



Outreach Strategies: Lessons Learned from a National Center

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Abstract: This paper examines lessons learned from five years of outreach efforts by the Micro Nano Technology Education Center (MNT-EC), a national center funded by the U.S. National Science Foundation's Advanced Technological Education (ATE) program. Outreach is an essential component for increasing public awareness, expanding relevant accredited coursework and degrees, building workforce pipelines, and developing sustainable industry-academic partnerships. Yet scaling outreach from regional to national levels presents persistent challenges related to resources, topical alignment, and sustained engagement. Drawing on MNT-EC's experience, this article synthesizes digital engagement data, partnership dynamics, and cultural considerations to present a structured model for national-scale outreach. Findings indicate that intentional, consistent, and student-centered communication strategies, combined with strategic partnerships and coordinated amplification across collaborators, significantly increase engagement and impact.

Keywords: outreach, technician education, micro-nano technology, partnerships, workforce development

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Introduction

Micro Nano Technology Education Center: A National NSF ATE Center

The Micro Nano Technology Education Center (MNT-EC) was established in 2020 as one of ten national centers funded by NSF ATE. The Center unifies leaders from earlier regional and national projects and centers specializing in micro- and nanotechnology education and now collaborates with more than 80 faculty and administrators across 40 community colleges, over 50 industry partners, and several nonprofit organizations. MNT-EC's goal is to "grow the micro and nano technology (MNT) technician workforce by fostering academic and industry mentorship between existing MNT partners and educators developing prospective community college MNT programs" [1].

MNT-EC uplifts, unifies, and collaborates on projects with other ATE centers, industry, and nonprofits in the micro-nano sphere. The Center disseminates information, learning opportunities, and professional development opportunities. It provides assistance to those who need support with project proposal mentorship, faculty and student support to attend conferences, opportunities for students to present at

conferences, participate in undergraduate research programs, and more. MNT-EC has four specific target audiences: faculty at community colleges, universities, and grades 7-12. They also work with students at community colleges and grades 7-12, companies in the micro- and nanotechnology industries, and the general public.

Defining Outreach

In the context of a technical workforce education center such as MNT-EC, outreach refers to the organized effort to connect with and engage students and external partners to expand access, awareness, and participation in workforce pipelines and resources. The goal of outreach is to create pathways into technical professional fields and to build stronger ties between the colleges and the communities it aims to support.

While NSF's ATE program does not list explicit outreach requirements, its emphasis on partnerships, curriculum development, and technician workforce preparation inherently necessitates engagement with educational institutions, industry, and the public.

An effective outreach program is critical to the success of an ATE center, as outcomes are measured and reviewed by their ability to engage with prospective students, faculty, and professionals to create sustainable pathways for technician education as well as a robust workforce pipeline in the sub-fields supported by NSF ATE.

Here, we present five years of data, identify lessons learned, and offer a scalable outreach framework for programs looking to grow or are newly established national centers.

Methods

This article draws on internal annual evaluation reports, digital engagement analytics (website traffic, social media metrics, email campaign data), and qualitative observations documented by the MNT-EC leadership team. These data reflect a mixed-methods approach that integrates quantitative measurement with narrative insights from faculty, administrators, students, and industry partners.

Data Sources

- Annual evaluation reports
- Digital communication metrics (YouTube, LinkedIn, Mailchimp, website analytics)
- Documentation of partnership meetings and community-of-practice activities
- Observational notes from outreach events and conferences

This approach provides a holistic understanding of how outreach strategies performed over time and identifies both barriers and effective practices.

Results

Scaling Up: Going from Regional to National

An outreach effort focuses on a localized area. That "localized" area may be defined relationally, educationally, or geographically. For an endeavor such as technological education, the initial outreach will be to the student population, educational institutions, and industries directly related to the technical topic within the physical region where the training occurs.

Historically, outreach has focused on like-minded populations within a limited geographic area. This included communication among local technical high schools and colleges and creating partnerships with neighboring industries in similar technology arenas. Growing beyond the "local" population requires a combination of geographical expansion and heightened awareness and communication. The challenges include technical and equipment requirements, building awareness of the multi-disciplinary aspects of a technology, and a lack of cultural knowledge.

