Haynes Evaluation

2025 ERN Research and Evaluation Report: NSF Grant - *Assessing the Impact of an Inclusive Community of Practice to Advance Motivation and Persistence among URM STEM Student Researchers*

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Executive Summary

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The primary input of this program is the Emerging Researchers National (ERN) Conference and all the activities included within the conference. These activities occurred as planned during this first program year. The activities reached the target participants (PIs, STEM students) and were conducted within the parameters set forth in the project proposal, i.e. providing communities and opportunities for supporting STEM student researchers.

Research Outcomes Summary

The program activities have met their intended goals by improving science/STEM identity, student sense of community, student self-confidence and efficacy in STEM, student wellbeing in STEM, and student persistence/resilience in STEM. Additionally, faculty confidence in supporting students and in mentoring was improved as a result of ERN activities. There are matched group pre to post-test data that showed **improvement** for all of the student impact metrics of interest **(science/STEM identity, student sense of community, student self-confidence and efficacy in STEM, student wellbeing in STEM, and student persistence/resilience in STEM)**. There were **no differences** for student sense of community, student self-confidence and efficacy in STEM, student wellbeing in STEM, and student persistence/resilience in STEM **across different institution types, student type (graduate or undergraduate), or NSF program**. There **was a significant difference for sense of community across different racial/ethnic groups**. The conference planning, activities, and data collection have all been informed by the prior year's award and efforts, allowing for a refined delivery of the program and evaluation/analysis of the efforts.

Conclusions

The program, through the ERN conference event and virtual engagements, has exposed STEM students to activities that are shown to promote student success, i.e. dissemination of resources, building of community/networking, opportunities for students to improve their science skills by sharing their research and learning from peers and mentors.

Recommendations

It is recommended that the program continue to implement the annual meetings and other activities while utilizing the findings of this evaluation to fine-tune the planning of future events.

Evaluation Plan

The external evaluation of this program is led by Gabriele Haynes, Ph.D., M.Eval, of Haynes Evaluation LLC (HEVAL). HEVAL will monitor and assess the development, implementation of all proposed activities and provide evaluation briefs summarizing findings to project leadership to guide program refinements. Implementation evaluation provides the context needed to understand and replicate project impacts. The evaluation will answer the questions:

1. Are project activities being administered on time, to the target participants and within the scope of what was planned?
2. Are program participants satisfied with the activities?

Annual reports and a cumulative summative report at the conclusion of the grant will be provided. Evaluation and program refinement efforts will be further supported by regular communication between program leadership and the evaluator. To guide the evaluation and research, a logic model that details the connections between proposed program activities, outputs, and measurable research outcomes was finalized in collaboration between project leadership and Dr. Haynes at the start of the grant (Figure 1).

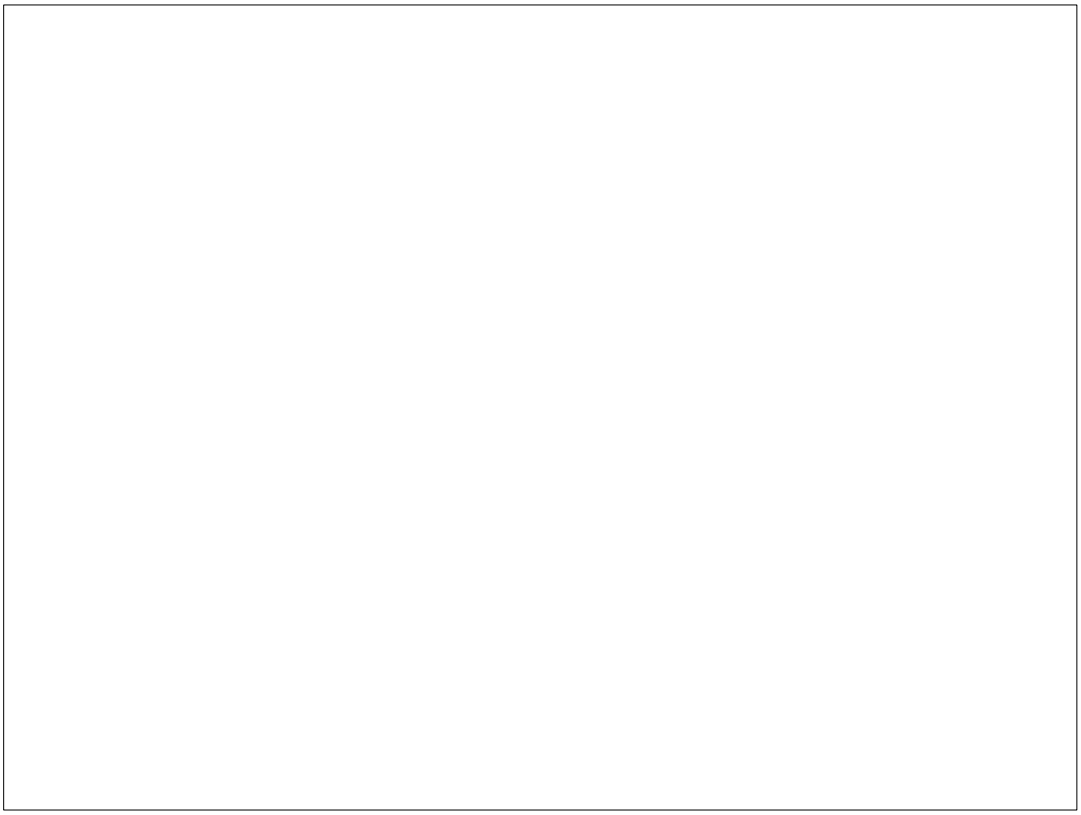

Figure 1 Program Logic Model

Research Plan

The primary objectives of this project fall within the general categories of foundational or exploratory research (Institute of Education Sciences; U.S. Department of Education & National Science Foundation, 2013). The project seeks to improve the future STEM workforce by supporting and engaging students in STEM. The project plans to accomplish this goal by improving student perceptions of self-efficacy, sense of community, motivation to persist in STEM, wellbeing and science identity. The research study will include administration of pre and post-tests that measure these constructs. The program is expected to improve each construct by .5 standard deviation points above baseline (which will be collected with the pre-test). An improvement of .5 above baselines with 80% statistical power and effect size of .5 (moderate effect) is achievable with a small sample size. These metrics are linked to improved student outcomes and therefore offer reliable evidence of program success, even within a small cohort model and regardless of the presence of financial assistance (Ballen et al., 2017; Estrada-Hollenbeck et al., 2011; Spanierman et al., 2013).

