the next step was to go back and read each code that was applied to each question and apply the following rating hierarchy:

- 1) If the individual received a code in response to any question that related the value of the program to the cost of the program, choose the rating associated with that coded response as the overall rating for that individual. If no such code is present for a given individual, go to number 2.
- 2) If the individual received a code in response to any question that related to the overall quality of the outcomes of the program, choose the rating associated with that code as the overall rating for that individual. If no such code is present for a given individual, go to number 3.
- 3) Re-read the responses, considering the codes and each of their ratings, and choose an individual overall rating consistent with the responses and codes for each question.

## FINDINGS

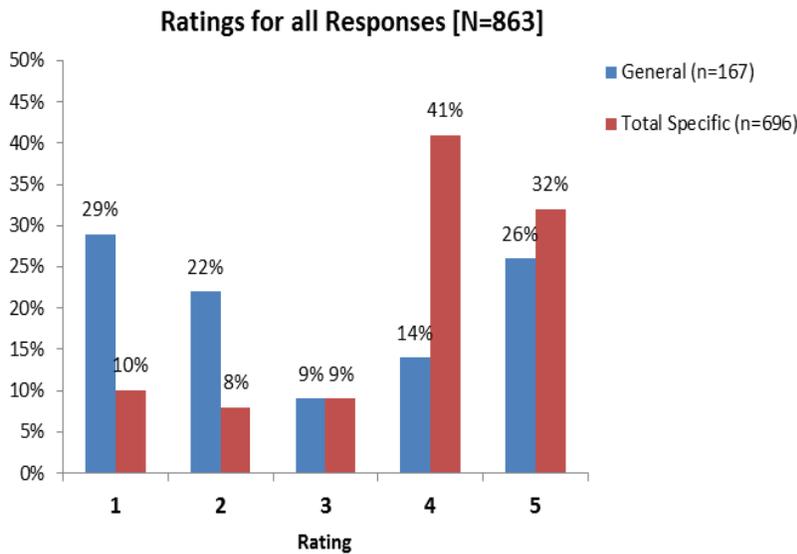
A total of 127 respondents provided feedback to the NIGMS Glue Grant Outcomes Assessment on-line questionnaire process, and as a result of eight survey questions, a total of 863 responses were collected. Although it is impossible to know whether any of the respondents completed both a general and a specific

survey, the overall trends in the data suggest that the frequency of this occurrence was very low; it is most likely that most respondents chose to complete just one survey.

The findings from our analysis are broken down into four sub-sections: aggregate ratings, findings by survey question, findings by individual Glue Grant program, and value of the Glue Grants.

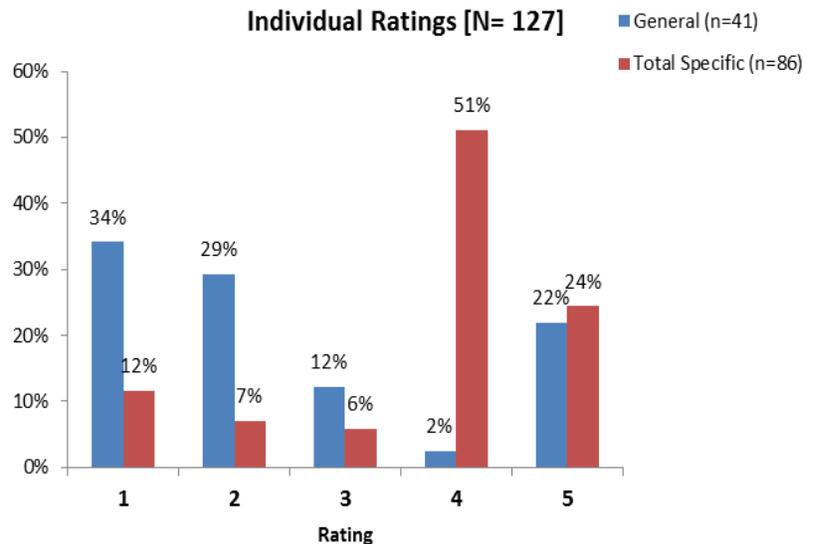
### Aggregate Ratings

Findings are reported first from an aggregate perspective in order to illustrate overall trends in the ratings. The graphs presented here illustrate ratings across survey questions, the ratings as assigned to individuals, and, due to the presence of inherent biases, ratings by affiliation and self-reported interest.

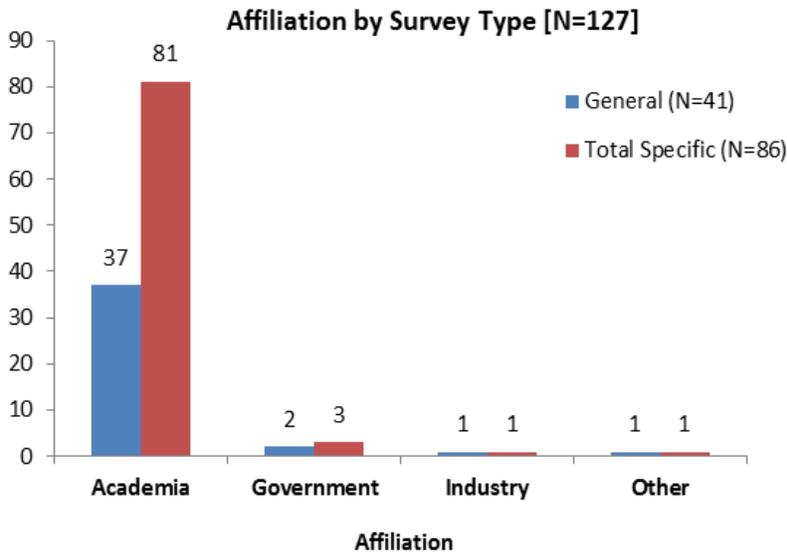


In comparing the total general and specific survey responses, a difference in overall sentiment was clear. Specific survey respondents expressed predominantly more positive views across all survey questions (73% of responses received a rating of either 4 or 5); general survey respondents were not as consistently positive, with slightly more than half expressing mostly negative views about the Glue Grants (51% of the responses received a rating of either 1 or 2).

A similar trend was evident in regard to the overall individual ratings. Specific survey respondents were most often rated positively (75% of the respondents were rated either a 4 or 5). In comparison, far fewer of the general survey respondents were rated positively (24% were rated either a 4 or 5). Also, in contrast to the specific survey respondents, the majority of general survey respondents were rated negatively (63% of the respondents were coded with either a 1 or 2).



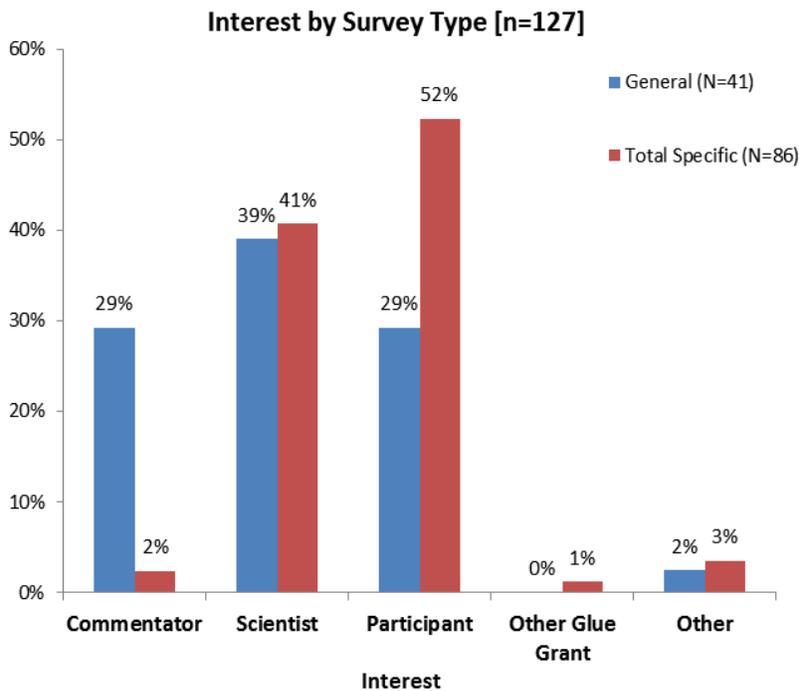
## Affiliation



Regardless of survey type, the majority of respondents reported an academic affiliation. The affiliation graph to the left uses actual frequencies, as opposed to percentages, due to the high number of respondents reporting an academic affiliation (n=118; 93%). The data set rounded out with 5 reported government affiliations, two industry and two other (private research institute and not reported). Of the five who reported a government affiliation, one was a commentator with a low opinion of the Glue Grant mechanism (general survey respondent). On the specific

surveys, three of the government respondents were participants, one was a scientist, and all four had high praise for the Glue Grants. The two industry affiliated respondents were a scientist and a commentator, both of whom praised the invaluable nature of the LIPIDS data base.

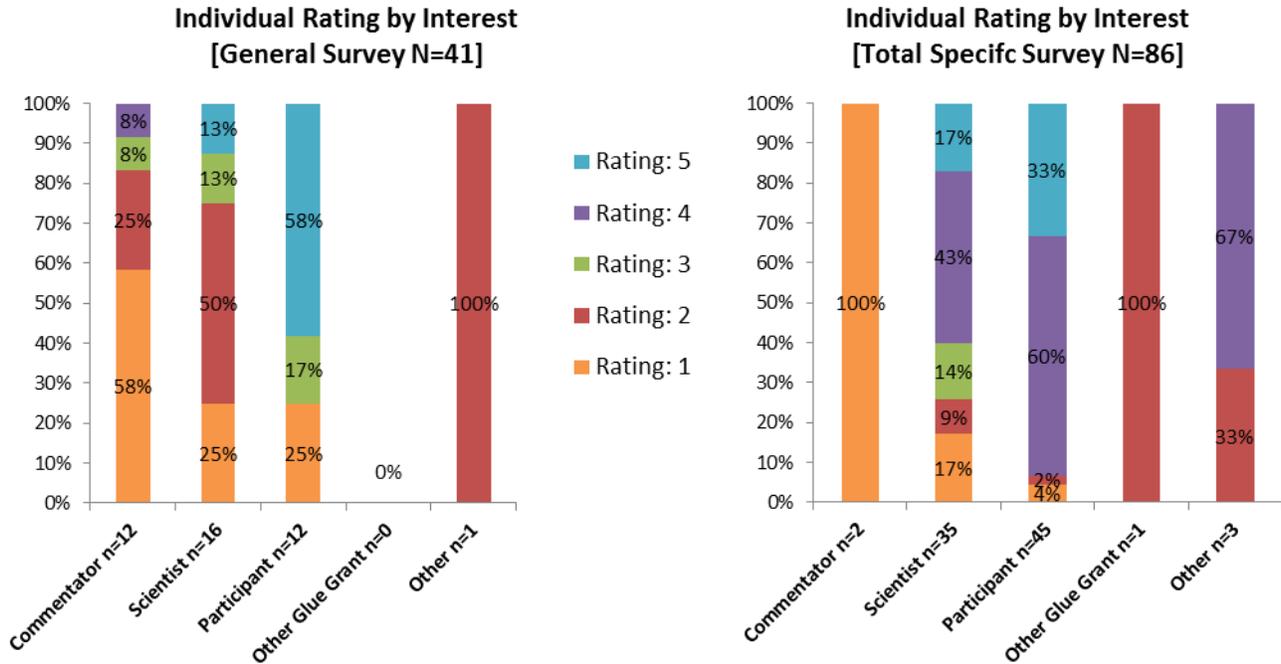
## Interest



As demonstrated by the graph on the left, participants and scientist composed the bulk of the survey respondents. Glue Grant participants largely reported through the specific survey, while scientists responded to the general and specific surveys at about the same rate (39% and 41% respectively). The vast majority of general commentators responded through the general survey.

A more detailed look at interest by survey type is presented next and illustrates who responded with which overall sentiment, further illuminating bias by interest type.

Overall, as shown below, commentators to the general survey reported negative sentiments, with a rating of 1 or 2 the most common. Similarly, the majority of scientists who reported through the general survey were primarily negative. The bulk of the positive sentiments received through the general survey were from participants.