In a grant-funded program, most of the budget is devoted to the successful execution and completion of the project's goals, with outreach often being a secondary or tertiary focus and therefore having a smaller budget.

Outreach consists of both expanding geographically (in terms of connecting with schools and organizations in different zip codes) and culturally (in terms of introducing people to new technologies or fields and their associated benefits). This latter component can pose a challenge to an ATE center, as MNT-EC can attest. MNT-EC found that, generally, students and some personnel were not aware of the multi-disciplinary nature of nanotechnology, nor of the careers and options available in the micro-nano technology ecosystem. In fact, the term "nanotechnology" was seen as vague or difficult to grasp.

The transition from a regional to a national scope intensifies many of these challenges. Workforce needs vary substantially across U.S. regions, and outreach is most effective when grounded in local (city, state or regional) labor-market demand and tailored to the industries in a given area. Coordinating across multiple time zones, navigating diverse and disparate industry mixes, and accounting for differences in training capacity all add complexity that a regional center does not face.

For MNT-EC, this meant that national outreach could not simply replicate a regional model at larger scale; it required building general awareness of micro- and nanotechnology career pathways while also working through regional partners who could translate that awareness into locally relevant opportunities. Being aware of these regional differences and designing outreach that complements local efforts is essential to making the national model feasible.

Strategic Partnership Development

The purpose of a partnership is to meet a goal defined by the center's strategic mission. For MNT-EC, the ultimate aim is to generate nano and micro-savvy technician-level employees to the workforce. To reach this goal, MNT-EC provided necessary educational content to a large number of community colleges with students in technical fields. This required partnerships with educational institutions to train students using available resources, as well as partnerships with industry to hire the graduates.

A complicating factor of nano and micro-scale technology education is that the tools and knowledge required to operate at the atomic and molecular level can be applied to many industries – some that are similar, yet many that are unrelated, such as construction, water treatment, medical diagnostics, and wearable sensors, semiconductor manufacturing and aerospace. At a basic level, it can be difficult to build and sustain alliances between certain academic departments and various industry members who prefer to focus solely on their particular field.

Historically, these groups or partnerships are small, short-lived, have fluid memberships, and often the contribution, although robust, may not meet the original, broader intent of the center.

Social Media and Digital Media: Prioritization of High-Impact Platforms

In its early years, MNT-EC's outreach efforts spanned numerous digital platforms. This broad approach proved difficult to sustain and evaluate for impact. Over time, three platforms emerged as the most effective: LinkedIn, YouTube, and Mailchimp. For public awareness, the first two are most helpful. For direct connection, with mostly no filters or algorithms, Mailchimp provides the most significant "return on investment" because it supports the former two by driving synergistic traffic to pages and posts almost immediately.

LinkedIn is a natural venue for professional and career-oriented communication. As students begin establishing their own professional profiles, the platform provides a purposeful and engaged audience for MNT-EC messaging. Other social media channels, while visually dynamic, are less aligned with the Center's mission and are difficult to stand out from large-scale institutional branding budgets beyond its scope.

Platforms like Instagram and Facebook were evaluated and retained as potential future accounts but ultimately ranked as low priority. These channels favored entertainment-driven engagement and required content-production resources disproportionate to their demonstrated impact within MNT-EC's audience. Additionally, the competition for attention in algorithm-driven feeds made it challenging for educational messages to maintain visibility without paid promotion, which NSF guidelines prohibit.

Comparative observations within the ATE community also informed this decision. Experience with another NSF ATE project indicated that although Facebook maintained a consistent following and sense of community, its potential to drive users to target websites (a top priority for most projects) or learning resources was limited. Engagement often remained on the platform, generating visibility but no measurable conversions —i.e., direct clicks from Facebook to the website.

In contrast, LinkedIn and YouTube consistently directed users to project resources, applications, and event pages. These insights reinforced the strategic decision to prioritize platforms that better support action-oriented engagement rather than passive consumption. However, it is important to note that this is the ongoing challenge with any platform where a center or project does not have direct access to its users or followers – one is at the mercy of a platform’s algorithms to surface content it deems worthy of a user's attention. This algorithm-driven approach is why email outreach, with its direct-access model, is ideal for strategically elevating all content shared.