Data will come from pre- and post- assessment surveys of key psycho-social constructs underlying the theory of change (self-efficacy in STEM, sense of community, persistence, etc.) of students. The research study will draw on data from surveys to explore potential impacts of the program on desired metrics (i.e., participant sense of community, wellbeing, self-efficacy, persistence and science identity). Changes in scores from pre- to post-assessment will be explored using matched-pair analysis to increase statistical power, either using student IDs or anonymous self-generated identification codes (Kearney et al., 1984; Yurek et al., 2008). Effect sizes will be calculated using Hedge's g to determine whether small, medium, or large effect sizes were achieved in each quantitative outcome measure, per WWC standards (What Works Clearinghouse, n.d.). All data collection instruments [1]were developed or modified in collaboration between the evaluator and project leadership, and IRB approval was secured before recruiting any participants to the study. Conventional content analysis (i.e., open coding; Hsieh & Shannon, 2005) was used to code and analyze qualitative data to identify key themes about the quality and impacts of the activities and supports. Statistical tests using mean-comparison for pre/posttests were employed. Further analysis disaggregated data according to characteristics of interest (student education level, institution type, NSF program of interest, etc.). The research study will answer the following questions over the course of the grant period:

[1] The instrument used was modified from an instrument that was previously developed and tested for reliability by Dr. Haynes. The instrument and the reliability scores are appended to this report.

1. Does participation in the ERN Conference advance motivation in STEM (science identity, sense of community, science self-efficacy, persistence and wellbeing) for the targeted student populations?
2. What drivers are most impactful in supporting students in STEM with disabilities?
3. How does leveraging career-enabling efforts of professional STEM societies advance support for STEM students?
4. What is the role of mentoring for students and for faculty in supporting student success?
5. What are the relationships between exposure to the ERN Conference and other support activities and measures of student perceptions (self-efficacy, persistence, sense of belonging and science identity) and do relationships differ by student characteristics?

Project Activities and Outputs

In this first program year, project efforts focused largely on organizing and convening the Emerging Researchers National (ERN) Conference, with recruitment strategies for the program's target participants and assignment of travel awards. Specific activities included:

Pre-Conference Webinars

- 2025 ERN Conference "Know Before You Go" Webinar
- How to Deliver an Excellent Oral STEM Research Presentation
- How to Deliver an Excellent Poster STEM Research Presentation
- How to Prepare an Excellent Oral/Poster STEM Research Presentation Abstract

Student Presentation Competition

Students were invited to present their research in the following categories:

- Biological Sciences
- Chemical Sciences
- Computer Sciences and Information Management
- Ecology, Environmental and Earth Sciences
- Math/Statistics
- Physics
- Science/Mathematics Education
- Social, Economic, and Behavioral Sciences
- Engineering/Technology
- Data Sciences
- Forensic Sciences
- Nonscience or Materials Science
- Neuroscience

Prizes of $300 (1st place), $200 (2nd place), and $100 (3rd place) were awarded in each category. Student presentations included poster and oral presentations. The presentations were judged by STEM professionals recruited from academia, industry, and the private sector who also serve as role models. Awards were announced on the final night of the conference in a ceremony to honor the achievements of the participants.

Plenary Sessions

Four plenary sessions were delivered, highlighting STEM experts. The sessions highlighted individuals who are excelling in their respective fields, and innovators who are engaged in cutting edge research from diverse backgrounds. Plenary session one included an alumni panel

of ERN alumni who shared details of their ERN experience and their current work and research, session two covered ethics in AI along with a work opportunities panel, session three included the keynote speaker and the final plenary session included a panel on STEM career pathways.

Professional Skill Development Workshops as Breakout Sessions

Workshops were facilitated by STEM professionals from academia, industry and the private sector and NSF program representatives on topics including:

- Advanced Computing for Data Science
- Mental Health and Wellness
- Career-Life Balance
- Forensic Science Careers
- Internships, Fellowships and Scholarships
- Student Orientation
- Judges Orientation
- Biomedical and Physician Scientists Training
- Future STEM Faculty
- AI Panel
- Funding STEM Education
- Complex Communication
- Navigating the PhD
- Mentoring 101
- Premed Journey
- Path to Graduate School

Educational/Career Fair

Exhibitor sessions during the conference included representatives from Academia, Industry, and Federal Science Agencies to share information with attendees regarding:

- Internships and employment
- Research opportunities
- Funding for STEM education
- STEM Professional Societies

Faculty-Focused Sessions

To engage the faculty, special sessions were included that focused on:

- Mentoring
- Evaluation and Project Management

- Best practices in supporting student researchers.

Summary of Evaluation Activities

Regular Check-ins

Throughout the implementation to date, Dr. Haynes has been in regular contact with the PI to ensure that all is proceeding as planned, and to access implementation/outcome data, as available.

Assessment of Implementation

Implementation data in this year of the program included monitoring of the April 2025 ERN Conference and monitoring of efforts toward program goals. The program evaluation questions were answered as part of the evaluation activities for this year. The evaluation questions for the project:

1. Are project activities being administered on time, to the target participants and within the scope of what was planned?
2. Are program participants satisfied with the activities?

First Year Report

This report represents one aspect of the evaluation and research activities for this year.

Summary of Research Activities

Attendance at Emerging Researchers National Conference 2025

Jason Haynes of HEVAL, LLC attended the ERN Conference held in Atlanta April 4-6, 2025. Mr. Haynes attended all plenary sessions and various other workshops/sessions.