General commentators (n=2), as respondents to the specific surveys, were not in favor of the Glue Grant programs, while participants and scientists were consistently more favorable of the specific programs than the participants or scientists who reported through the general survey.

Participants of the Glue Grant programs most frequently and consistently responded positively across survey types, but the strength of sentiment was greatest from those participants who responded through the specific surveys. Scientists had diverse opinions about the Glue Grants, while general commentators were primarily dissatisfied.

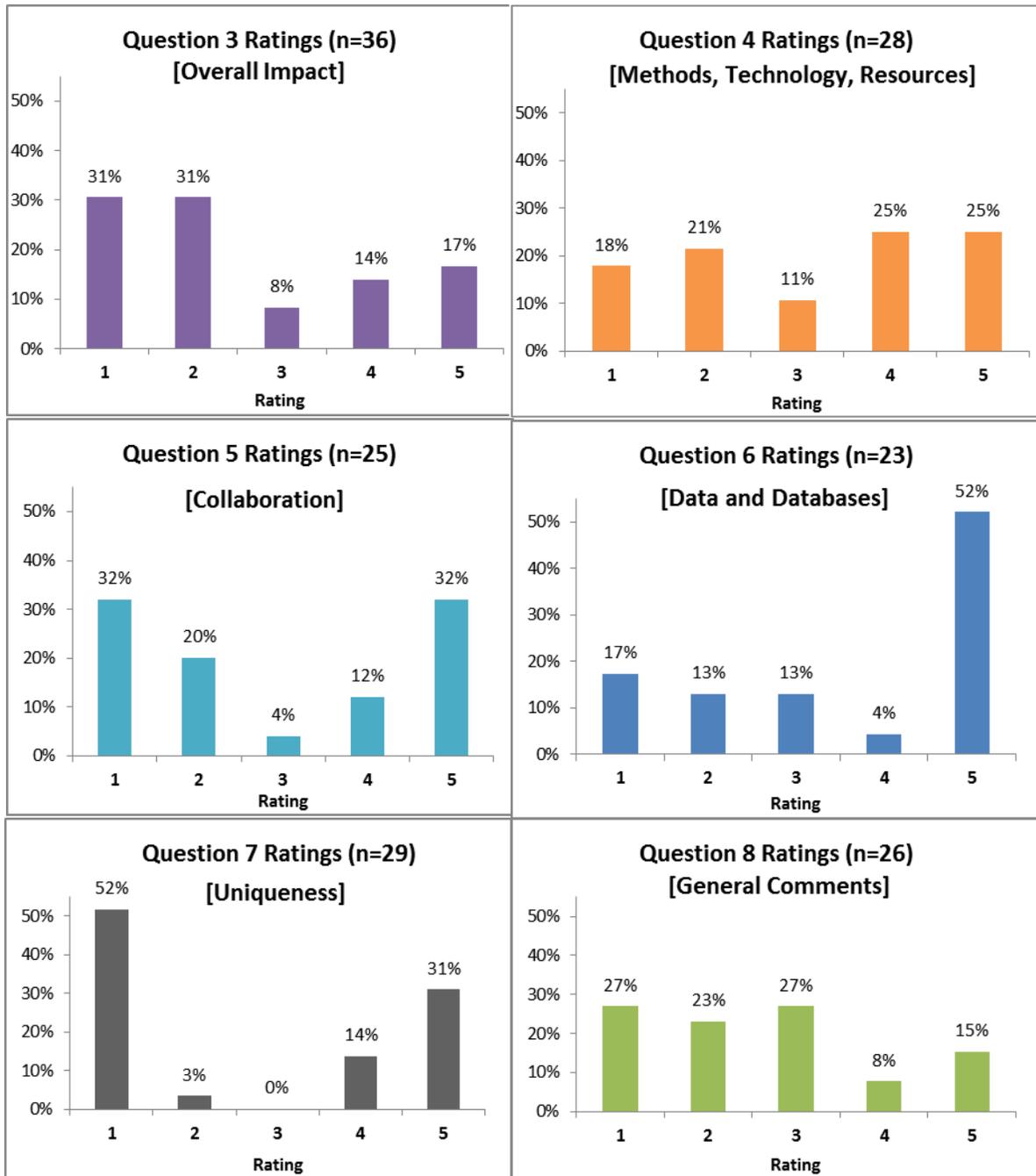
### Findings by Survey Question

Data was analyzed by survey question in order to provide the most detail in response to the overall categories of interest. Responses from the six questions on the general survey were analyzed independently of the specific survey and are presented first; responses from the 12 questions on the specific surveys are presented second.

#### The General Survey

As a group of individuals, respondents to the general survey were not in favor of Glue Grants. As individual respondents, 63% were rated a 1 or 2, 12% were rated a 3, and 24% were rated a 4 or 5. While the majority of the overall sentiment was negative, respondents found some value in particular outcomes of the Glue Grant.

The graphs shown below, which illustrate ratings per survey question, reveal that half of the respondents found the methods, technology, and resources produced through the Glue Grants to be unique, valuable and possible only through the Glue Grant mechanism.



In response to the question about the data and databases, more than half agreed that broad and valuable resources of long lasting value to the community had been developed. A bitter tone was present in some of the negative responses, for example in response to question 5, several respondents commented that collaborations created through the Glue Grants were artificial and unproductive. The group was divided in

their opinions about whether or not the work produced as a result of the Glue Grants was unique. Five individuals recommended formal evaluation.

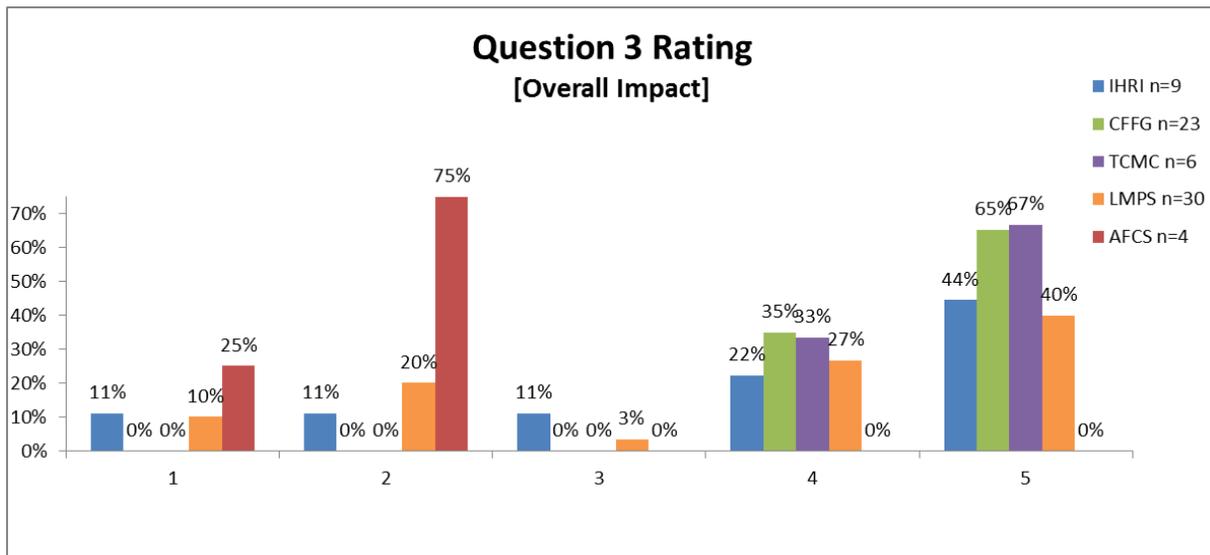
As a whole, there was strong consensus among respondents to the general survey that current funding for Glue Grants should be allocated through the R01 grant mechanism, and not allocated for continued Glue Grant support.

### The Specific Surveys

For ease of presentation, ratings from each survey question from all of the specific Glue Grant surveys are presented in one graph. The trends and subtle differences in strengths and weaknesses were most apparent when responses were placed in this context, but interpretation requires a note of caution. These graphs are descriptive tools that shed light on trends for each Glue Grant, but they do not assume a direct comparison of the Glue Grant programs to one another. The surveys were not designed for comparison, the number of survey respondents to each of the survey types is different, and, while it is fair to compare the perceived strength of responses between each Glue Grant program (i.e., the ratings), the ratings themselves are associated with more than code (for full details on the codes, their associated rating and frequencies, see [Appendix B](#)). Taking those three factors into consideration, presenting the data this way was considered the most efficient and concise manner for illustrating our findings.

### Survey Question 3

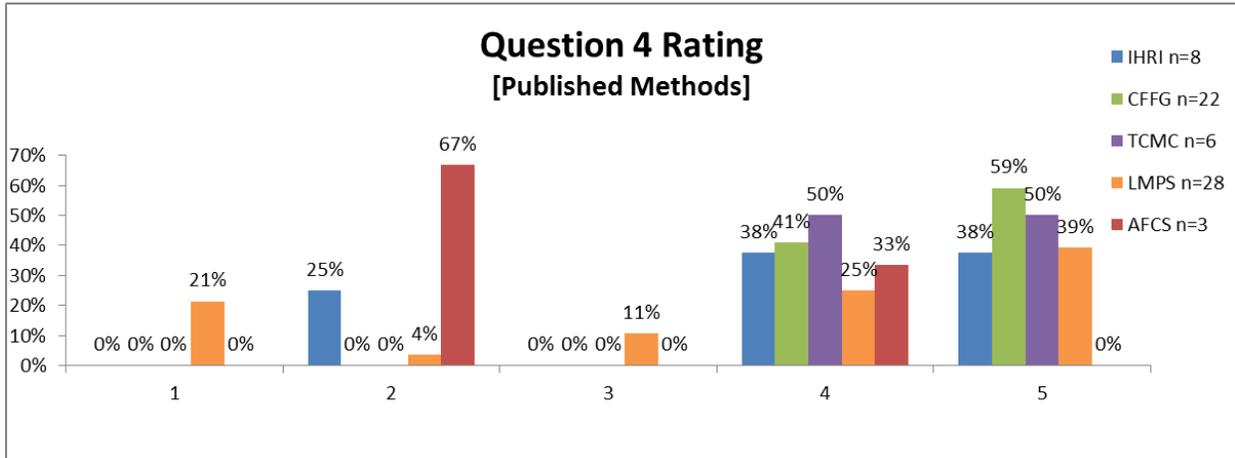
Respondents were prompted to state their views about whether the results published by the Glue Grant awardees have had major, some, or minimal impact on the understanding of the field of science.



Respondents to the TCMC survey displayed the highest percentage of strongly positive remarks; nothing was neutral or negative. TCMC respondents described high impact, benchmark publications that have influenced and will continue to influence the field. Also without negative or neutral comments, the sentiment was strongly positive for the CFFG. Similar to the TCMC, CFFG respondents perceived publications as innovative with high quality and impact. IHRI and LMPS respondents provided mostly positive remarks with less strong tone, but also had some negative comments. In both cases, respondents were dissatisfied with the outcomes of the investment, stating most frequently that there has not been significant impact or advancement of the field. Only negative responses to the AFCS survey were received; the sentiment was that returns were not worth the investment.

### Survey Question 4

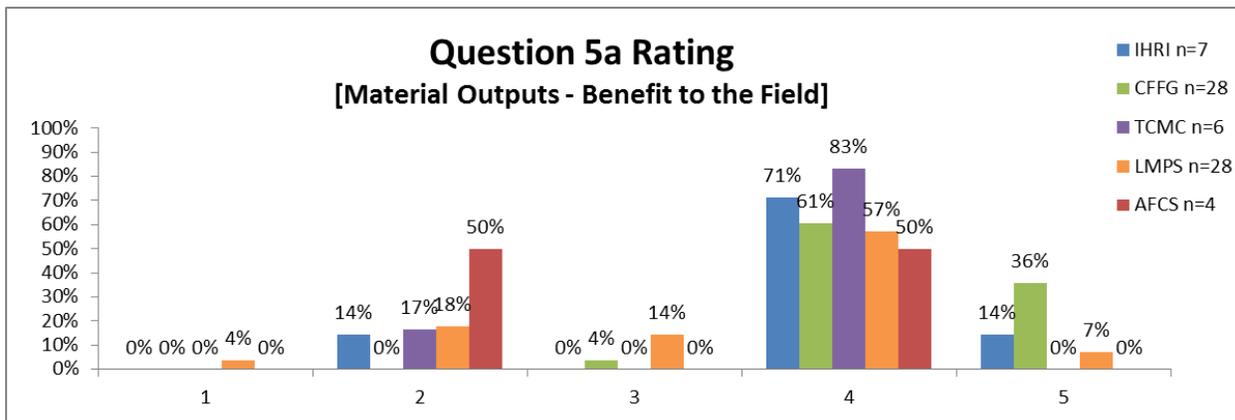
Question 4 asked respondents to evaluate whether the methods developed and published by the Glue Grant awardees have had a major impact, some impact, or minimal impact on the field. For this question, CFFG respondents were among those with the highest percentage of positive ratings, with no neutral or negative ratings. Similarly, TCMC survey respondents had highly positive sentiments, with only 11% neutral ratings.