By focusing on LinkedIn as the primary outreach channel (while recognizing YouTube's complementary role), measurable growth occurred. Follower count rose from 170 to 371 in early 2024, when the focus shift began, and reached approximately 800 by mid-2025. This exponential upward trajectory indicates that the revised strategy was both practical and sustainable [2].

Table 1. Primary outreach tools utilized in Year 5 of the MNT-EC award cycle

Outreach Tools	
Website	Blog
Email Campaigns	Newsletter
Videos	Conferences
Career Awareness Materials	Podcasts
Professional Development Workshops	Social Media
Undergraduate Research	Undergraduate Internship

Video as a Core Engagement Channel

YouTube has proven to be a durable and valuable complement to other communication efforts. Views increased from 800 in Year 1 to nearly 64,000 in Year 5, totaling 147,896 lifetime views. For a niche educational channel, these results demonstrate significant visibility and keyword recognition within search results. YouTube is considered the number two search engine, second only to Google (its parent company), and that discovery aspect has driven new viewers and followers to the channel.

MNT-EC’s "Your Future in Nano" short video series served as a primary entry point for students, with individual episodes attracting 7,000-9,000 views each. "Short-form video" is usually less than 10 minutes in length. The tight focus targets student audiences and has consistently outperformed almost all the channel's longer videos.

Most videos, long or short, thrive when they solve a problem or answer a question the viewer has. This is part of how YouTube evaluates and ranks videos: do they answer the viewer's search question or intent? YouTube rewards videos that keep people on the platform. While longer videos can foster deeper engagement, there has been a universal shift among consumers toward short, dynamic video posts.

However, MN-TEC's Talking Technicians podcast, cross-posted from the Buzzsprout audio platform to YouTube, has gained consistent attention despite its minimal visual design—meaning there is little dynamic content and only a static image throughout the video. The podcast is experimenting with recorded video components, and recent progress seems positive for increased visibility and reinforcing the program's cross-platform reach. Many podcast listeners use YouTube as their audio-only platform of choice, so this is not a novel strategy; it is simply posting content where users are known to visit.

Discussion

National ATE centers face several challenges regarding outreach. Outreach may be limited by geographic, financial, or cultural barriers. For MNT-EC, the lack of mainstream knowledge of the scope, career paths, and general relevance of micro and nanotechnology fields remains a challenge. Therefore, outreach efforts need to include an uncomplicated educational element to pique the interest of targeted populations. Outreach requires heavy engagement with intended audiences, i.e., community college students on technical tracks, faculty and administrators, and industry partners.

Partnerships are essential to scaling outreach beyond local contexts. MNT-EC relies on alliances between community colleges and industry to create technician-level training pipelines. Yet such partnerships are often small, short-lived, and fragmented. Key obstacles include weak member commitment, the absence of shared vocabulary across disciplines, unclear or poorly managed goals, and insufficient recognition of cultural differences. Partnerships also struggle when perceived benefits for participants are lacking or when outreach funding is treated as secondary to core project objectives.

Strategic use of digital communication and social media provides incredibly beneficial and cost-effective tools for disseminating information across broad regions and populations. However, communication needs to be tailored to specific audiences across relevant channels to be most effective. Having dedicated personnel to produce, publish and track digital communication sources is a necessary component of outreach. Addressing these challenges requires deliberate action. The section below discusses the steps and strategies that MNT-EC integrated to address these issues.

Participate as an Active Partner

In practice, building partnerships starts with meeting with potential collaborators – attending conferences that are technically aligned, reaching out to corporate individuals who manage workforce development, and spending a good deal of time asking questions to understand what their pain points are, and building meaningful relationships. For example, effective partnerships of any kind depend on four interrelated steps:

Step 1: Study. It is necessary to study the educational institutions, industries, and cultures intended to be the recipients of the outreach effort. This includes researching the programs, strengths, and faculty depth of an educational institution, as well as the focus and philosophy of the administration. For industry, study their websites, review job openings, products, and research areas. Search for information regarding the culture to understand their lifestyle, philosophy, history, mindset, and present situation.

Step 2: Listen. Do everything possible to have short one-on-one conversations with people from each of these groups. Attending meetings of the groups mentioned in Step 1 is also a way to meet people who can provide insight.