Assessment of Outcome Data

Outcome data for this year were collected in the form of survey and demographic data as well as field observations from the 2025 ERN Conference held in April. Assessment of data was performed, and findings are included in this report. The data from this first year of implementation offer answers to research questions one and five:

- Does participation in the ERN Conference advance motivation in STEM (science identity, sense of community, science self-efficacy, persistence and wellbeing) for the targeted student populations?
- What are the relationships between exposure to the ERN Conference and other support activities and measures of student perceptions (self-efficacy, persistence, sense of belonging and science identity) and do relationships differ by student characteristics?

Future years reporting will offer more data to answer the remaining research questions.

First Year Report

This report represents one aspect of the evaluation and research activities for this year.

Research Findings

Student Impacts

Pre and post conference data were collected using the same instrument. These data were collected, cleaned, and loaded into SPSS where basic descriptive statistics were gathered. Students were administered a pre and posttest that measured the way they see themselves in STEM (science identity), self-confidence (self-efficacy) to persist in STEM, sense of community in STEM, and wellbeing in college.

All metrics (Science/STEM Identity, Persistence in STEM, Sense of Community, Self-efficacy in STEM, and Wellbeing in STEM) showed improvement from pre to posttests. All items were scaled using either confidence or agreement scales where 0 = not at all and 10 = completely.[2] Along with collecting demographic data, the survey measured participant perceptions on key metrics linked to improved outcomes in STEM (Hart, 2012; Hausmann, Schofield, & Woods, 2007; Maramba & Museus, 2011):

- Science/STEM Identity – item used was taken from (McDonald, Zeigler-Hill, Vrabel, & Escobar, 2019)
- Persistence in STEM
- Sense of Community in STEM
- Self-Efficacy/Ability to Pursue STEM Goals
- Wellbeing in STEM

The science/STEM identity item used pictorial depictions of student self-perceptions of their identity as a scientist. To accommodate those with visual impairment, “alt text” was added to the images to create “percentages of overlap” and for analysis, the responses were converted to numeric scores where 1 = the first image with no overlap and 7 = the last image with almost full overlap. The item is included below as it appeared in the survey for ease of interpretation of the findings (Figure 2).

[2] For the analysis, the scale was shifted so that the minimum was 1 and the maximum was 11 so that scores of zero did not skew the means. Due to the need to keep the survey responses anonymous, individual tracking for matched, paired analysis was not possible but response tracking using survey software allowed for monitoring to ensure that the posttest responses were also given by the same participants as those that completed the pretest, so that all responses can be analyzed and the maximum sample size is used. As such, responses were analyzed at the group level using independent summary t tests for comparison in SPSS and effect size was calculated as Cohen’s d.

"Select the picture that best describes the current overlap of the image you have of yourself and your image of what a STEM professional is."

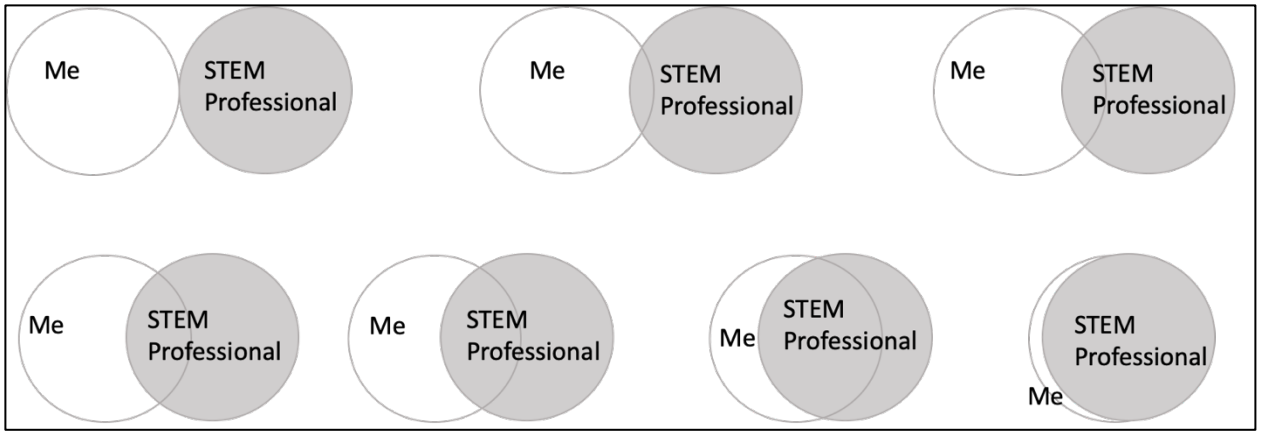

Figure 2 Science Identity Pictorial Response

Table 1 below shows comparison of the pre and post-test responses for science identity for all students. These data indicate an improvement in student science identity after exposure to the ERN conference events. The pretest scores had a mean of 4.80 (n = 409) and the posttest had a mean score of 5.04 (n = 312).

Table 1 Science/STEM Identity Pre-Post Comparison

Metric	Timing	N	Mean	SD	Sig	ES
Science/STEM Identity	pre	409	4.80	1.68	0.06	0.14
	post	312	5.04	1.61		

An agreement scale was used to measure sense of community in STEM and wellbeing stating: "Please indicate how true each of the following statements are for you right now on a scale of 0 - 10, where 0 means it is not true at all for you, and 10 means it is completely true for you." A confidence scale was used to measure self-efficacy in STEM and asked: "If 0 = not at all confident and 10 = completely confident, how confident are you in your ability to do each of the following, be sure to indicate your current level of confidence as it exists now (i.e., before responding to each item, say to yourself, "Right now, I can do the following:"). Improvement is revealed from the pre to posttests for all students with statistical significance shown for both persistence in STEM and self-efficacy in pursuing STEM careers (Table 2). These data indicate program success.