The majority of highly positive responses centered on the novelty of methods and technologies produced as a result of the Glue Grant, as well as the quality and impact of the published methods. Though LMPS respondents at this end of the spectrum were no exception, there were a notable number of respondents who had extremely negative comments. Alone in this category, they criticized the published methods for their lack of impact on the field, claimed that they would have occurred without the Glue Grant, and denounced the Glue Grant as a waste of resources. Other moderately negative to neutral responses (few in numbers, though representing a high percentage of AFCS responses) recognized that methods had been developed, but believed they were of little impact on the field, due in part to limited distribution and publication. Similar disappointment was echoed by 25% of IHRI respondents who stated that published methods did not meet expectations.

### Survey Question 5a

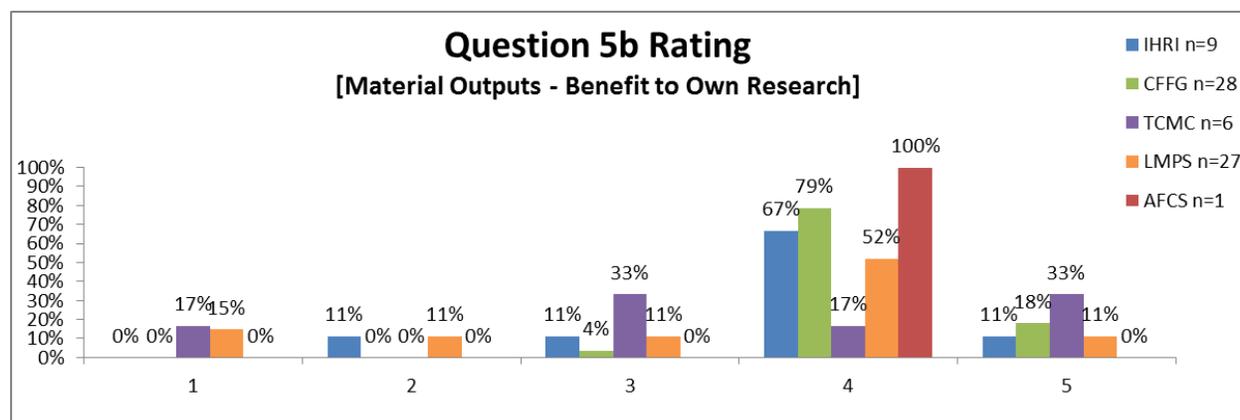
Question 5a focused on whether the material outputs generated by the Glue Grant awardees had substantially, somewhat or minimally benefited the field as a whole.



Most of the respondents across all surveys – namely TCMC (83%), CFFG (57%), and LMPS (54%) – had positive comments on the high quality of the material outputs and their strong contributions to the advancement of the field. Of these survey groups, the CFFG comments were the most positive, with an additional 36% of responses falling in the strongly positive category, praising the material outputs as invaluable and innovative, and perceiving that the many accomplishments would not have been possible without the Glue Grant. A secondary peak of responses gathered around the neutral/negative end of the spectrum. The most common sentiment among this group, a majority of IHRI and AFCS responses, was of an insufficient return on investment. Though some materials had been produced, the impact was unclear or minimal, with limited distribution of outcomes. Responses from LMPS were the only group that spanned the spectrum of ratings.

### Survey Question 5b

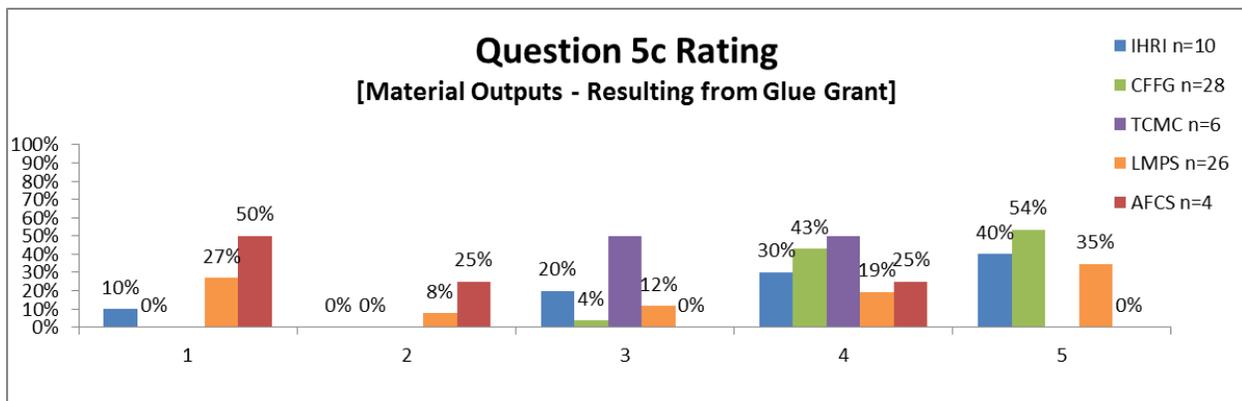
Respondents were asked to state their views on whether Material Outputs had critically influenced, expedited, or been of no specific use to them in their own research.



All four AFCS respondents and 79% of CFFG respondents joined LMPS and IHRI majorities to share their sentiment that the contributions of the Glue Grant had advanced their own work or understanding. For the most enthusiastic, including 33% of TCMC respondents who received a rating of 5, the Glue Grant led to groundbreaking discoveries and provided them invaluable resources for their research, none of which would have been possible otherwise. TCMC respondents, however, were not all in agreement: a good portion of their comments also fell into the neutral (33%) or strongly negative (17%) ends of the spectrum. These types of comments generally came from respondents who were personally unaffected by the material outputs of the Glue Grant, and the most constant criticism by those who did not report personal benefit: no significant impact, progress, or advancement in the field.

### Survey Question 5c

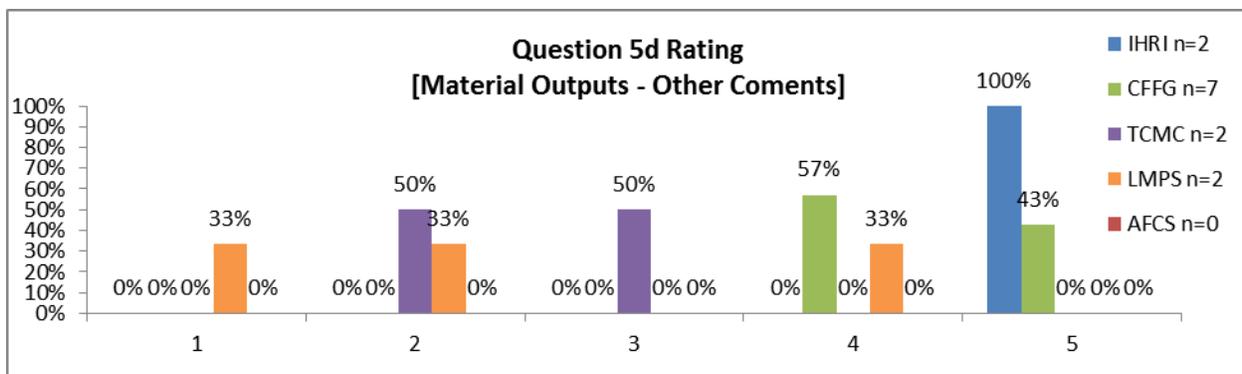
Respondents were asked to state their opinion as to whether the materials [would] have become available to the community and to them if the Glue Grant had not existed, and from which sources (Existing Commercial, New Commercial, Other Academic, or Other Source). A clear majority of the respondents (CFFG: 97%; IHRI: 70%; LMPS: 54%) perceived that the invaluable materials would not (a rating of 5) or most likely would not (a rating of 4) have occurred without the Glue Grant.



Neutral responses involved uncertainty about the likelihood of material outputs having been developed or available without the Glue Grant, or offered no judgment but stated they were not personally affected by the materials. A typical trend for LMPS respondents (35%) was echoed by the majority of AFCS respondents (75%) and a smattering of IHRI respondents: the outcomes of the Glue Grant would have or could have occurred without Glue Grant funding.

#### Survey Question 5d

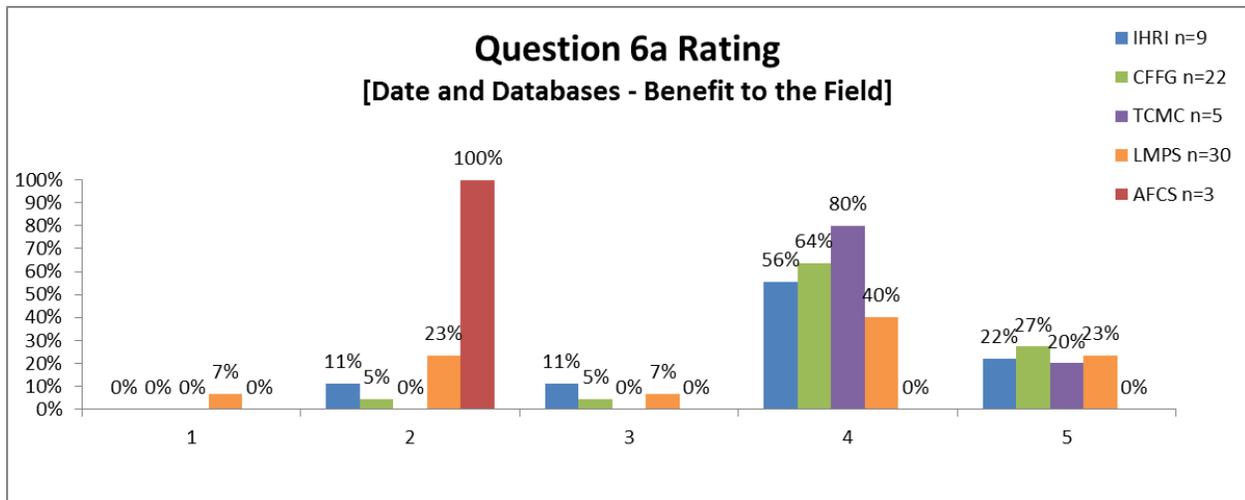
Question 5d was an open-ended question that asked respondents for any other comments on material outputs. Out of the reduced pool of respondents, CFFG and IHRI survey responses were all positive (ratings 4 and 5) with no neutral/negative comments. Respondents expressed plentiful and general enthusiasm for, and approval of, those Glue Grant programs.



At the neutral to negative end, a TCMC respondent expressed ambiguity by praising the materials but calling for increased manufacturing and commercialization. This sentiment was echoed more strongly in the negative comments, where both TCMC and LMPS respondents expressed concern over the limited distribution of resources. Once again, a smattering of LMPS responses could also be found at the lowest end of the spectrum (rating of 1) with comments indicating an all-out disdain for the Glue Grant, dismissing it as inefficient or inappropriate.

