

Organization: University of Maryland College Park

Proposal Detail:

Proposal Information

Proposal Number: 1449815

Proposal Title: NRT-DESE: Flexibility in Language Processes and Technology: Human- and Global-Scale

Received by NSF: 06/24/14

Principal Investigator: Colin Phillips

Co-PI(s): Robert DeKeyser

Hal Daume

Rochelle Newman

William Idsardi

This Proposal has been Electronically Signed by the Authorized Organizational Representative (AOR).

NSF Program Information

NSF Division: Division Of Graduate Education

NSF Program: NSF Research Traineeship (NRT)

Program Officer: Richard Boone
PO Telephone: (703) 292-0000
PO Email: rboone@nsf.gov

Proposal Status

Status As of Today Dated: 03/24/15

A program recommendation for award was concurred with by the cognizant Division/Directorate on **03/23/15**. However, no award is ensured and the recommended duration is **60** months with an effective date of **02/15/15** are subject to change. The grantee institution assumes any pre-award costs at its own risk. NSF may request additional information.

Award Duration: (months)

Our records indicate that the following Final Project Report(s) are due or overdue for the Award(s) listed below. Please submit the report(s) as soon as possible using the Project Reports System within FastLane. The report(s) will be considered overdue if not submitted by the Report Overdue Date mentioned for each report. Having an Overdue project report will affect/delay NSF actions on any other award related to the PI/Co-PI:

Award 1124877: Final Report due for period ending 02/28/2015 for William Idsardi

This recommendation was received in the Division of Grants and Agreements on **03/24/15**. The NSF Grants Officer issuance of an award may require 4 weeks or more from the receipt of the recommendation in Division of Grants

Reviews

All of the reviews of your proposal that have been released to you by your NSF program officer can be viewed below. Please note that the Sponsored Project Office (or equivalent) at your organization is NOT given the capability to view your reviews.

Document:	Release Date:
Panel Summary #1	Feb 6 2015 11:30AM
Review #1	Feb 6 2015 11:30AM
Review #2	Feb 6 2015 11:30AM
Review #3	Feb 6 2015 11:30AM
Review #4	Feb 6 2015 11:30AM
Review #5	Feb 6 2015 11:30AM

Context Statement

Two-hundred sixty-two proposals were submitted to the National Science Foundation Research Traineeship (NRT) program competition for Fiscal Year 2015. This total includes the twelve collaborative proposals, but it excludes the four incomplete and two withdrawn submissions of proposals. NSF expects to fund approximately 8 NRT awards from this competition, based on the quality of the proposals and the availability of funds.

Thirteen interdisciplinary review panels were organized to review the full proposals at the National Science Foundation. The review process was managed by the NRT Program Directors and the NRT Coordinating Committee (NRT CC) that is comprised of program officers drawn from the NSF Directorates: Biological Sciences; Computer and Information Science and Engineering; Education and Human Resources; Engineering; Geosciences; Mathematical and Physical Sciences; Social, Behavioral, and Economic Sciences.

Each proposal was placed in one of the thirteen panels on the basis of the affinity of proposal subject matter, with the exception of a few proposals that addressed research domain areas not represented in a panel. Subject matter experts provided ad hoc reviews for these few proposals. A minimum of 3 and a maximum of five panelists was assigned to provide written reviews for each proposal. Panelists provided written reviews of their assigned proposals prior to the panel meeting. They were asked to address both NSF review criteria of intellectual merit and broader impacts of the proposed NRT activity, and to consider the additional NRT criteria discussed in the program solicitation.

At the panel meeting, each proposal was discussed individually in turn. Panelists having a conflict of interest with a specific proposal did not review the proposal and left the panel room during its discussion. A panelist was designated as scribe for each proposal to record the panel discussion and prepare a panel summary describing strengths and weaknesses. The panel summary addressed the intellectual merit and broader impacts criteria, the NRT specific solicitation criteria, the Data Management Plan, and, if appropriate, the Postdoctoral Mentoring Plan. Based on the panel discussion and the written reviews, the panels classified each proposal into one of three categories: Highly Competitive, Competitive, and Not Competitive. In order to focus the panel decisions, NSF instructed each panel that one proposal be placed in the High Competitive category and the top three in the Competitive category be ranked.