Table 2 All Students Pre to Post Comparison on Metrics of Interest

Metric	Timing	N	Mean	SD	Sig	ES
Persistence	pre	395	8.38	1.65	**	0.32
	post	302	8.90	1.58		
Community	pre	404	7.82	1.28	0.09	0.13
	post	303	8.00	1.38		
Wellbeing	pre	398	8.36	1.67	0.33	0.08
	post	309	8.48	1.69		
Self-Efficacy	pre	390	8.13	1.57	**	0.27
	post	298	8.57	1.68		

Comparison of Student Impacts by Characteristic of Interest

In order to test if there were differences for the impact metrics (Science/STEM Identity, Persistence in STEM, Sense of Community, Self-efficacy in STEM, and Wellbeing in STEM), one way ANOVA tests were performed. Anova are used on non-binary variables, in this case the ANOVA tested the characteristics of interest; institution type, race/ethnicity and NSF program. Student type (undergraduate vs graduate) was tested separately because the variable is binary, results for student type are included later in the report. For the ANOVA, **no statistical significance was found between groups for institution type nor for NSF program for the impact metrics (Science/STEM Identity, Persistence in STEM, Sense of Community, Self-efficacy in STEM, and Wellbeing in STEM)**. Therefore, there were no differences in impacts (Science/STEM Identity, Persistence in STEM, Sense of Community, Self-efficacy in STEM, and Wellbeing in STEM) based on the type of institution that the students attend. Similarly, there were no differences in impacts (Science/STEM Identity, Persistence in STEM, Sense of Community, Self-efficacy in STEM, and Wellbeing in STEM) based on the NSF program that students represent. Race/ethnicity **was found to have statistically significant difference** between groups for **sense of community (Table 3).** This finding indicates that changes in student perceptions of their sense of community were statistically significantly different for students of various racial and ethnic identities.

Table 3 ANOVA of Changes in Impacts across Race/Ethnicity Groups

Metric of Change	Anova	df	F	Sig
Persistence	Between Groups	8	0.698	0.693
	Within Groups	253		
	Total	261		

Metric of Change	Anova	df	F	Sig
STEM ID	Between Groups	8	1.523	0.149
	Within Groups	267		
	Total	275		
Sense of Community	Between Groups	8	1.977	*
	Within Groups	254		
	Total	262		
Wellbeing	Between Groups	8	1.321	0.233
	Within Groups	257		
	Total	265		

For the binary variable of student type (undergraduate vs graduate), an independent t test was performed to explore if there were differences for student impacts (Science/STEM Identity, Persistence in STEM, Sense of Community, Self-efficacy in STEM, and Wellbeing in STEM) based on the type of student (undergraduate vs graduate student). This test revealed **no significant differences between undergraduate and graduate students of the five impact metrics (Science/STEM Identity, Persistence in STEM, Sense of Community, Self-efficacy in STEM, and Wellbeing in STEM).** In an effort to simplify the report and to save space, the test tables are not included here since they showed no significant differences.

Faculty Impacts

The ERN 2025 Faculty Feedback Survey gathered both quantitative and qualitative responses from participants. The survey asked faculty to report changes in their own levels of confidence in areas that were learning outcomes of the ERN Conference. The goal of this analysis is to inform future conference planning, support mechanisms for faculty development, and measure impacts of the ERN conference on faculty. The exploration of faculty impacts is being included here for the purposes of showing full intended and unintended impacts of the grant program and to inform future ERN planning. However, it is worth noting that the original grant proposal did not require nor set out to examine faculty impacts. As such, faculty impacts are reported here measuring changes in confidence regarding student support and NSF program implementation, but data were not collected that allow for disaggregating faculty findings by institution type, NSF program, or any other characteristic.

The survey assessed shifts in faculty confidence across six key areas: mentoring students, facilitating positive mentoring networks, leveraging NSF-funded programs, building institutional consensus, working with administration, and supporting student research. Table 14 illustrates participant responses, highlighting notable gains in all categories.

The data reveal that the majority of faculty experienced at least a moderate improvement in confidence across domains. Most notably, large proportions reported 'A great deal more confident' in areas such as mentoring, research support, and institutional leadership. The chart underscores that ERN 2025 was especially effective in reinforcing faculty capabilities to support student engagement and enact institutional change. The area with slightly more modest gains—'Utilize NSF-funded programs for institutional improvement'—may point to an opportunity for deeper exploration or a response to current uncertainty in NSF program support. Even so, the overall distribution reflects overwhelmingly positive impacts of the ERN conference experience on faculty self-efficacy.

Figure 3 Changes in Faculty Confidence for Mentoring

Themes from Open-Ended Feedback

Open-ended responses from participants were analyzed for recurring themes, providing richer context to the numeric data. Faculty praised several aspects of the ERN 2025 experience, offering suggestions for improvement and insight into evolving professional interests.

-Technology and AI (12 responses): A strong interest emerged in artificial intelligence, ethics, classroom applications, and future-oriented teaching strategies.
- Session Quality (17 responses): While many workshops and presentations were lauded, participants expressed that some sessions varied in engagement and effectiveness.
- Networking (5 responses): Mixed reviews on networking opportunities suggest that while valued by some, these moments could be more intentionally structured.

- Workshops (5 responses): Interactive, hands-on sessions were especially appreciated and recommended for expansion.
- Organization and Logistics (5 responses): The use of tools like the Whova app facilitated planning and navigation; a few responses noted minor issues.
- Inclusivity and Accessibility (4 responses): Participants called for expanded access and attention to inclusivity, reflecting an equity-conscious outlook.
- General Praise (9 responses): Numerous responses celebrated the quality, content, and energy of the event using descriptors such as 'great' and 'awesome'.
- Suggestions for Improvement (6 responses): Participants recommended more interactivity, earlier networking sessions, and refining the depth and relevance of certain presentations.

The ERN 2025 conference had a demonstrable impact on faculty confidence in key domains and fostered meaningful discussions on topics such as mentoring, AI integration, and institutional collaboration. Faculty found value in both content and structure, while also identifying opportunities for deeper engagement and improved inclusivity. These findings should serve as both affirmation of the conference's strengths and a guide for enhancing future iterations of ERN.