#### Survey Question 6a

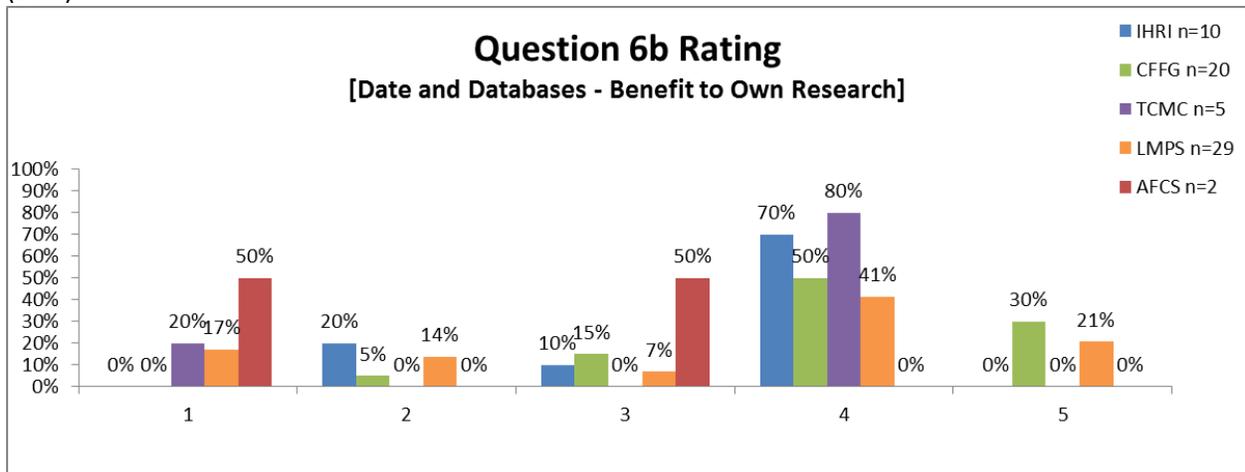
In Questions 6a, respondents were asked to state their opinion on whether the data, information and informational resources generated by the Glue Grant had a minimal, somewhat or substantial benefit to the field as a whole. Both CFFG (23%) and LMPS (23%) respondents had strongly positive responses about the invaluable resources produced by the Glue Grant mechanisms.



Those responding to the CFFG and TCMC surveys were quite positive about the resources produced by the Glue Grant, noting personal use of these and acknowledging that the Glue Grants contributed to the advancement of the field. The majority of those responding to the LMPS and IHRI surveys had a much more varied opinions, ranging from the sentiment that no significant progress had been made (13% for LMPS and 11% for IHRI), to acknowledging the invaluable resources produced by the Glue Grant (23% of LMPS respondents) and that novel methods produced were gaining traction in the field (11% IHRI). Finally, the only AFCS respondent to answer felt that the Alliance had no significant impact on the advancement of the field and that the outcomes did not meet their expectations.

#### Survey Question 6b

Question 6b asked respondents to indicate whether they had used the data, information and informational resources produced by the Glue Grant awardees extensively, somewhat, or not at all in their own research. Those responding to the AFCS survey (n=2) expressed modest interest in the resources produced (50%), or indicated that the resources produced would not significantly impact their own work (50%).

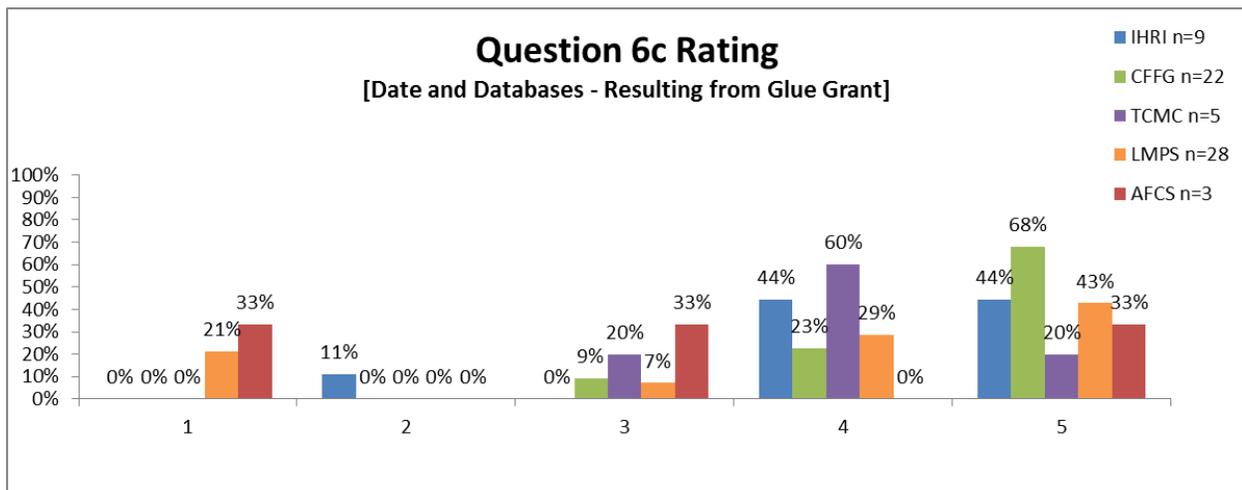


The responses from the other surveys, however, were more positive, with the majority of the respondents receiving a rating of 4, and indicating that they had personally used resources produced by the Glue Grant awardees, or that the resources were of high quality (70% of IHRI, 60% of TCMC, 50% of CFFG and 41% of LMPS respondents). The remaining responses were fairly even distributed. Some indicated that they had

made no use of the resources produced by the Glue Grant awardees (20% for TCMC and 17% for LMPS), receiving a rating of 1, while others felt that the resources produced had been invaluable in their own research (30% for CFFG and 21% for LMPS), receiving a rating of 5.

### Survey Question 6c

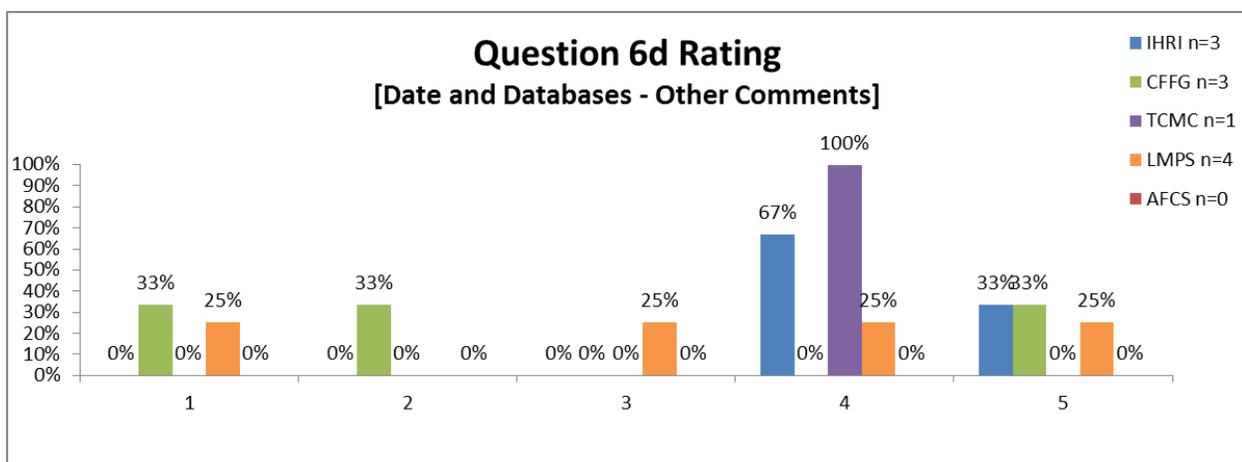
Question 6c asked respondents to give their opinion about whether or not the data, information, and informational resources would have been made available to the community if the Glue Grant did not exist.



The majority of CFFG (68%), IHRI (44%) and LMPS (43%) respondents agreed that the accomplishments of the awardees would not have been possible without the support of the Glue Grant mechanism; 60% of the TCMC and 44% of the IHRI survey respondents indicated that the accomplishments would have been unlikely without the Glue Grant mechanism. The AFCS survey respondents (n=3) were evenly split between thinking the accomplishments were possible only because of the Glue Grant (33%, rating 5), feeling unsure that the accomplishments would have happened without the Glue Grant (33%, rating 3), and indicating that the accomplishments would have been possible without the Glue Grant (33%, rating 1).

### Survey Question 6d

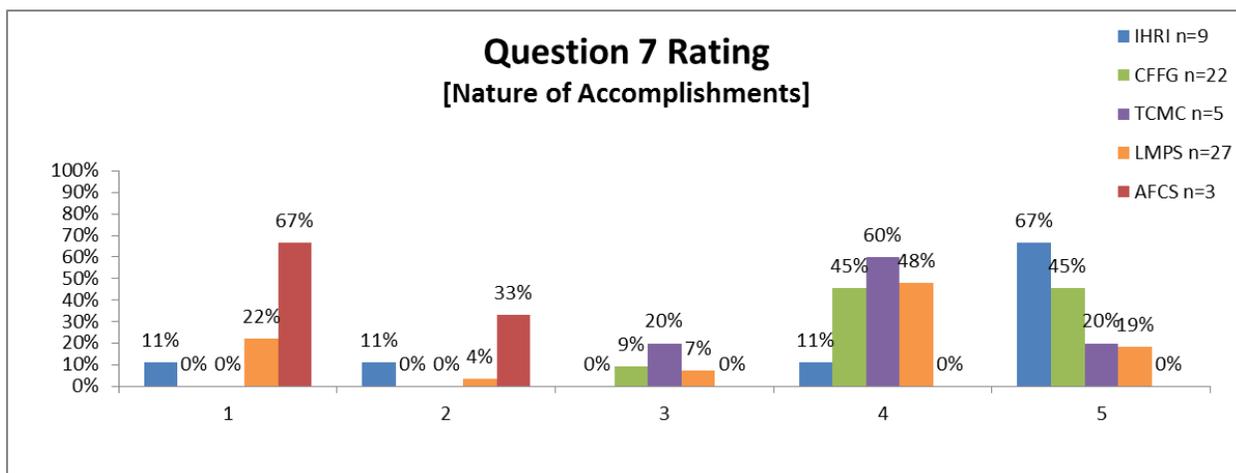
Question 6d prompted respondents to include any additional comments regarding the data and databases produced by Glue Grant awardees.



Of the small number of responses, 100% of those from the TCMC survey, 100% from the IHRI survey, 50% from the LMPS survey, and 33% of CFFG respondents indicated that the resources produced were of high quality and indicated that the databases were of long-lasting value to the community and would have been made available only through the Glue Grant mechanism. However, both CFFG (33%) and LMPS (25) also received comments indicating that the database created was insufficient.

### Survey Question 7

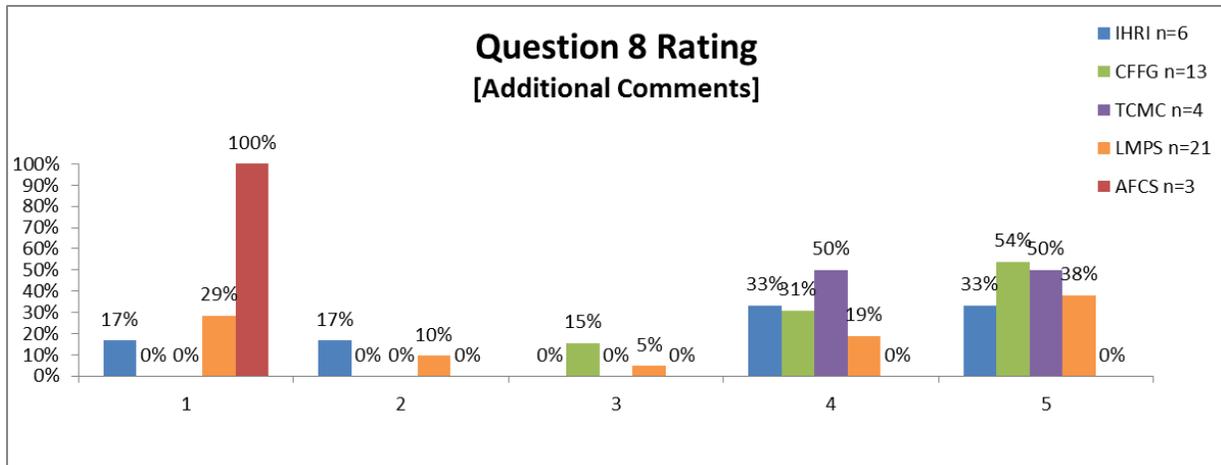
Respondents were prompted to state their opinion on whether the work undertaken by the Glue Grant awardees has been qualitatively different from that undertaken by the rest of the field, similar to the work executed by the rest of the field except for the scale of activity, or similar to the work executed by the rest of the field.