Following the panel deliberations, two Likelies meetings were held during which panel managers presented proposals they championed for funding; in addition DGE NRT Program Officers met with several panel managers for individual debriefings and further discussions. DGE NRT Program Officers presented a preliminary slate of 8 proposals for an award recommendation to the NRT CC members, then adjusted the slate based on committee feedback. This likelies list was presented to the EHR Administrative Review Board. Based on NRT CC feedback, additional feedback from panel managers, their own assessments, and portfolio balance, the NRT DGE Program Officers finalized the list of 8 NRT proposals to be recommended for funding and presented the list to the NRT CC. Subsequently they presented the list to the DGE Division Director for DD Concur.

The individual reviews and a summary of the panel discussion are available for each proposal via FastLane. They are provided as feedback to the applicant to help in understanding the Foundation?s action. They may also be helpful for applicants in preparing any future submissions to the NRT program.



Organization: University of Maryland College Park

Panel Summary #1

Proposal Number: 1449815

Panel Summary: Panel Summary

NRT 2014 Phillips Panel Summary

I. Brief Description of Project:

This very exciting project focuses on flexible language expertise in humans and machines. Young humans learn language easily, but Siri does a poor job in learning language. How is it that humans learn language using less data than would be required by a machine?

The training plan features the use of computing and modeling tools to inform understanding.

The proposed NRT would build on a previous IGERT award at the institution, with a somewhat shifted theme that focuses on multi-scale data, communication training, and a policy emphasis.

II. Intellectual Merit:

Strengths:

Panelists were highly complimentary of the training: This is an extremely well thought out and innovative plan that really captures the challenges of creating an interdisciplinary training program. The panelists noted that the training efforts were extensive and highly interdisciplinary, featuring many different types of student-faculty interaction. There are many student-led activities too which was seen as a strength.

The training plan includes not only a solid content area but communications & public outreach.

The IGERT work has shown positive results, and this project will test hypotheses generated by that work. It was pointed out that the proposal is explicit about the challenges faced in the IGERT project and how they were dealt with, and the reasons for the need for funding followup work. The team is well qualified and experienced with training programs. They recognize the difficulties with transdisciplinary organizations.

The summer camp plan was seen as a strength in that it draws from successful models in neuroscience and biology and includes a public communication component.

The panel thought that the inclusion of policy mentors was a great idea.

There was also enthusiasm regarding the engagement of a theater professor so that the students will learn to communicate science to non-scientists, although it was felt that some details were lacking.

One panelist thought that the collaboration with Gallaudet featured a high level of multilevel interweaving. It was appreciated that there is funding for interpreters in the budget.

Weaknesses:

One panelist thought that the training efforts were vague, especially with regard to how they relate to the curriculum.

One panelist expressed a concern with the inclusion of professional/clinical MA students, in that they may not be very research oriented and so may not benefit from the training.

It was felt that the team needs to expand assessment efforts using other avenues beside the existing evaluator group. The evaluation plan needs to include more detail on how it builds on and moves beyond IGERT.

The panel did not see a letter from Gallaudet; there is no one on the advisory board from there.

III. Broader Impacts:

Strengths:

The project will help us understand language learning even in smaller languages.

The panel felt that the plan features maximum scalability. There is interest from industry and other universities.

Organizational and logistic challenges have been anticipated and planned for. The IGERT experience was valuable to the team.

The panel felt, overall, that the project is innovative, student driven, scalable as a model for creating an interdisciplinary program, and potentially transformative of graduate education conceived more broadly.

Weaknesses:

None noted.

IV. NRT Program Criteria

a) Integrating Diversity into NSF Program, Projects, and Activities What is the quality of the recruiting and mentoring plans to broaden participation?