Evaluation Findings

Pre-Conference Webinar 1 Feedback

How to Deliver an Excellent Oral STEM Research Presentation

The participants in this session were all students, with a mixture of undergraduate and graduate attendees. Every respondent indicated that they were not currently members of the American Association for the Advancement of Science (AAAS). The group had a variety of academic backgrounds and came from different institutions, including both Historically Black Colleges and Universities (HBCUs) and non-HBCUs. None of the attendees reported having attended the ERN conference in the past.

The feedback for this webinar was highly positive based on numerical scoring from the survey:

- How well did the webinar meet your expectations? — Mean score: 5.0
- Do you feel better prepared to deliver an oral STEM research presentation? — Mean score: 4.0
- Overall effectiveness of the webinar: — Mean score: 5.0
- Effectiveness of the presenter: — Mean score: 5.0

Participants found this webinar to be exceptionally valuable. All key aspects of the webinar—its content, structure, and presentation—were rated at the highest level by respondents. The mean score of 5.0 in three out of four categories indicates a strong consensus that the webinar either met or exceeded expectations.

In terms of preparedness, the mean score of 4.0 suggests that participants felt significantly better equipped to deliver their own oral research presentations. Many respondents specifically mentioned that the actionable tips and the structure of the presentation were especially helpful. The fact that all respondents indicated they would recommend this session to other students reinforces its perceived value.

The presenter was universally praised, receiving perfect marks from all respondents. This highlights both the clarity of the content delivery and the effectiveness of her engagement with the audience.

Pre-Conference Webinar 2 Feedback

How to Deliver an Excellent Poster STEM Research Presentation

This session also included a mix of undergraduate and graduate students. Participants represented disciplines ranging from engineering and chemistry to neuroscience and computer science. Like in Webinar 1, none of the respondents were current members of AAAS, and most

had not attended the ERN conference previously. Several attendees were affiliated with HBCUs, while others were not.

The quantitative feedback for this session was also positive, though slightly more varied:

- How well did the webinar meet your expectations? — Mean score: 4.45
- Do you feel better prepared to deliver a poster STEM research presentation? — Mean score: 3.73
- Overall effectiveness of the webinar: — Mean score: 4.45
- Effectiveness of the presenter: — Mean score: 4.82

Participants generally found the poster presentation webinar to be very helpful, though the scores suggest slightly more variation in experience compared to the oral presentation session. The average rating for expectation fulfillment and webinar effectiveness was approximately 4.45, indicating that the majority of attendees felt their goals for attending the webinar were met.

While the mean score for preparedness (3.73) was still above average, it suggests a bit more room for growth in this particular aspect. Some attendees may have desired more detailed examples or a longer session to explore content more deeply.

The presenter once again received very high marks, with a mean score of 4.82, reflecting a high level of appreciation for her clarity, professionalism, and approachability.

Overall, the feedback points to a strong impact from the session, with attendees citing practical improvements they would implement, such as enhanced poster layout strategies, more confident public speaking, and greater preparation before presenting.

Pre-Conference Webinar 3 Feedback

How to Prepare an Excellent Orla/Poster STEM Research Presentation Abstract

This session was attended by graduate students from disciplines such as computer science and science/mathematics education. None of the participants had previously attended the ERN conference. While two respondents were affiliated with HBCUs, one was not.

- Descriptive Statistics (Mean Scores)
- How well did the webinar meet your expectations? — 5.0
- Do you feel better prepared to deliver an oral STEM research presentation? — 4.0
- Overall effectiveness of the webinar — 5.0
- Effectiveness of the presenter — 5.0

Survey responses for the abstract writing webinar reflect strong attendee satisfaction. All respondents felt the webinar met or exceeded their expectations. The presenter received unanimous praise, and the overall quality of the session was perceived as excellent. The preparedness score (4.0) indicates that while participants felt more confident, there may still be areas in abstract writing that warrant further exploration or practice. Attendees valued the clarity of instruction and the structured approach to improving abstract quality.

Satisfaction Overall with ERN

All participants (not just students) were surveyed about their overall satisfaction with the ERN Conference in 2025 and the findings are summarized below, indicating that participants are highly satisfied with the event (the scale is 0-10 as previously mentioned and converted 1-11 for analysis). All mean scores are above nine suggesting high levels of satisfaction for all conference components.

Table 4 All Participant Satisfaction with ERN Overall

Satisfaction	N	Min	Max	Mean	SD
Speakers	415	1	11	9.70	1.49
Engagement at the conference	410	3	11	9.42	1.59
How it met your expectations	412	1	11	9.64	1.59
Platform/technology used (WHOVA)	412	2	11	9.37	1.93
The OVERALL effectiveness of the conference	415	3	11	9.77	1.40
Content	411	3	11	9.62	1.61
Delivery of content	414	1	11	9.70	1.59
Usefulness	415	1	11	9.63	1.75

Breakout Session Feedback

ERN participants were surveyed about their satisfaction with and the usefulness of the breakout sessions they attended. The findings are included below and show high levels of satisfaction and usefulness for each session. The scales were presented originally on the survey as 0 = not likely to use/satisfied and 10 = 100% likely to use/satisfied. For the analysis, the responses were converted to 1 – 11 because zeros would skew the mean scores. The findings are shown in Table 6 through Table 13 below and are broken out by day. Day one only had two sessions (the orientations for judges and students). Because day one only had two sessions, the survey combined all breakout sessions from days one and two into the same survey. The tables that follow are labeled with the topic of the survey question and the day of the conference that the table represents (i.e. Day 1 and 2 Expectations Met indicates survey findings for all sessions on days one and two of the conference when asked to rate satisfaction with each session at meeting participant expectations).

Table 5 Day 1 and 2 Expectations

On an 11-point scale, when asked to rate how satisfied they were with each breakout session at meeting participant expectations, respondents consistently gave high scores to the breakout sessions from days one and two.