Step 3: Remain "other-focused". This step is closely tied to Step 2 but is often overlooked by organizations seeking to set up strategic partnerships. Take time to understand how an ATE center's involvement will benefit their partner organizations.

Step 4: Engage. Begin to find the person or persons to work with as a strategic partner. This may take a few rounds, and it may require reaching out to people at higher or lower levels within a target organization. If there is a specific group or function they can participate in, let them know the goal and the benefits of their involvement.

Following these four steps will help create strong strategic partnerships to address common challenges and result in sustainable groups to support an ATE project. These measures can transform outreach from fragmented and short-lived efforts into sustainable, mutually beneficial collaborations.

After any touch point, quick follow-up with direct next steps is also crucial. Successful outreach is measured in terms of participation and retention. Understanding how your targeted population and partners define success is key, as well.

Working with Industry

The most important factor in a relationship-building effort, in this case for a technological education project or program, is to clearly express the benefit of the proposed relationship. An NSF-funded project has distinct attributes, processes, and results that can benefit any number of population segments; however, often the approach to capturing partners or participants is too focused on the attributes of the program and not enough on the benefits to an outside partner.

Partnerships with industry are a classic example of this situation. The mission of an ATE-funded program is to develop a knowledgeable workforce. This involves finding the appropriate participants, creating and providing educational content and training and preparing them for the workforce environment and culture. When working with company and industry members, a crucial component is defining the KSAs (knowledge, skills, and abilities) they need for their future technician hires.

A large part of this effort that significantly contributes to the success of a project is involvement and partnership with the companies that will hire the project's "graduates". This success is usually measured by how many project graduates obtain appropriate work in the discipline.

However, often industry involvement is based on personal relationships and relies on the willingness of industry personnel to devote time to the efforts of the technician education project.

Whether the project is reaching out to industry, city or civic organizations, or other projects, it is important to clearly state the benefits to those potential partners.

For example, industry benefits may include:

- Confidence that potential employees will have the knowledge, skills and abilities desired
- Knowledgeable and prepared entry-level employees require less time and money in training
- First access to the best and brightest graduates
- Name recognition for a company

Finally, for any partnership between an ATE center and industry members, it is important to clearly define the assumptions, expectations, and commitment requirements of each participant.

Tailoring Content

The art of tailoring content essentially means using the same vocabulary, understanding an audience's culture, and acknowledging where they're at in terms of prospective outreach partners or recipients. Tailoring content involves logic and emotion.

It is important that the vocabulary used in outreach efforts is appropriate and accurate for the demographic to be reached. Utilize the connections with partners across various geographic areas and ask for a review of the intended outreach material to get important perspective feedback before launching targeted marketing material. Although simple to do, skipping this step can result in significant unintended consequences.

Outreach requires contextual consideration. Acknowledge the current situation of the intended recipient(s). Outreach communications should recognize the practical and emotional situation of potential participants. As an example, one focus of MNT-EC is to build a strong a semiconductor fabrication workforce. Even though people currently working in the semiconductor field are aware of the opportunity, creativity, innovation, and career advancement opportunities in their industry, just listing those nouns and a few pictures will not draw more than a handful of students into the program. However, when the outreach effort addresses their uncertainty ("are there enough jobs available that I can get one?"), the self-doubt ("am I smart enough to do that?"), the historical hesitation ("what if this is another dead-end job?"), things can change. In a way, outreach works by creating an avatar that relates to the audience's current situation. When outreach efforts connect with people who can identify with the avatar, they are then ready to listen to what you may have to say about a better path, a better option.

Cross-Collaboration with Regional and National Companies and Organizations

When working on a national level, it is important to 1) define the customers, 2) identify ways to reach them, and 3) determine how to work with them. When working with industry, the time they give towards the program must be valuable to them. MNT-EC employs several strategies for working with its industry partners. Two specific models are: the BILT (Business and Industry Leadership Team) model and the Working Partners model.