Plans for recruitment of individuals from historically underrepresented groups are thoughtful, and nicely reflect the PIs' experiences with such activities to date. Retention and mentoring plans are comprehensive and empirically grounded.

b) Sustainability

What is the potential for sustaining successful program elements after NRT funding ends?

The program is sustainable beyond the grant duration. Furthermore, the training program continue to improve graduate training not only at the University of Maryland but at other graduate programs who may look to them as a model of how to restructure graduate programs to achieve greater interdisciplinarity.

c) Model Dissemination

What are plans and mechanisms to disseminate and share successful approaches, practices, and training models across institutions and nationally?

There is a strong data management both in terms of disseminating the data from the research and the evaluation from the research. This plan is a strength of the proposal as well. Furthermore, the PIs expect students to disseminate data through conference participation as well.

d) Integration of Research and Education

Does the proposal address training needs that are not currently available at the institution(s) and/or in disciplines, and are there clear and compelling connections between the training elements and the interdisciplinary research theme?

The team has made a compelling argument that the training and research are well integrated. This new project will continue and extend the training and research framework of the IGERT project.

e) Interdisciplinarity

What is the degree of interdisciplinarity and the potential for high impact synergies among the disciplines?

Most of the panel felt that the interdisciplinarity was very high, including components from math, computer science, linguistics, and natural language processing. There was some dissension with in the panel, however; one panelist pointed out that while this project is interdisciplinary, it will not create new interdisciplinarities. The panel engaged in a discussion regarding the solicitation criteria and the weighting that we should place on interdisciplinarity. The majority of the panel felt that the interdisciplinarity was sufficient to merit enthusiasm.

f) Evaluation

Does the evaluation plan include reasonable outcomes, performance measures, benchmarks, and an evaluation timetable, as well as how formative evaluation will improve practice?

The evaluation plan derives from the successful plan associated with the IGERT.

V. Data Management Plan and (if appropriate) Postdoctoral Mentoring Plan

There is a strong data management both in terms of disseminating the data from the research and the evaluation from the research. This plan is a strength of the proposal as well. Further the PIs expect students to disseminate data through conference participation as well. There will in addition to a website, de-identified data will be made available to researchers by request.

VI. Panel Recommendation and Justification, including key strengths and critical weaknesses.

The panel was very impressed by the integration of the training and research plan, and felt strongly that the training plan features a multi-level comprehensive approach that will be very effective and scalable. Novel training components will emphasize transferrable skills in communication, public policy and outreach, and the analysis and use of multi-scale data.

Please provide a summarizing paragraph that is consistent with the panel recommendation of highly competitive, competitive, or not competitive.

_x__ Highly Competitive ___ Competitive Not Competitive by Panel

The summary was read by the panel, and the panel concurred that the summary accurately reflects the panel discussion.

Panel Recommendation: Highly Competitive

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Organization: University of Maryland College Park

Review #1

Proposal Number: 1449815

NSF Program: NSF Research Traineeship (NRT)

Principal Investigator: Phillips, Colin

Proposal Title: NRT-DESE: Flexibility in Language Processes and Technology: Human- and Global-Scale

Rating: Very Good

REVIEW:

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

Strengths:

- The integration of research and training is especially strong.
- The fields involved, while tilted rather heavily toward linguistics, are nonetheless well-chosen for their potential to learn from each other and (thus) to contribute meaningfully to research advances across disciplinary boundaries.
- Similarly, the research foci strike a nice balance across linguistics, computer science, and data science.
- The team is well-positioned to do the work, and the resources available at UMD are more than sufficient to the task.