Table 6 Day 1 and 2 Effectiveness

On an 11-point scale, when asked to rate how satisfied they were with each breakout session's effectiveness, respondents consistently gave high scores to the breakout sessions from days one and two.

Table 7 Day 1 and 2 Satisfaction with Content

On an 11-point scale, when asked to rate how satisfied they were with each breakout session's content, respondents consistently gave high scores to the breakout sessions from days one and two.

Table 8 Day 1 and 2 Satisfaction with Delivery of Content

On an 11-point scale, when asked to rate how satisfied they were with each breakout session's delivery of content, respondents consistently gave high scores to the breakout sessions from days one and two.

Table 9 Day 3 Expectations

On an 11-point scale, when asked to rate how satisfied they were with each breakout session at meeting participant expectations, respondents consistently gave high scores to the breakout sessions from day three.

Table 10 Effectiveness

On an 11-point scale, when asked to rate how satisfied they were with each breakout session's effectiveness, respondents consistently gave high scores to the breakout sessions from day three.

Table 11 Day 3 Satisfaction with Content

On an 11-point scale, when asked to rate how satisfied they were with each breakout session's content, respondents consistently gave high scores to the breakout sessions from day three.

Table 12 Day 3 Satisfaction with Delivery of Content

On an 11-point scale, when asked to rate how satisfied they were with each breakout session's delivery of content, respondents consistently gave high scores to the breakout sessions from day three.

Overall, the breakout sessions were rated highly by participants, with all sessions scoring above nine on an 11-point scale for satisfaction with meeting participant expectations, satisfaction with session effectiveness, satisfaction with session content and satisfaction with the delivery of content.

Judge's Survey Findings

The ERN 2025 Judges Survey was conducted to assess the experience of conference judges, with a focus on the effectiveness of abstract assignments, satisfaction with the judging process, and the perceived integration of judges' input into final decisions. The survey combined both scaled quantitative measures and open-ended feedback to provide a comprehensive view of how the judging process was experienced.

Summary of Judges Satisfaction

Judges were asked to rate several aspects of their experience using descriptive scales, which were numerically converted for analysis (on a 1–6 scale, where 6 represents "Very much" or "Very satisfied"). The results show high levels of satisfaction across all categories:

Table 13 Judge's Satisfaction

Item	N	Mean	SD
If you are a returning judge, please rate your overall satisfaction with the app/site enhancements that have been made?	48	5.00	1.81
If you are a new judge please rate the quality of the orientation, information and materials received regarding the 2025 ERN Conference judging process and logistics.	40	2.40	2.73
Rate the extent to which your abstract assignments and judge team groupings aligned/matched to your areas of expertise	52	4.33	0.51
Rate your overall experience as a 2025 ERN Conference judge.	52	5.60	0.66
Please rate the extent to which you feel your voice was heard and input incorporated into the final scores and award decisions.	52	4.17	0.47

Qualitative Feedback Themes

Open-ended responses from judges provided valuable insight into areas of strength and opportunities for refinement. Analysis of the qualitative data revealed five dominant themes:

- App Usability (10 mentions)
  A significant number of judges pointed to challenges with the judging app, such as difficulty navigating the interface or accessing necessary materials. Enhancements to the app's user experience were commonly recommended.
- Abstract Assignments (9 mentions)
  Judges expressed that while they were mostly satisfied, there were some mismatches between their expertise and the abstracts they were assigned. Suggestions included allowing more input from judges in selecting abstracts or improving the algorithm used for matching.
- General Satisfaction (7 mentions)
  Several judges used open-ended questions to reaffirm their positive experience, praising the organization, clarity of materials, and overall smoothness of the process.
- Team Communication and Scoring Input (4 mentions)
  A few respondents noted they wanted more clarity on how deliberations were structured and how their voice was factored into final decisions, suggesting the need for enhanced communication within judging teams.
- Orientation and Training (1 mention)
  One participant suggested providing more robust orientation or training for new judges, particularly those unfamiliar with the judging platform or process.

The 2025 ERN Judges Survey paints a clear picture of a strongly positive judging experience, with particularly high ratings for overall satisfaction and inclusion in scoring outcomes. While most judges felt well-matched to their assigned abstracts, this area scored slightly lower than others, indicating an opportunity to fine-tune alignment. Feedback also underscored the

importance of improving app usability and reinforcing communication within judging teams. These findings offer clear, actionable pathways for further enhancing the ERN judging experience in future conferences

Exhibitor's Survey Findings

Exhibitors rated several elements of their experience using qualitative scales, which were converted to a 1–7 numerical scale for analysis. Exhibitors found the students who visited their booths to be of very high quality, reflecting strong engagement and preparedness on the part of the student attendees. Exhibitors reported that their overall benefit of attending was high, with a mean score of 5.6, indicating that exhibitors saw clear value in attending and saw a positive return on investment in terms of exposure, recruiting, or institutional visibility. Most exhibitors reported that they achieved their primary objectives for attending—whether that involved recruitment, outreach, or program promotion. Usefulness of the Whova App is notably lower than the other areas evaluated. This reflects mixed experiences with the app as a tool for managing the exhibit experience, collecting leads, and coordinating logistics.

Table 14 Exhibitor Satisfaction

Satisfaction Topic	N	Mean	SD
Overall Benefit	15	5.6	0.51
Goal Achievement	15	5.6	0.83
Whova Usefulness	9	3.56	2.01
Candidate Quality	15	6.27	0.8

Qualitative Feedback Themes

Open-ended responses revealed additional insights into exhibitor experience. Although the number of comments was limited to two only. Those comments are summarized here.

- One respondent suggested enhancements to lead collection features, such as better digital tracking of student visitors at booths. This aligns with the lower satisfaction rating for the Whova app, suggesting that improved technology could boost exhibitor outcomes.
- Another comment praised the overall event quality, reflecting satisfaction with how the conference was organized and executed.