Survey responses from TCMC, CFFG, IHRI and LMPS had overwhelmingly positive tones with a rating of 4 (positive) or 5 (highly positive). Respondents in these categories perceived the groundbreaking work produced by the Glue Grant as qualitatively different from the rest of the field. Both CFFG and IHRI respondents also pointed to impressive leadership/organization as contributors to the Glue Grant’s success. A small percentage of LMPS and CFFG responses expressed an ambiguity about the return on investment. Only negative responses were received to the AFCS survey, characterized by the perception that no significant impact was made in the field as a result of the Glue Grant and that regular funding mechanisms could/would have produced more results. 22% of IHRI and 26% of LMPS responses echoed this sentiment and some added that they felt the Glue Grant was inefficient and/or inappropriate.

### Survey Question 8

Question 8 was an opportunity for respondents to make any additional comments about the Glue Grants. About one third to a half of the respondents offered additional feedback. Those who responded were generally pleased with the program; the highest percentage of positive responses being from CFFG and TCMC respondents (54% and 50% respectively). Those two groups, along with 38% of LMPS and 33% of IHRI respondents, generally expressed strong support for continued funding, and praise for the invaluable collaborations that had occurred as a result.



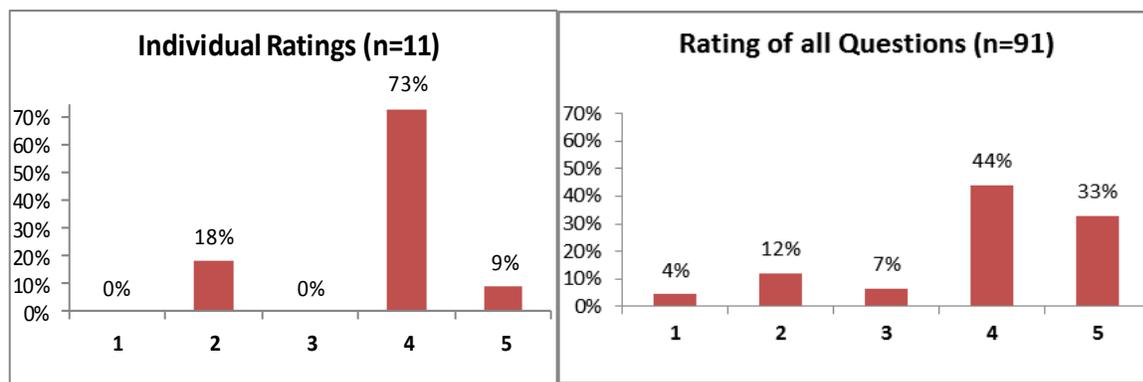
At the negative end of the spectrum, one AFCS respondent stated that outcomes were not worth the investment, while 17% of LMPS and 17% of IHRI respondents perceived the Glue Grant mechanisms as inefficient or inappropriate, suggesting funds be allocated to the R01 mechanism. A handful of CFFG and LMPS respondents were not as convinced that the program had been successful and called for ongoing assessment if funding was to continue.

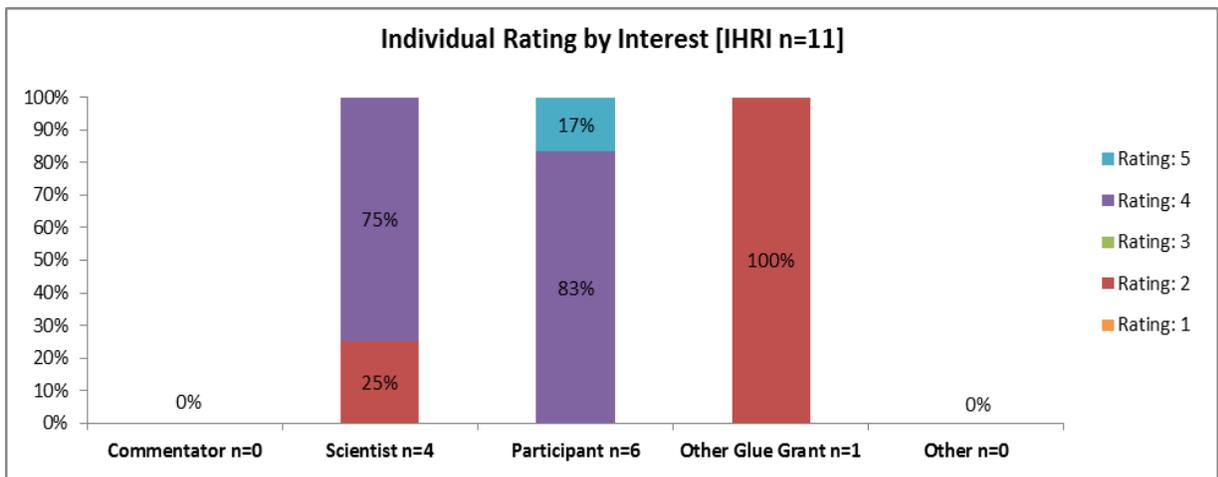
### Findings by Individual Glue Grant Program

To provide a comprehensive summary of findings for each Glue Grant program, 4 elements are included as part of the text: (i) individual ratings for each respondent, (ii) ratings for overall responses, (iii) ratings by self-reported interest, and (iv) a list of codes (with associated rating and frequency of code application to each question).

### Inflammation and the Host Response to Injury (IHRI)

A relatively small number of surveys (n=11) were received in response to the IHRI glue grant. The general sentiment was positive.

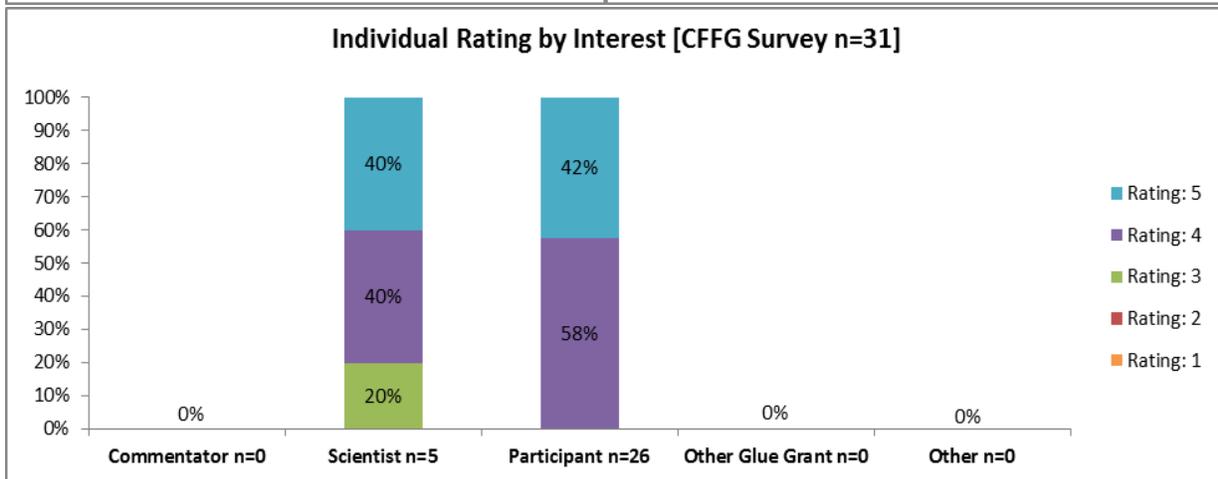
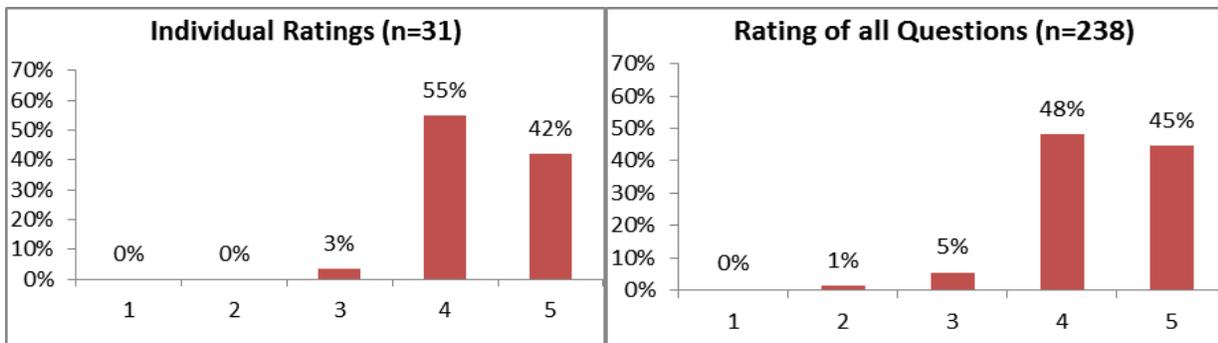




IHRI respondents perceived the development of a unique genomic dataset as a groundbreaking discovery with lasting results for the burn and trauma community. In large part, they felt that these advances in science were only possible as a direct result of the Glue Grant, which facilitated collaborations and access to informational resources. Some were disappointed, however, in the low number of publications and felt that the Glue Grant had been a learning process, slow to produce results. A small minority was highly disappointed in the Glue Grant, finding the outcomes insufficient considering the investment, and critical of the limited distribution of findings to the community. Still, these were minority sentiments, and the overall individual rating of 4 speaks to a shared hope for continuing this Glue Grant in the future.

### Consortium for Functional Glycomics (CFFG)

The CFFG received the second highest number of specific survey respondents. Of the 31 individuals who offered feedback, 30 reported an academic affiliation and one a government affiliation.

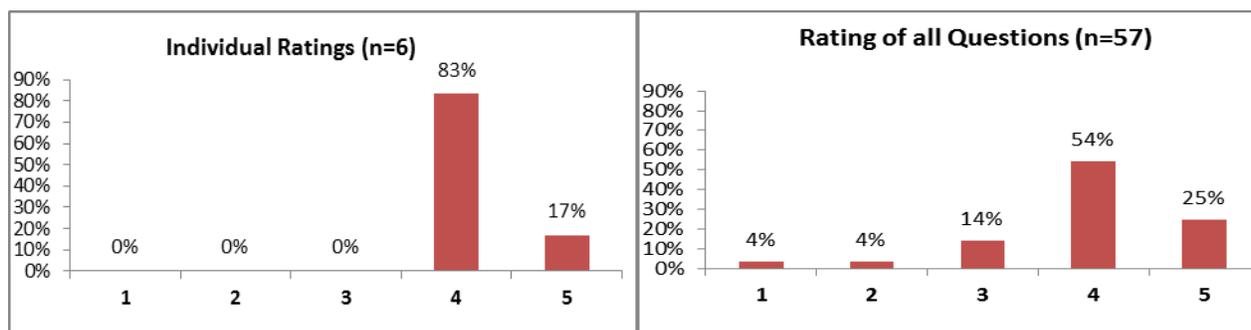


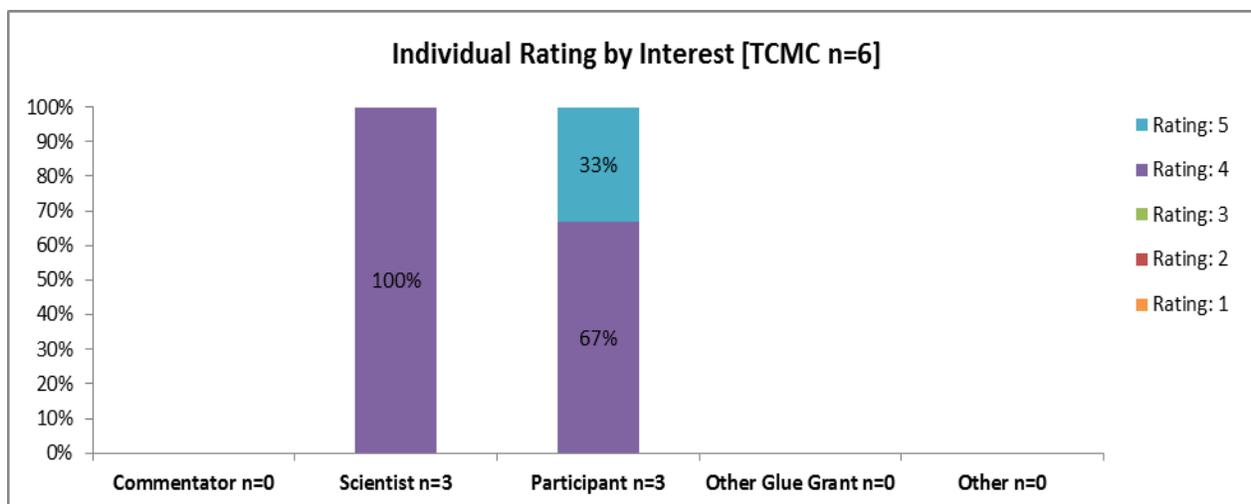
An overwhelmingly positive response to the CFFG Glue Grant was heralded by most, with one respondent referring to the CFFG as the “model glue grant that sets the bar for others.” These positive responses highlighted the multidisciplinary, collaborative approaches made possible by the Glue Grant, the enormous and positive impact to the quality of glycobiology studies that resulted, and dramatic advances for the field. The resources produced also received high praise – with respondents pointing out the numerous publications and the frequently used Consortium for Functional Glycomics (CFG) website. Many reported using material outputs from the Glue Grant in their own research, leading them to better quality research, higher impact publications, and increased innovation. The only comment with a muted tone was from a recipient with an overall rating of 3, who acknowledged the resources developed, considered the current economic climate, and then encouraged an assessment that would provide evidence for the value of Glue Grants. Confident about the impact and importance of this undertaking, CFFG respondents were largely in favor of continuing Glue Grant funding.