Weaknesses:

- Relative to other similar programs, there is less focus on conventional classroom/pedagogical activities. This is in some respects also a strength, but it leaves open the possibility that students will not receive much in the way of "conventional" training in fields outside their own discipline. I mention this as a weakness because, while the tools and approaches used in different disciplines are often the same, learning in disciplinary courses also serves to inculcate students with the values, priorities, and tropes of a discipline; this, in turn, can prove valuable to students from other fields for understanding disciplinary norms and forms of communication.
- While it builds on a successful previous program, the proposal is occasionally scant on specifics. For example, it suggests that the creation of "curated" training data for low-resource languages COULD be a topic for a summer course. Many of the other research foci have similarly ambiguous language.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

The potential broader impacts of the proposal are several. The societal and industry benefits of the proposed research are manifest. The PIs' innovative ideas about recruitment of members of historically underrepresented groups may prove effective, in which case that would be a valuable contribution. Perhaps most important, the programmatic and pedagogical components of the proposed work are strongly innovative, and have the potential to influence the way we do interdisciplinary training and collaboration well beyond the areas of linguistics and computer science.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

- Plans for recruitment of individuals from historically underrepresented groups are thoughtful, and nicely reflect the PIs' experiences with such activities to date.
- The primary evaluator's affiliation with UMD is a weakness, albeit one acknowledged by the PIs; I would feel better

about the effort if evaluation was conducted by an entity with no vested interest in its findings or outcome.

- Other components of assessment are generally strong; I am particularly fond of the transparency-enhancing move of making evaluation materials available publicly via the web.
- The emphasis on student leadership, planning, and coordination of program activities -- including evaluation -- is (relatively) novel and a real strength.

Summary Statement

This is a proposal by a team largely composed of linguists to develop a research and training program in the area of flexible human and machine learning of language. The program itself extends a previous IGERT, and includes summer and winter workshops, weekly talks, an annual Language Science Day, and other programmatic activities. There are at least four proposed research themes: Low-resource languages, "language poverty," flexible automatic speech recognition, and high-speed predictive text and language processing.

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Organization: University of Maryland College Park

Review #2

Proposal Number: 1449815

NSF Program: NSF Research Traineeship (NRT)

Principal Investigator: Phillips, Colin

Proposal Title: NRT-DESE: Flexibility in Language Processes and Technology: Human- and Global-Scale

Rating: Excellent

REVIEW:

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

There are many things that make this proposal particularly meritorious. The PIs make an interesting and compelling case that the need for inquiry into flexible language expertise is pressing but underdeveloped and neglected. That case includes everything from understanding and better developing new technologies to similarly understanding and better combating terrorism. Likewise, they make a similarly compelling case that much touted "Big Data" is relatively useless (inefficient and expensive) in most language instances. They point to the ease with which young children and the great difficulty of mature adults of learning new languages. Together these point to the importance of understanding what aspects of children's language learning abilities can be transferred to adults and also of expanding K-12 language learning. Further, the PIs note that Big Data fail to address 99% of languages.

The majority of my comments about the merit of this program target the NRT solicitation.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

The potential broader impacts are considerable. The research component addresses language flexibility both in human learning and machine learning and this area is critically important in the current global and technologically mediated context. The 4 themes all of which push linguistics forward. Additionally, interdisciplinarily trained scholars will have greater impact than those who are not so trained. Further, this training program is sustainable and will continue to improve graduate training not only at the University of Maryland but at other graduate programs who may look to them as a model of how to restructure graduate programs to achieve greater interdisciplinarity.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

Another strength of the proposed NRT training is that it builds on and learns from the deficiencies of a previous IGERT. The PIs note that the NRT is their "third experiment in graduate education." The first was there broadening (along ID lines) a traditional linguistics that became the basis for their IGERT (Experiment 2) that focused on ID training a broadening the intellectual community. Now they seek to turn that interdisciplinary community's attention to solving this very important ID problem of human and machine language flexibility as well as to expand the communication and data skills of the participants. Further, the training program will shift the focus of many of the graduate students outside of the academy into industry and the public sector where these skills are of great important and potential impact.