No themes emerged specifically around event logistics or student preparedness, and there were no strongly critical remarks, indicating that exhibitors were broadly satisfied with their ERN 2025 experience. While most goals were met, the feedback points to opportunities to enhance digital engagement tools—particularly the Whova app—for better lead management and communication. The insights from this survey affirm the value of ERN for institutional partners while offering a focused direction for future improvements in exhibitor support.

Student with Disabilities Working Group Feedback

The ERN 2025 Students with Disabilities Working Group (SWDWG) survey collected detailed feedback from attendees to assess satisfaction with sessions, explore what attendees found most beneficial, and gather suggestions for future improvements. Responses were evaluated through both quantitative metrics and thematic analysis of open-ended comments. Participants rated their satisfaction with three SWDWG events using a scale from “Not at all satisfied” to “Completely satisfied.” All three events received six out of six, the highest satisfaction rating. This exceptional consistency points to an overwhelmingly positive participant experience with the programming, content, and facilitation of the SWDWG sessions, according to the seven participants that replied to the survey (29 students reported having a disability on the overall student survey but only 7 responded to this working group survey).

Qualitative Feedback Themes

Participants were asked to identify the most and least valuable aspects of the working group and offer suggestions for future improvements. Their open-ended responses were analyzed and grouped into thematic categories:

This was the most common theme. Respondents emphasized the value of shared experiences, peer support, and inclusive dialogue. Comments referenced “group discussions” and connecting with others who have similar goals or lived experiences.

- Several attendees suggested more intentional documentation of the sessions, such as filming, creating recordings, or note sharing. These ideas reflected a desire to extend the impact of the discussions and ensure accessibility for those unable to attend.
- Some feedback touched on logistical challenges, including a request for a more centralized and accessible location for future events.
- A few participants simply described the event as “great” or “valuable,” with no additional commentary.
- None/No Suggestions (2 mentions)

Several respondents noted that everything was beneficial or had no suggestions for improvement, reinforcing the highly positive sentiment found in the satisfaction ratings. The SWDWG at ERN 2025 was unanimously rated as completely satisfying, underscoring the success of the event in providing a welcoming and empowering space for attendees. Themes of connection, community, and shared learning were central to participant reflections. While satisfaction was unanimous, suggestions for improvement included capturing and sharing session content and ensuring future venues are as accessible as possible. These findings validate the value of the SWDWG experience while offering concrete steps to enhance inclusion and long-term impact moving forward.

Similarly, leadership for the working group administered their own follow up survey about a joint lunch with both working groups and those qualitative data were analyzed and summarized. Participant feedback emphasized the importance of sustained connection and collaboration, including regular meetings, shared platforms, and opportunities for collective dialogue. Respondents called for stronger infrastructure such as a secure central repository of resources, documentation of outcomes, and consistent internal evaluation to ensure accountability. Demonstrated commitment, clear action plans, and preparedness through training and response mechanisms were highlighted as critical to maintaining momentum. Finally, participants stressed that access must remain core values of STEM societies, supported by interdisciplinary partnerships and ongoing capacity building across staff, boards, and members.

SWDWG Summary of Observations of Working Group Meeting

Stigma, Disclosure, and Performance Credibility

Concerns about disclosing disabilities in professional and academic settings were widely shared. Attendees expressed that disclosure often led to doubt, infantilization, or misjudgment of competence. Visible disabilities in particular were cited as undermining credibility and creating social isolation. Nevertheless, for some, strategic disclosure was empowering and allowed them to gauge institutional values and supportiveness.

Participants emphasized the need to shift public and institutional narratives to focus on ability, contribution, and resilience. They advocated for media representation and institutional messaging that highlight disabled scientists as credible, capable, and valuable members of the STEMM community.

Mentorship, Community, and Support Networks

Mentorship emerged as a critical element for success. Attendees underscored the importance of peer, upward, and cross-generational mentoring to combat isolation and support persistence in STEMM pathways. The idea of Professional Learning Communities (PLCs) was introduced as a way to structure collaborative support and shared goal-setting.

Additionally, the group discussed creating year-round digital spaces such as Discord servers or message boards to maintain engagement beyond conferences. These asynchronous communities were seen as critical for sustaining morale, fostering mentorship, and addressing isolation.

Action-Oriented Recommendations

Several concrete strategies and proposals emerged:

- **For the 2025 ERN Conference:** Suggested theme: "Sustaining Disabled Hope and Joy in STEM." Proposals included sessions on advocacy skills, international collaboration, structural barriers, and mentorship frameworks.
- **Student Needs Assessment:** Drafting and distributing a survey to understand support needs.
- **Ongoing Engagement:** Hosting pre-conference meetings and using April ERN Working Day outputs to support yearlong engagement.
- **Institutional Advocacy:** Encouraging universities and scientific organizations to develop better support structures and normalize accommodation as part of standard operations.
- **Leadership Development:** Supporting disabled students and professionals to lead efforts in scientific diplomacy, policy engagement, and institutional transformation.

Professional Societies Working Group Feedback

The PSWG (Professional Societies Working Group) survey conducted at ERN 2025 collected feedback from participants regarding their disciplinary background, satisfaction with the working group, intentions for future involvement, and overall impressions. This analysis summarizes both the quantitative and qualitative findings from the survey to help inform improvements and planning for future PSWG events.

Disciplines Represented

Survey participants represented primarily engineering, with 5 of 7 respondents identifying this as their discipline, however, attendance at the event was actually fairly evenly split with 5 from engineering, 5 from sciences, and 6 from STEM broadly. So, the survey responses are skewed toward engineering participants, but this is not reflective of the program's the outreach, event participation, and attendance.

Future Participation Intent

When asked if they plan to participate in the PSWG at ERN next year:
- 5 respondents said "yes"
- 1 respondent said "unsure"
- 1 respondent said "no"

This reflects an overall positive reception of the PSWG, with 71% of respondents (5 out of 7) planning to return, and only a small number uncertain or disinclined to attend again. One "no" respondent cited a scheduling conflict with the NSBE 2026 Convention, not dissatisfaction.