The employer-led BILT model was developed by Ann Beheler, an experienced leader in workforce development and PI of multiple federally funded centers [3]. The design is simple: one industry member is selected to be the "cheerleader". This person coordinates monthly meetings with other industry representatives in the area of need. For example, MNT-EC's area of need is micro- and nanotechnology and related areas (biotechnology, optics/photonics, materials). BILT runs two types of meetings. One is a trends meeting, where industry talks about what's coming down the pipeline. This could be new manufacturing or processing equipment, new processes, or even new designs. The purpose is to identify what skills or abilities technicians will need to know 3-5 years from now so that MNT-EC can adapt technical training programs to fit the need.

The other type of meeting is called a KSA (Knowledge, Skills, and Abilities) voting meeting. In this meeting, industry members rank the KSAs technicians need to know in order to be successful in their position within industry. KSA voting meetings happen quarterly, with each KSA area voted on each year. MNT-EC has three KSA areas; microsystems process technician, microsystem maintenance technician, and chip design technician.

The Working Partners program is an internal effort. MNT-EC has a dedicated group that evaluates the partnerships within the center and ranks them according to their needs. Each year after joining MNT-EC, they are evaluated as to whether or not they have fulfilled their duties to MNT-EC and if MNT-EC has fulfilled its duties to them. A conversation is had with them on how they would like to move forward with MNT-EC each year. This ensures that they are getting what was promised to them and that MNT-EC is getting what it was promised.

MNT-EC also hosts a Community of Practice (CoP). This community is comprised of students, community college faculty, university faculty, and members from industry, non-profits and other organizations. The group meets once a month to discuss what is happening within MNT-EC, the CoP, ATE, and industry. Participants have the opportunity to discuss what they are doing, ask questions, and get help with anything they may need.

Outreach to faculty outside of the CoP is done through the MNT-EC Mailchimp newsletter, newsletters from other organizations like SEMI, NIICA, nanoHUB, etc. Partners are asked to disseminate information out to their networks just as MNT-EC disseminates its information to internal networks. The aim is to try to make the lift as light as possible for MNT-EC industry partners.

Digital Communication

Five years of experimentation demonstrated that digital tools alone are insufficient without focus, consistency, and narrative authenticity. Content that highlighted individuals—particularly students—consistently outperformed general announcements or event promotions. It is important to note that content directly aimed at helping students find internships or apprenticeships, or increase their future work opportunities, was highly viewed and often ranked close to student-focused stories.

The primary lesson from this period is clear: sustained growth and meaningful engagement rely on a strategic focus on platforms and the ongoing promotion of authentic stories or opportunities. These principles will guide the next phase of MNT-EC's outreach and communications strategy. The following section will discuss the institutional impacts that have resulted and explore how the lessons learned from MNT-EC's experience can inform outreach and partnership strategies for other NSF ATE centers and projects.

Student-Centered Content Drives Engagement

Content created about students, families, and faculty consistently achieved the highest levels of engagement. During 2023–2024, student and parent webpages recorded over 5,600 views. Podcast episodes featuring technician stories experienced a 77 percent increase in listens or downloads, reflecting strong audience interest in these narratives.

Email campaigns through Mailchimp reinforced this pattern. Internship-focused campaigns achieved an average click-through rate of approximately 38 percent, significantly exceeding benchmarks in the education sector. These outcomes highlight the effectiveness of centering outreach around authentic student voices, even though maintaining a steady pipeline of such stories remains an ongoing challenge, as students naturally focus on their studies rather than on helping an institution use them to tell its own story.

Navigating the Attention Economy

Capturing and retaining online attention has become increasingly complex. To enhance visibility and engagement, three coordinated strategies were implemented:

1. Visual storytelling: Student profiles, posters, and multimedia reports consistently generated higher traffic.
2. Synchronized distribution: Posts were timed with Mailchimp campaigns to engage nearly 3,000 subscribers, maximizing initial visibility and participation. Other attempts to time posts, such as early in the morning or later in the day, have not yielded much difference in traffic when evaluated on their own merits. Most content today is available whenever the user wants to consume it, and its distribution time is less important than if the creator is a trusted and valued resource producing content the user sees as relevant.
3. Partnership amplification: Sharing content through collaborating institutions extended reach, though refinement of these collaborative processes is still ongoing. Amplification is a key strategy for MNT-EC through direct emails to keep partners and organizations updated as content is published. Tagging content on LinkedIn with the @ symbol, because it puts the post directly into another individual's or organization's feed, often results in the content being surfaced higher and directly to the tagged user. If no relationship exists, this is considered spam; however, tactical use, when communicated proactively between partners and allies, results in greater views and traffic.