### The Cell Migration Consortium (TCMC)

Although TCMC had a relatively small pool of respondents (n=6), overall, individuals were rated positively and their responses were primarily favorable. The general consensus was that resources produced by the TCMC Glue Grant awardees were of high quality and greatly contributed to advances in the cell migration field. Participants and scientists alike believed it was unlikely that the accomplishments would have been possible without the Glue Grant mechanism. In describing the breakthroughs for the field, they pointed to the numerous high impact publications, the new methods developed such as the Hahn photo-activatable proteins, the Schwartz tension-sensor, and Danuser computational multiplexing, and other technological advances for imaging instrumentation which made it possible to study fast processes.

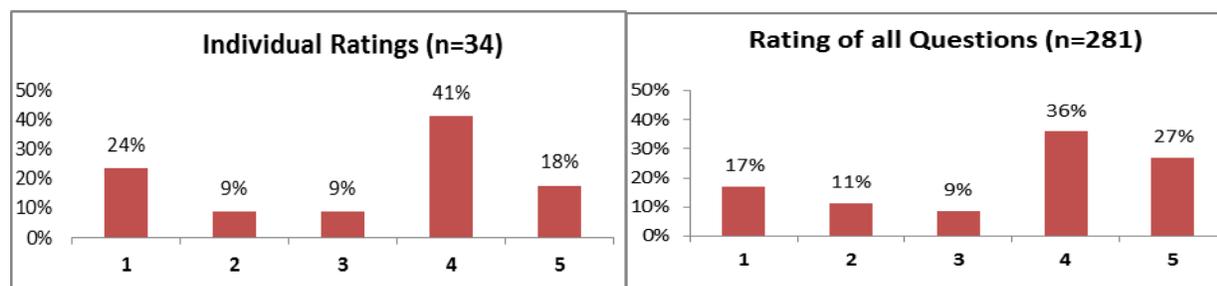
Half of the respondents were scientists who believed resources had been well distributed to the community, and reported personal use of resources produced by TCMC. Instrumental in their work was the Cell Migration Gateway database, as well as the Addgene program for construct dissemination. Participants made up the other half of the group and all believed the unique nature of their work could not have been achieved without Glue Grant support, specifically citing the multi-disciplinary approach and collaborations as direct contributors to the success. Although the respondent pool was small, the overall response to this survey was positive from both participants and scientists who had made use of the resources developed by the consortium.

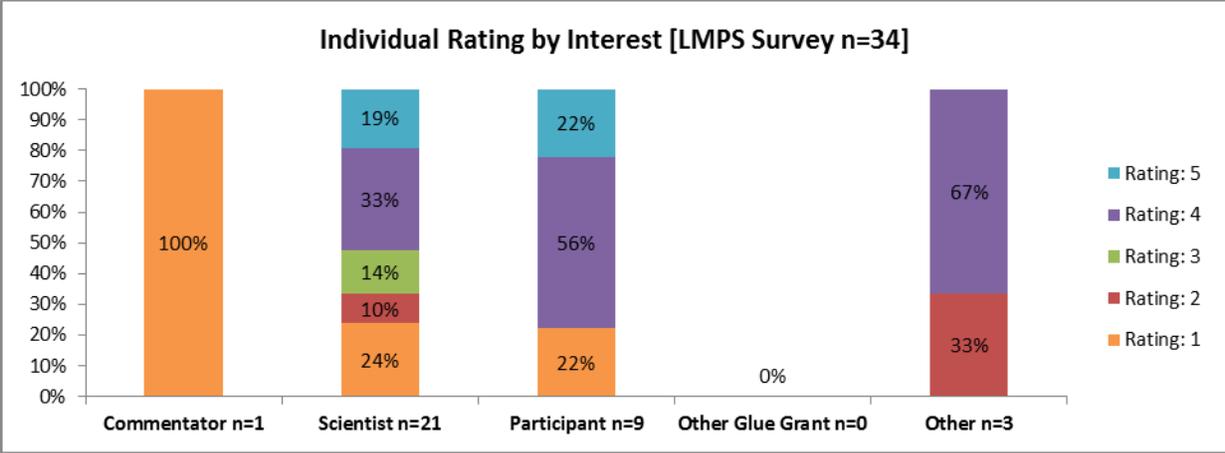




### Lipid Metabolites and Pathways Strategy (LMPS)

Responses to the LMPS survey were the most diverse and also the highest in number of the five specific surveys (n= 34). Glue Grant descriptions ranged from “absolutely worthless” and a “boondoggle” to an “extremely valuable” undertaking with “outstanding impact that is providing novel insights on the role of lipids and their metabolites in inflammation, diabetes, cardiovascular disease and cancer.” Though almost all agreed that there were no significant material outputs, some argued that this was due to the general infancy of the study of Lipidomics, assuring that the legacy from the Glue Grant would grow. Supporters of this Glue Grant attributed success to the much-needed production of mass spectrometry methods and standards for analyzing different lipid classes, and for standardized nomenclature for lipids. The utility of the lipids database was a contested issue. Most respondents believed the database was an invaluable resource used worldwide, and that “Lipid Maps has provided a backbone for the field as a whole”, but a consistent and meaningful number of individuals disagreed and suggested the work could have been done without Glue Grant funding. Those rated 1 and 2 most frequently suggested the database did not significantly contribute to the advancement of the field, and could have been developed without the Glue Grant funding mechanism. Many criticized the cataloging of the lipids, with one respondent claiming: “We don't know what to do with the information as it is not hypothesis driven.”

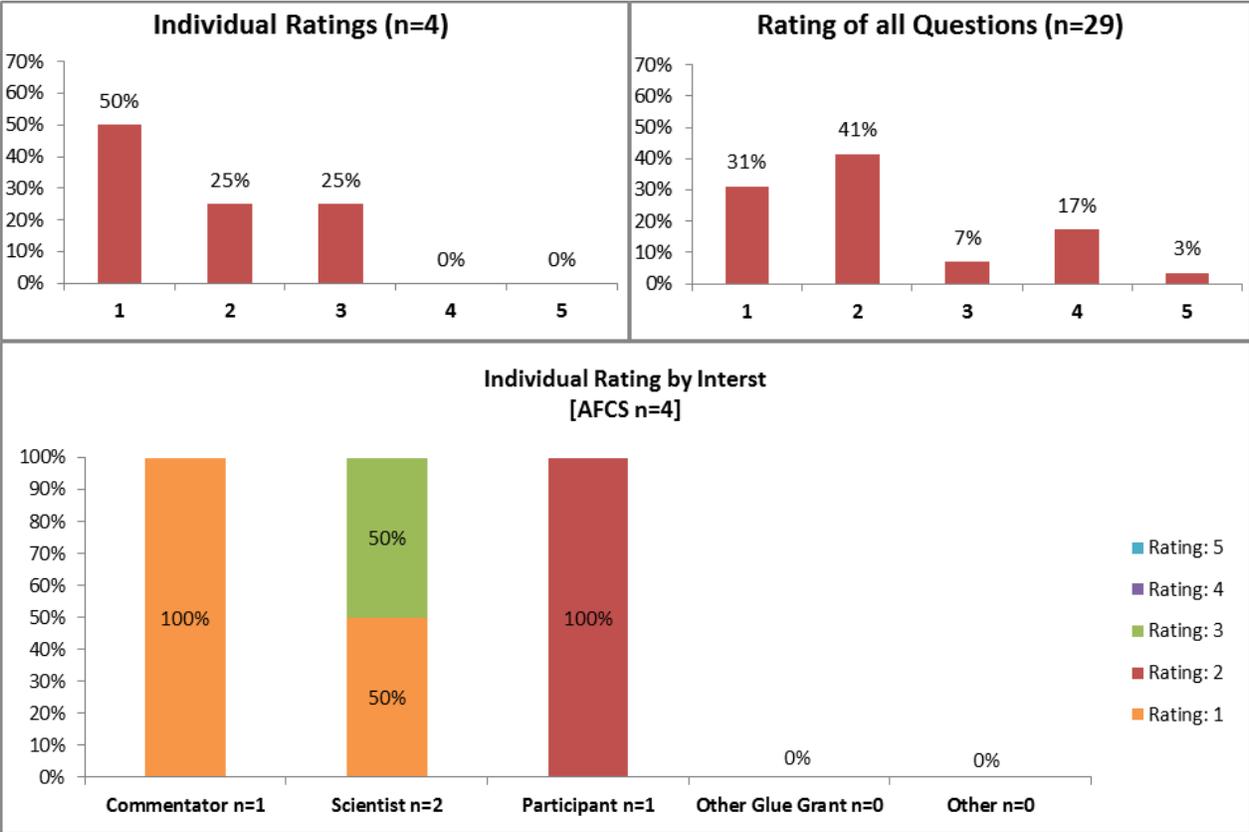




Negative sentiment included the belief that the whole endeavor was an insufficient return on investment and that the Glue Grant was of little to no value. Overall, while the feedback was mostly positive, the strongest sentiment was more frequently negative.

**Alliance for Cellular Signaling (AFCS)**

The Alliance for Cellular Signaling received the lowest number of survey responses, all four reported an academic affiliation and the general sentiment was negative.



AFCS respondents perceived the overall impact of the published results and methods as minimal, and felt funding was too limited to a small number of labs, all of which had a limited capacity for sharing the

resources and knowledge that they developed. Some positive sentiment was expressed in relation to the materials and databases produced, but as a whole, the AFCS program was deemed an inefficient use of resources. This group felt funding should be allocated back to the R01 mechanism.

## Value of the Glue Grants

The overarching issue that permeated the data was the perceived value of the Glue Grant Mechanism. A clear tension was present between those who perceived the Glue Grant funding mechanism as fundamental for supporting unique outcomes, and those who perceived the Glue Grants as a terribly inefficient method for supporting quality science. Strong biases emerged as the vast majority who trumpeted the successes of the Glue Grants were participants or scientists intimately invested or connected to the specific programs under review. Strong leadership, high quality collaborative relationships, and quality products topped the list of program strengths. While a few noted a unique level of global prominence, the majority shared strong opinions about the nature of the achievements as only attainable because of Glue Grants. The quality of work was described as invaluable, groundbreaking, and paradigm shifting.

*This glue grant has provided in itself a paradigm shift [It is an example] for how one consortium can make an immense impact on an entire field.*

~Participant (CFFG)

There were a handful of respondents who acknowledged a rocky start to the program, but believed the kinks had been or could be ironed out. The general sentiment from this small group was that it would be a shame to stop funding for these programs all together.

At the opposite end of the spectrum were those who were not impressed with the outcomes of the Glue Grant programs, and felt the same achievements would have been made through traditional funding mechanisms. As illustrated in the aggregate ratings section, most of those respondents who provided negative feedback did so through the General Questionnaire and were primarily general commentators or scientists. Participants most frequently responded with praise for the program; across all survey types, only six participants were rated with a negative score. Here is an example of the rare instance where a participant voiced disapproval.