Interest in PSWG Advisory Committee

When asked if they would be interested in serving on the PSWG Advisory Committee in future years:

- 2 respondents said “yes”
- 5 respondents said “no”

This shows that while the event sparked engagement, only 29% of participants (2 out of 7) are currently willing or able to commit to an advisory role. Some respondents indicated interest but noted external limitations, such as workload or calendar conflicts.

Qualitative Themes from Open-Ended Feedback

Open-ended responses from participants were analyzed thematically. Across multiple survey items—such as what participants found most valuable, least valuable, suggested improvements, and planned follow-up actions—key themes emerged:

-Collaboration & Networking (4 responses): Respondents emphasized the value of engaging in collaborative, cross-society discussions.
- Planning & Follow-Up Actions (2 responses): Two participants outlined specific intentions to follow up with colleagues or leadership groups.
- Meeting Structure and Logistics (2 responses): Some comments referenced the format of the meeting and technological or procedural hiccups.
- Communication & Messaging (1 response): One response emphasized the need to better communicate the societal value of science and engineering.
- Representation & Inclusivity (1 response): A response indicated interest in better integrating professional societies and ensuring inclusive engagement.
- Policy & Legislative Engagement (1 response): A participant cited the legislative updates as a major takeaway.
- Positive General Feedback (1 response): One participant succinctly noted that the event was “valuable.”

The PSWG session at ERN 2025 was positively received, with the majority of participants reporting plans to continue involvement. Qualitative feedback highlighted the event’s value in promoting collaboration, action planning, and inclusive dialogue. Participants appreciated the legislative context and expressed readiness to support future initiatives. However, findings also suggest an opportunity to refine logistics, expand participation from other STEM disciplines, and strengthen the advisory engagement pipeline. These insights provide a strong foundation for enhancing future PSWG activities at ERN.

PSWG Summary of Observations of Working Group Meeting

Workforce Development and Resilience

Professional societies are shifting focus toward supporting workforce preparation. This includes:

- Professional development opportunities that embed membership benefits.
- Mentoring programs to train new generations in advocacy and leadership.

There is a growing recognition that mission-driven work must adapt to continue effectively, including finding ways to protect early-career researchers and foster resilience in a changing landscape.

Strategic Recommendations and Next Steps

Action-oriented proposals and forward-looking recommendations included:

- **Leveraging existing spaces and partnerships**, including informal gatherings at conferences and joint efforts through entities like the Societies Consortium on Sexual Harassment in STEMM.
- **Ongoing collaboration**, with a commitment to sustained meeting cadence and implementation tracking by organizers

Overall Evaluation Summary

This program year saw successful implementation of the program, on time, within the planned scope and to the targeted participants. Additionally, participants were highly satisfied with all program components.

1. Are project activities being administered on time, to the target participants and within the scope of what was planned? **YES**
2. Are program participants satisfied with the activities? **YES**

Recommendations

Continue with ERN Conference Activities

The data gathered from the event show participant support for the program activities and have generated evidence of program success. It is recommended that the conference activities continue and that the findings of this report are used to refine the planning of the next ERN conference.

Continue Effective Communication with Evaluator/s and Project Leadership

Project leadership and staff maintained regular communication with the evaluator/s throughout this program year. Data were collected and shared in a timely and effective manner. This promotes timely and thorough assessment of the program, and it is recommended that these practices continue.

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Appendix

Student Impact Survey Items and Scale Reliability Scores[3]

Persistence in STEM Cronbach's α = .89 for 9 items

Find ways to get to know STEM mentors, even if they are busy.

Deal with unfair treatment in STEM classes, if you received it because of your race/ethnicity.

Deal with unfair treatment in STEM classes, if you received it because of your gender.

Persist in STEM classes even if you did not see many other people like you in them.

Deal successfully with competition among peers in STEM.

Stick with the decision to pursue STEM education/career even if someone close to you tried to discourage this decision.

Find ways to overcome communication problems with math/science/engineering professors or teaching assistants.

Continue in STEM even if you felt that the environment in these classes was not welcoming for persons of your gender, race, ethnicity, social class, or disability status.

Be recognized by STEM professionals for my work in STEM.

Sense of Community in STEM Cronbach's α = .63 for 6 items

I have developed personal relationships with other students in STEM.

I feel comfortable contributing to STEM discussions.

I feel that a STEM faculty member would take the time to talk to me if I needed help.

I feel better when I see others who look like me in STEM classes/departments/careers.

[3] Each set of items used either confidence or agreement scales where participants rate their confidence/agreement from 0 – 10 where 0 = none and 10 = 100%. For analysis the scales were converted from 0-10 to 1-11 so that zeros did not skew the mean scores.

Being underrepresented (i.e., by race, social class, ethnicity, gender, ability, etc.) in the academic STEM disciplines makes me more vulnerable to stress than my well-represented peers.

I feel supported in STEM when faced with unique challenges.

Self-efficacy in STEM Cronbach's α = .93 for 17 items

Even without the ERN Conference, I have access to the kind of professional development that I need to be successful in STEM.

My health (physical and mental) is as important as my academic STEM success (grades, internships, etc.).

I have a network of people in STEM to help me pursue my educational/career goals.

I understand how to secure internships in STEM.

I know how to navigate my search for a career in STEM.

I can complete my degree/graduate degree in STEM.

I can find and secure adequate employment in STEM upon graduation.

I have communication skills in STEM that will further my career/education goals. (i.e. presenting at conferences, working on teams, etc.)

I have the ability to prepare application essays, resumes, and other documents needed to foster my STEM goals.

I can solve real world STEM problems.

I understand research articles or books about STEM issues.

I can work on a project involving STEM concepts.

I will contribute to STEM scholarship through my education and future employment.

I know how to secure funding to complete my educational goals in STEM.

I have access to enough funding to pursue my goals in STEM.

I have access to enough resources to help me achieve my goals in STEM.

I feel confident in my knowledge about available STEM scholar