Another refreshing strength of this proposal was the keen understanding of how difficult it is to create, nourish and sustain interdisciplinary research teams and training . The PIs enumerate a number of problems that follow IGERT programs (and I would add, any ID program) and focus on the necessary changes in the environment and organizational structure. I have to say, given my own participation of two different ostensibly interdisciplinary programs, and the difficulty in actually sustaining ID research, this awareness on the part of the PIs and the integration of student-led activity coheres with Sarah Kaplan's research(University of Toronto) about the role of

students in successful ID research teams, and adds to their credibility and the liklihood of continued success. The PIs' clarity on the importance of creating the environment necessary for creating and sustaining ID research teams goes far in convincing me that these PIs will do this right. The summer camps the PIs propose in which students focus on only one theme and of which they will take only one, are also particularly well thought out. The integration of Science Policy and the resources of the local community are also a strength. They are drawing on the resources of their location that is another strength.

Also clever is the recruiting strategy; rather than use funding to entice students, they will use the activities themselves. This strategy is outstanding and one that draws on the ideal motivation.

The PIs seem well versed in the scholarship of ID, have thought through and planned for the obstacles, and have come up with a student focused NRT training program that will have great impact on the field of language technology and language learning. The understanding of the positive uses of assessment and thoughtful plans (including social network analysis) is impressive. Further, I think this program will have considerable broader impacts on other programs since it provides such an impressive model of how to create and sustain interdisciplinary training and research teams and clearly conceptualizes what they are doing as something catalyzed by but not eternally dependent on, NSF funding.

There is a strong data management both in terms of disseminating the data from the research and the evaluation from the research. This plan is a strength of the proposal as well. Further the PIs expect students to disseminate data through conference participation as well. There will in addition to a website, de-identified data will be made available to researchers by request.

Summary Statement

This proposal takes seriously that strong interdisciplinary science occurs through explicit activities and organizational structures that facilitate and support it. With a research focus on flexible language expertise in humans and machines, the PIs propose a training program that teaches not only about the content (efficient use of language data to understand human and machine language expertise) but also how to do interdisciplinary, team-based research, communicate effectively in writing and speaking and continue as strong interdisciplinary (ID) scholars.

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Organization: University of Maryland College Park

Review #3

Proposal Number: 1449815

NSF Program: NSF Research Traineeship (NRT)

Principal Investigator: Phillips, Colin

Proposal Title: NRT-DESE: Flexibility in Language Processes and Technology: Human- and Global-Scale

Rating: Very Good

REVIEW:

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

The 4 themes presented and a clear vision of the project materializes when all of them are taken into consideration as a whole.

Theme #1: Low-resource languages and field-linguistics.

Theme #2: "Language Poverty" and Learner Differences.

Theme #3: Flexible Automatic Speech Recognition.

Theme #4: Prediction and Millisecond-scale Information Management.

The intellectual merit is not clear until the reader gets to the themes section but the proposal carries strong intellectual merit with enormous potential

In the context of the five review elements, please

evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

The broader impact of the proposal comes along when one thinks of having auto-correct capabilities present in text based communications (computer, cellphones texting, email, etc.) but for oral-live communication. Clearly the potential for expanding the program and the research as the project evolves is definitely there. Foundations and industry interest will exist if the project is successful.

Please evaluate the strengths and

weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

Although it is not clear how the program(s) would be scalable since it seems to be presented without very clear mapping of training and the project does not have a defined terminal life period since the it will no doubt lead to new avenues to pursue.

The proposal would benefit a bit if the training/mentoring program permeated throughout the project is aligned and presented in a clearer way.

Summary Statement

The proposal presents what seems to be a visionary program with great potential to have social impact and continue to do so after funding expires.

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Organization: University of Maryland College Park

Review #4

Proposal Number: 1449815

NSF Program: NSF Research Traineeship (NRT)

Principal Investigator: Phillips, Colin

Proposal Title: NRT-DESE: Flexibility in Language Processes and Technology: Human- and Global-Scale

Rating: Excellent

REVIEW:

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

This is a thoughtful, well-organized, and well-reasoned proposal.