*From my inside perspective, and under protection of anonymity, someone has to be honest and tell NIH that only boondoggle about 10-20% of the people supported by this grant actually believe in the value of it. No one is going to admit their reservations and turn away the funding, but this glue grant was plainly a boondoggle. Don't be fooled by the many papers. I have not seen a single paper emerge from this entire project that changes our understanding of anything. Of course, many of the papers are published in conspicuously prestigious journals because of their novelty. But once again, if someone had simply inserted random results into those papers, what would change? Nothing. Now that we got our second round of funding, I hope we can get on to more interesting projects.*

~Participant (LMPS)

Fueling the strong sentiment of disapproval were issues around the limited distribution of resources, access to and the quality of resources (materials, databases, collaborative relationships), and the overall

failure of the programs to meet their expectations for either discovery or the application of resources to address important biological questions.

Central to the debate over whether the Glue Grant added value over other grant mechanisms, were the voices that told a story about a complicated process with multiple outcomes, some valuable and some of unknown utility. Individuals in the middle questioned the overall value of the programs, or suggested a formal evaluation and assessment.

One last perspective emerged from a group of diverse respondents: five scientists, one commentator, and one participant all placed their opinions about the future of the Glue Grant mechanism in the context of the current fiscal environment. Reflecting on the program's inception and evolution, this group was generally satisfied with the outcomes, but considered the program a luxury.

*In the current budget crisis in which some institutes are funding less than 10% of RO1 grants, the majority of NIH resources should be given to RO1s. I see faculty in my department that publish papers in outstanding journals who are having very difficult times to have their grants funded. The RO1 mechanism was always the lifeline of biomedical research in the US. The drastic drop in funding of RO1s will surely have a long-term negative effect. Moreover, it also discourages students and postdocs from choosing a career in academic research.*

~Participant (GNQN)

This group suggested re-allocating Glue Grant funds through the tried and true R01 grant mechanism as means for maintaining a healthy and productive biomedical workforce that attracts new scientists to the field.

## SUMMARY AND CONCLUSIONS

Specific survey respondents were mostly participants and scientists in the field who predominantly voiced approval of the programs. Comparing specific surveys to one another, CFFG and TCMC received the most positive feedback, LMPS respondents were spread out across the positive to negative continuum, and IHRI and AFCS received the most persistently negative feedback. From the general survey, most commentators strongly disapproved of the Glue Grant programs while scientists in the field offered more diverse opinions, including a call for formal evaluation.

One of the major accomplishments perceived of as only possible through Glue Grant funding was the support for multidisciplinary collaborations, which allowed for the use of advanced, sophisticated technologies in research. The result, in some cases, was a paradigm shift. For example, scientists from the fields of engineering and physics collaborated with biologists to produce a mass index spectrometer. Glue Grants engaged top-level experts in the field, and several respondents frequently noted how these collaborations, or their personal use of resources, had benefited both their careers and the field as a whole. At the other end of the spectrum, however, were those who did not benefit from collaborations and felt shut-out of the process. With the latter group, the Glue Grants were perceived as a shared privilege, only accessible to an inner circle of PIs and host universities.

The tangible accomplishments of the Glue Grants included high impact publications, well-maintained and extensive databases and innovative methods and tools. Most participants believed the accomplishments

were either moving the fields forward, or would eventually have a significant impact. Those who disagreed criticized the lack of scientific solutions produced. They considered the results of the research conducted as overly academic and too descriptive. The resulting resources were felt to exist in a vacuum, and respondents were discouraged that the results were not applied to clinical and practical problems. While inappropriate goal setting was pointed to as part of the problem, the absence of ongoing peer review or assessment also was perceived as contributors to an inefficient return on investment.

## Conclusions

The overarching issue that permeated the data was the perceived value of the Glue Grant Mechanism. A clear tension was present between those who perceived the Glue Grant funding mechanism as fundamental for supporting unique outcomes, and those who perceived the Glue Grants as a terribly inefficient method for supporting quality science. General commentators primarily expressed disapproval with limited resources making it out to the community. Scientists were diverse in their opinions, and participants were most frequently positive, hailing the Glue Grants as a success, though about half of these, while positive, took a cautiously positive tone, suggesting satisfaction with the program, but no statement about future funding.

Regardless of the level of approval for the perceived benefits and successes of the Glue Grants, or lack thereof, a general sentiment emerged that the current competitive nature of funding for research dollars was not conducive for Glue Grant funding to continue. In some cases, mostly with the general commentators, a sense of injustice emerged in connection with the feeling that only insiders to the Glue Grant programs were benefitting. That was perceived as unfair and also bad for science and workforce development. More commonly though, the message was that although some of the findings were interesting and valuable, reallocating funds to the R01 and P grant mechanisms was a more equitable means for dispensing funds in the context of fiscal constraint, and would support a healthier method for conducting science.

To be responsive to many of the comments, NIGMS may consider identifying the valuable resources created under the Glue Grants, and provide incentives for scientists in the field or Glue Grant participants to continue working on maintaining, improving, or conducting new research with these unique resources. The incentive could be offered as a different grant mechanism that leverages the strengths of the Glue Grant mechanism, but requires the type of bottom-up motivation that inspires researchers to strike professional collaborations in the first place.

## APPENDICES

### Appendix A. NIGMS Glue Grants Interim Outcomes Assessment: Community Input Forms

#### General Questions Applicable to the Glue Grants Program as a Whole

1. **Affiliation:** Select your affiliation
  - a. Academia
  - b. Industry
  - c. Government
  - d. Other, if Other specify
2. **Interests:** Select the phrase that best characterizes your interests in the glue grant Program.
  - a. General Commentator with no specific interests in **any** glue grant project
  - b. Participant in one or more of the glue grant projects
  - c. Scientist in one or more of the glue grant projects
  - d. Other
3. **Overall Impact:** Give your views on the scope and impact of the scientific knowledge produced by the NIGMS glue grant program as a whole.
4. **Methods, Technology, Resources:** Give your views on whether the NIGMS glue grant program as a whole supported methods, technology or resource development that would not otherwise have occurred.
5. **Collaboration:** Give your views on whether the NIGMS glue grant program as a whole supported collaborative and multidisciplinary research that could not otherwise have been conducted.
6. **Data and Databases:** Give your views on whether the NIGMS glue grant program as a whole created informational resources (data, databases, Web sites) that are of broad and lasting value to the scientific community.
7. **Uniqueness:** Give your views on whether the nature of the research conducted by the glue grants is/was fundamentally different from what could otherwise have been undertaken using other NIH grant funding mechanisms.
8. **General Comments:** Elaborate on the areas mentioned above or any other areas that the glue grant assessors should consider about the program as a whole. Please submit project-specific general comments on the individual glue grant input forms.

#### Input on Individual Specific Glue Grant Projects

1. **Affiliation:** Select your affiliation
  - a. Academia
  - b. Industry

- c. Government
  - d. Other, if Other specify
2. **Interests:** Select the phrase that best characterizes your interests in the glue grant Program.
- a. General Commentator with no specific interests in **any** glue grant project
  - b. Participant in **this** glue grant project
  - c. Scientist in the field of **this** glue grant, but not a participant in this glue grant project
  - d. Participant or scientist with specific interests in **another** glue grant project
  - e. Other
3. **Published Results:** Give your views on the impact of the results published by the glue grant awardees on the understanding of the field of science.
4. **Published Methods:** Give your views on the impact of the methods developed and published by the glue grant awardees.
5. **Material Outputs:**
- a. Give your views on the degree to which material outputs (e.g., cell lines, vectors, clones, arrays or other reagents) generated by the glue grant awardees benefited the field as a whole.
  - b. Indicate the extent to which the material outputs generated by the glue grant awardees have been of use to you in your own research.
  - c. Give your views on the likelihood that these materials would have become available to the community and to you, and from what sources, if the glue grant did not exist.
  - d. Other Comments on Material Outputs
6. **Data and Databases:**
- a. Give your views on the degree to which the data, information and informational resources generated by the glue grant awardees have benefited the field as a whole.
  - b. Indicate the extent to which you have used the data, information and informational resources generated by the glue grant awardees in your own research.
  - c. Give your views on whether these data, information and informational resources would have become available to the community and to you if the glue grant did not exist.
  - d. Other Comments on Data and Databases
7. **Nature of Accomplishments:** Give your views on whether the work undertaken by the glue grant awardees has been qualitatively different from that undertaken by the rest of the field.
8. **Additional Comments on This Glue Grant.**

## Appendix B. Code Frequency Tables per Survey Question

### General Survey, Question 3 [Overall Impact]

	Code Name	Total Respondents
Rating 1	01-R1 - Allocate funds back to RO1	7
	02-R1 - Mechanism inefficient and/or inappropriate	4
Rating 2	03-R2 - No significant impact/progress or advancement of the field	3
	04-R2 - Regular funding mechanisms could/would have produced same/more	2
	05-R2 - Insufficient return on investment	4
	06-R2 - Did not extend far enough into the community	1
	07-R2 - Did not meet expectations	1
Rating 3	08-R3 - Personally unaffected	1
	09-R3 - Quality depends on program	2
Rating 4	10-R4 - Personal use of GG resources	1
	12-R4 - High quality/useful resources produced	4
Rating 5	13-R5 - Invaluable resources	1
	14-R5 - Accomplishments only possible because of GG mechanism	4
	15-R5 - Groundbreaking discoveries; shifting paradigms	1
Rating 0	00-R0 - Non Responsive	2
	99-R0 - Missing	3
	<b>Total</b>	<b>41</b>

### General Survey, Question 4 [Methods, Technology, Resources]

	Code Name	Total Respondents
Rating 1	01-R1 - Regular funding mechanisms could/would have produced same/more	2
	02-R1 - None whatsoever	3
Rating 2	03-R2 - Insufficient return on investment	5
	05-R2 - Did not extend far enough into the community	1
Rating 3	06-R3 - Value Unclear/Additional Assessment Necessary	3
Rating 4	07-R4 - Personal use of GG resources	2
	08-R4 - Unique/prominent strength/success of the program	1
	09-R4 - Valuable methods and technologies to the community	2
	10-R4 - Accomplishments greatly facilitated by the GGs	2
Rating 5	11-R5 - Accomplishments only possible because of GG mechanism	7
Rating 0	00-R0 - Non Responsive	2
	99-R0 - Missing	11
	<b>Total</b>	<b>41</b>

### General Survey, Question 5 [Collaboration]

	Code Name	Total Respondents
Rating 1	01-R1 - Artificial or unproductive collaborations	6
	02-R1 - Mechanism Inefficient and/or Inappropriate	2
Rating 2	03-R2 - Collaborations too limited	3
	04-R2 - Could have been done without the GG	2
Rating 3	06-R3 - Value Unclear/Additional Assessment Necessary	1
Rating 4	09-R4 - Impressive leadership/organization	1
	14-R4 - Broad/multidisciplinary research	2
Rating 5	10-R5 - Invaluable collaborations, only possible because GG	8
Rating 0	00-R0 - Non Responsive	1
	99-R0 - Missing	15
	<b>Total</b>	<b>41</b>

### General Survey, Question 6 [Data and Databases]

	Code Name	Total Respondents
Rating 1	01-R1 - None whatsoever	4
Rating 2	02-R2 - Insufficient return on investment	1
	03-R2 - Could have been done without the GG	1
	04-R2 - Access to data (e.g., the interface) obscured utility	1
Rating 3	06-R3 - Value Unclear/Additional Assessment Necessary	3
Rating 4	07-R4 - Data is useful	1
Rating 5	08-R5 - Longlasting value to community	1
	09-R5 - Broad and valuable resources for the scientific community	3
	10-R5 - Exceptional tools have been developed and being used	7
	11-R5 - Unique/prominent strength/success of the program	1
Rating 0	00-R0 - Non Responsive	2
	99-R0 - Missing	16
	<b>Total</b>	<b>41</b>

### General Survey, Question 7 [Uniqueness]

	Code Name	Total Respondents
Rating 1	01-R1 - Regular funding mechanisms could/would have produced same/more	3
	02-R1 - Nothing uniquely positive/not fundamentally different	12
Rating 2	03-R2 - No significant impact/progress or advancement of the field	1

Rating 4	04-R4 - Questions and research are more complex/unique	4
Rating 5	05-R5 - Questions and research are more complex/unique	4
	06-R5 - Accomplishments only possible because of GG mechanism	4
	07-R5 - Accelerated discovery	1
Rating 0	00-R0 - Non Responsive	1
	99-R0 - Missing	11
<b>Total</b>		<b>41</b>

Note that no respondents provided a neutral response (Rating 3).