The rationale for the content area and the accompanying training program is clear. Language and language use is an inherently interdisciplinary research focus and a fitting test case for the training of students in communication, public policy and outreach, and the analysis and use of multi-scale data

This NRT builds on a previous iGERT award at the institution, with a somewhat shifted theme that focuses on multi-scale data, communication training, and a policy emphasis. Given the success of the previous award, this connection could constitute a relative strength of the proposal. However, one question is whether the NRT training plan provides sufficient justification for additional funding? Will the elements and training model be sufficiently novel and distinctive to warrant support through this new funding mechanism? The PIs address this issue and make a good case for the distinctiveness of the new training plan. For example, the PIs argue the groundwork has been laid for true interdisciplinary training and that their model represents a hypothesisà to be tested with the NRT. This is an interesting way to frame the connections and a convincing one. I think.

The training plan builds on a successful model and incorporates new elements (relative to the iGERT). In particular, the Summer Camp training is a new element that has precedent in other disciplines and as described, is another strength of the proposal. Other novel elements are the public policy or public-facing components, which again constitute a considerable strength. One note of concern is simple that although sample organizations or agencies are identified, I could imagine that organizations could be difficult to identify and that as a consequence, these 'internships' could be difficult to implement. It may also be difficult to recruit and coordinate policy mentors.

There is a good rationale for the communications training as well and along with internships and outreach, this type of training has the potential to impact individual student careers as well as STEM fields more generally. Although speaking and communication practice will be embedded in multiple components of the training program (winter storm, research lunches), a communications professional (theater professor) will be engaged to help. The logistics of this component was less clear.

The team of PIs is extremely well qualified to carry out the proposed research and training. Each PI brings complementary skills and expertise to the proposed project, including considerable education, research, and mentoring experience. Indeed, the core team has considerable experience designing, implementing, and administrating training programs and promoting interdisciplinary research and study. The PIs' complementary backgrounds and research programs constitute a considerable strength of the proposal and make them well positioned to implement this training model. The institutional resources available to the PIs both at their home institution are exceptional. Indeed, the University of Maryland and the leadership of the training program have strong connections across disciplines both within and outside the university.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

The proposed training plan will generate research and empirical tools that will further our understanding of language learning, both in machines and in children and adult language users. This research is relevant to multiple domains that will directly and indirectly benefit society.

The focus on public outreach, engagement, and communication training is a relative strength of this proposal.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

The proposal presents a very well-articulated set of research synergies with a clear integration of education and interdisciplinary research themes.

The PIs have taken a thoughtful and interesting approach to increasing the participation of underrepresented minorities. Retention and mentoring plans are comprehensive and empirically grounded.

The evaluation plan appears to draw from best practices. The integration of feedback from the evaluation instruments is not well specified.

The program structure is sustainable beyond the grant duration.

Summary Statement

The proposed training program will provide interdisciplinary training of students in the study of language and language use. Novel training components will emphasize transferrable skills in communication, public policy and outreach, and the analysis and use of multi-scale data. The training plan is thoughtful, clear, and well-reasoned.

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Organization: University of Maryland College Park

Review #5

Proposal Number: 1449815

NSF Program: NSF Research Traineeship (NRT)

Principal Investigator: Phillips, Colin

Proposal Title: NRT-DESE: Flexibility in Language Processes and Technology: Human- and Global-Scale

Rating: Excellent

REVIEW:

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

This inter-disciplinary proposal presents an excellent plan for strengthening graduate training in the content areas involved. Focusing on linguistics and communication is an area rich for data analysis and also application. The policy piece of the proposal is an excellent addition and can help bring insights to faculty, students and the public alike.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

This proposal provides for authentic participation for underserved audiences, such as audiences at Gallaudet University. The Summer Camp and Winter Storm provide opportunities for student leadership and growth. As improving early language learning abilities and bilingual language learning abilities are increasingly important to the population of the United States, these areas of study are within national priorities and fit national needs.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

Summary Statement

This proposal is forward-thinking and involves a team of well-qualified individuals who have access to resources needed. The policy aspect of the program as well as the collaboration with Gallaudet University can lead to transformative results. The mix of an internal evaluator with NSF ADVANCE experience and an external auditor helps provide a robust evaluation framework. The comparison group approach to the evaluation will help the project to determine outcomes from this mix of training activities.

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