#### General Survey, Question 8 [General Comments]

	Code Name	Total Respondents
Rating 1	01-R1 - Allocate funds back to RO1	3
	02-R1 - Mechanism Inefficient and/or Inappropriate	2
	03-R1 - Insufficient return on investment	2
Rating 2	04-R2 - Mechanism Inefficient and/or Inappropriate	2
	05-R2 - No significant impact/progress or advancement of the field	1
	06-R2 - Insufficient return on investment	3
Rating 3	08-R3 - Value Unclear/Additional Assessment Necessary	6
	13-R3 - Good/needs improvement	1
Rating 4	09-R4 - Continue funding and tackle challenges	2
Rating 5	10-R5 - Accomplishments only possible because of GG mechanism	2
	11-R5 - Groundbreaking discoveries; shifting paradigms	1
	12-R5 - Annual meetings of outstanding value	1
Rating 0	00-R0 - Non Responsive	0
	99-R0 - Missing	15
<b>Total</b>		<b>41</b>

#### Specific Surveys, Question 3 [Published Results]

	Code Name	Total Respondents
Rating 1	01-R1 - Do not fund again	1
	03-R1 - No impact/progress or advancement of the field	1
	04-R1 - Insufficient return on investment	2
	05-R1 - Would have occurred without GG	1
Rating 2	06-R2 - No significant impact/progress or advancement of the field	7
	07-R2 - Limited distribution of outcomes/resources	3
Rating 3	10-R3 - Good/needs improvement	1
	11-R3 - Personally unaffected	1

Rating 4	13-R4 - Strong publications	9
	15-R4 - Contributions advanced understanding	7
	17-R4 - Personal use of GG resources	4
Rating 5	20-R5 - Accomplishments only possible because of GG mechanism	6
	21-R5 - Groundbreaking discoveries; shifting paradigms	10
	23-R5 - High impact/benchmark publications	13
	24-R5 - Innovative, excellent, awesome, outstanding	6
Rating 0	00-R0 - Non Responsive	2
	99-R0 - Missing	12
<b>Total</b>		<b>86</b>

#### Specific Surveys, Question 4 [Published Methods]

Code Name		Total Respondents
Rating 1	01-R1 - No impact/progress or advancement of the field	1
	02-R1 - Would have occurred without GG	4
	03-R1 - GG is a waste of resources	1
Rating 2	04-R2 - Limited distribution of outcomes/resources	1
	05-R2 - Did not meet expectations	4
Rating 3	07-R3 - Good/needs improvement	1
	09-R3 - Personally unaffected	2
Rating 4	10-R4 - High quality/useful resources produced	13
	12-R4 - Valuable methods and technologies made available/gaining traction in the community	6
	13-R4 - Personal use of GG resources	4
Rating 5	15-R5 - High impact/benchmark publications	6
	17-R5 - Accomplishments only possible because of GG mechanism	3
	18-R5 - Outstanding developments in technologies and methods	21
Rating 0	00-R0 - Non Responsive	3
	99-R0 - Missing	16
<b>Total</b>		<b>86</b>

#### Specific Surveys, Question 5a [Material Outputs - Benefit to the Field]

Code Name		Total Respondents
Rating 1	01-R1 - No impact/progress or advancement of the field	1
Rating 2	03-R2 - Insufficient return on investment	3
	04-R2 - No significant impact/progress or advancement of the field	3
	05-R2 - Limited distribution of outcomes/resources	3

Rating 3	09-R3 - Personally unaffected	5
Rating 4	10-R4 - Personal use of GG resources	5
	11-R4 - Good Collaboration	1
	12-R4 - Contributions advanced understanding	18
	13-R4 - High quality/useful resources produced	21
Rating 5	14-R5 - Invaluable Resources	10
	15-R5 - Accomplishments only possible because of GG mechanism	2
	16-R5 - Innovative, excellent, awesome, outstanding	1
Rating 0	00-R0 - Non Responsive	5
	99-R0 - Missing	8
<b>Total</b>		<b>86</b>

#### Specific Surveys, Question 5b [Benefit to Own Research]

Code Name		Total Respondents
Rating 1	02-R1 - No impact/progress or advancement of the field	5
Rating 2	03-R2 - No significant impact/progress or advancement of the field	1
	04-R2 - Limited distribution of outcomes/resources	2
	05-R2 - Did not meet expectations	1
Rating 3	06-R3 - Personally unaffected	7
Rating 4	09-R4 - Personal use of GG resources	33
	10-R4 - Contributions advanced understanding	11
Rating 5	11-R5 - Invaluable resources	5
	12-R5 - Accomplishments only possible because of GG mechanism	4
	13-R5 - Groundbreaking discoveries; shifting paradigms	2
Rating 0	00-R0 - Non Responsive	5
	99-R0 - Missing	10
<b>Total</b>		<b>86</b>

#### Specific Surveys, Question 5c [Material Outputs – Resulting from Glue Grants]

Code Name		Total Respondents
Rating 1	01-R1 - Would have occurred without GG	7
	02-R1 - Mechanism inefficient and/or inappropriate	2
	03-R1 - No significant impact/progress or advancement of the field	1
Rating 2	04-R2 - Could have been done without the GG	3
Rating 3	05-R3 - Personally unaffected	2
	06-R3 - Unsure if would have happened without GG	7

Rating 4	07-R4 - Unlikely to have happened without GG	20
	08-R4 - Good distribution of outcomes/resources to community	4
Rating 5	09-R5 - Invaluable resources	3
	10-R5 - Accomplishments only possible because of GG mechanism	25
Rating 0	00-R0 - Non Responsive	3
	99-R0 - Missing	9
<b>Total</b>		<b>86</b>

**Specific Surveys, Question 5d [Material Outputs - Other Comments]**

<b>Question 5d [Material Outputs - Other Comments]</b>		<b>Total Respondents</b>
Rating 1	01-R1 - Mechanism inefficient and/or inappropriate	1
Rating 2	02-R2 - Limited distribution of outcomes/resources	2
Rating 3	03-R3 - Good/needs improvement	1
Rating 4	04-R4 - High quality/useful resources produced	5
Rating 5	05-R5 - Accomplishments only possible because of GG mechanism	2
	06-R5 - Invaluable resources	1
	07-R5 - Innovative, excellent, awesome, outstanding	2
Rating 0	00-R0 - Non Responsive	10
	99-R0 - Missing	62
<b>Total</b>		<b>86</b>

**Specific Surveys, Question 6a [Data and Databases - Benefit to the Field]**

<b>Code Name</b>		<b>Total Respondents</b>
Rating 1	01-R1 - No impact/progress or advancement of the field	2
Rating 2	02-R2 - No significant impact/progress or advancement of the field	6
	03-R2 - Limited distribution of outcomes/resources	2
	04-R2 - Did not meet expectations	4
Rating 3	06-R3 - Value Unclear/Additional Assessment Necessary	4
Rating 4	08-R4 - Personal use of GG resources	7
	09-R4 - Contributions advanced understanding	8
	10-R4 - High quality/useful resources produced	18
	11-R4 - Unlikely to have happened without GG	2
Rating 5	12-R5 - Invaluable resources	13
	14-R5 - Groundbreaking discoveries; shifting paradigms	3
Rating 0	00-R0 - Non Responsive	1
	99-R0 - Missing	16
<b>Total</b>		<b>86</b>

**Specific Surveys, Question 6b [Data and Databases - Benefit to Own Research]**

Code Name		Total Respondents
Rating 1	01-R1 - No impact/progress or advancement of the field	2
	02-R1 - No use of resources	5
Rating 2	04-R2 - Limited distribution of outcomes/resources	1
	05-R2 - Little/No Direct Use	6
Rating 3	06-R3 - Personally unaffected	2
	08-R3 - Modest use/intent to use resources/data/databases	5
Rating 4	09-R4 - Personal use of GG resources	30
	11-R4 - High quality/useful resources produced	3
Rating 5	12-R5 - Invaluable resources	12
Rating 0	00-R0 - Non Responsive	3
	99-R0 - Missing	17
<b>Total</b>		<b>86</b>

**Specific Surveys, Question 6c [Data and Databases - Resulting From Glue Grants]**

Code Name		Total Respondents
Rating 1	01-R1 - Would have occurred without GG	6
	02-R1 - Mechanism inefficient and/or inappropriate	1
Rating 2	04-R2 - Limited distribution of outcomes/resources	1
Rating 3	05-R3 - Personally unaffected	1
	06-R3 - Unsure if would have happened without GG	5
Rating 4	07-R4 - Good distribution of outcomes/resources to community	1
	08-R4 - Unlikely to have happened without GG	18
	09-R4 - Accelerated discovery	1
Rating 5	10-R5 - Invaluable resources	1
	11-R5 - Accomplishments only possible because of GG mechanism	32
Rating 0	00-R0 - Non Responsive	3
	99-R0 - Missing	16
<b>Total</b>		<b>86</b>

**Specific Surveys, Question 6d [Data and Databases - Other Comments]**

Code Name	Total Respondents
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Rating 1	01-R1 - Database Insufficient	2
Rating 2	02-R2 - Database Insufficient	1
Rating 3	04-R3 - Good/needs improvement	1
Rating 4	05-R4 - High quality/useful resources produced	3
	06-R4 - Good distribution of outcomes/resources to community	1
Rating 5	07-R5 - Accomplishments only possible because of GG mechanism	2
	08-R5 - Longlasting value to community	1
Rating 0	00-R0 - Non Responsive	9
	99-R0 - Missing	66
<b>Total</b>		<b>86</b>

### Specific Surveys, Question 7 [Nature of Accomplishments]

Code Name		Total Respondents
Rating 1	01-R1 - Regular funding mechanisms could/would have produced same/more	5
	03-R1 - Mechanism Inefficient and/or Inappropriate	2
	04-R1 - Insufficient return on investment	2
Rating 2	06-R2 - No significant impact/progress or advancement of the field	1
	07-R2 - Data not qualitatively different	2
Rating 3	08-R3 - Value Unclear/Additional Assessment Necessary	2
	09-R3 - Personally unaffected	2
	11-R3 - Good/needs improvement	1
Rating 4	12-R4 - Good collaboration	4
	16-R4 - High quality/useful resources produced	14
	17-R4 - Impressive leadership/organization	9
Rating 5	20-R5 - Invaluable resources	1
	21-R5 - Accomplishments only possible because of GG mechanism	17
	22-R5 - Groundbreaking discoveries; shifting paradigms	4
Rating 0	00-R0 - Non Responsive	3
	99-R0 - Missing	17
<b>Total</b>		<b>86</b>

### Specific Surveys, Question 8 [Additional Comments on this Glue Grant]

Question 8 [Additional Comments on This Glue Grant]		Total Respondents
Rating 1	01-R1 - Allocate funds back to RO1	3
	02-R1 - Mechanism inefficient and/or inappropriate	3

	03-R1 - Insufficient return on investment	3
Rating 2	05-R2 - Insufficient return on investment	1
	07-R2 - Limited distribution of outcomes/resources	2
Rating 3	08-R3 - Value Unclear/Additional Assessment Necessary	2
	09-R3 - Good/needs improvement	1
Rating 4	10-R4 - Continue funding	4
	11-R4 - High quality/useful resources produced	4
	12-R4 - Impressive leadership/organization	3
	13-R4 - Good collaboration	1
Rating 5	14-R5 - Invaluable resources	3
	16-R5 - Groundbreaking discoveries; shifting paradigms	5
	17-R5 - Invaluable collaborations/personal use of GG resources	5
	17-R5 - Absolutely continue funding GG	6
Rating 0	00-R0 - Non Responsive	4
	99-R0 - Missing	36
	<b>Total</b>	<b>86</b>