Together, these efforts created a more cohesive and data-informed approach to engagement across digital platforms. Table 2 shows the longitudinal growth of views and engagement with MNT-EC platforms, a direct result of the aforementioned strategies implemented.

Table 2. Year-to-year growth of visits and views on MNT-EC’s outreach platforms

Channel	Y1	Y2	Y3	Y4	Y5
Website Visitors	805 ^a	3,648	6,614	14,428	22,808
YouTube Views	802	1,285	2,579	15,351	63,784
YouTube Subscribers	55	102	166	580	1,469
LinkedIn Followers	--	--	170	882	1,436
Podcast Downloads (cum.)	418	1,278	2,274	4,034	6,647

^a First 64 days after the February 2021 launch

Long-Term Measurement

Early experimentation with partner amplification laid the groundwork for a broader concept later termed “social amplification” – a coordinated model of shared outreach across ATE projects and partners. MNT-EC is doing this on a narrower scale.

Over the next five-year funding cycle, the Center plans to formalize testing of its social amplification practice, e.g., the intentional coordination of content sharing among ATE centers, projects, and industry partners. Early observations indicate that when outreach materials are released simultaneously or cross-linked through multiple channels, both reach and engagement rise measurably without added cost.

In the forthcoming award cycle, MNT-EC will regard amplification as both an outreach method and an evaluative measure of collaboration. Tracking co-authored posts, content tagging and re-sharing/re-posting, reciprocal links, and shared analytics reports will provide quantitative evidence of network strength—an indicator increasingly relevant to the ATE program's emphasis on partnerships and national impact.

Dissemination remains a defining metric across ATE centers. The 2024 ATE Survey Report notes that 61 projects collectively produced 204 publications—ranging from journal articles to newsletters and online reports [4].

The same report highlights that most projects “shared their evaluation results with NSF program officers, faculty or staff at their host institution, and executive administrators,” demonstrating a mature cycle of feedback and transparency [5].

These national-level dissemination data reinforce MNT-EC’s emphasis on long-term measurement, positioning social amplification as the next stage—quantifying not just what is shared, but how far and through which partner networks information travels.

The Rise and Integration of Artificial Intelligence

Looking forward, artificial intelligence (AI) is poised to reshape several dimensions of outreach work. Generative AI tools can, to an extent, accelerate the drafting of newsletters, video scripts, and accessibility-friendly captions. AI-assisted analytics can help teams identify which content resonates with certain audiences and highlight trends across platforms more quickly than manual review allows. At the same time, algorithm-driven dynamics already shape platform visibility, and this may intensify as AI-generated content saturates feeds. As such, authenticity, human voice, and trusted partner amplification will become even

more important. MNT-EC has begun piloting AI-supported workflows in its renewal funding cycle and has seen how it can be beneficial for certain workflows, but it requires human effort to prompt, teach, add context, and thoroughly review for accuracy and mistakes. The “assisted” element of AI-assisted work is crucial to keep in mind – AI will not replace humans who manage outreach initiatives, but it will aid their workflows, and, if built and used properly, will provide insights that can drive deeper impact.

Conclusion

When intentionally designed and iterated upon, outreach is a powerful force for connection and impact. Through social media, video, email, and events, the Micro Nano Technology Education Center has established strong ties between community colleges, students, and industry.

The clearest wins came from student-centered content. Videos, podcasts, and success stories consistently pulled more interest than standard event notices. Posts tied to internships and jobs performed exceptionally well.

Cross-posting to LinkedIn further increased traffic, while Mailchimp campaigns to nearly 3,000 subscribers maintained high engagement. Analytics confirmed what we saw firsthand: highlighting students, faculty, and staff attracts the audience.

For ATE projects and centers, the message is simple. Put people at the center. Outreach that amplifies authentic voices, backed by data, can build a stronger workforce pipeline and also enhance competitiveness for future funding.

Summary Framework

Five principles emerged as central to effective national outreach:

1. Focus: Prioritizing the highest-impact communication platforms.
2. Consistency: Delivering regular, data-informed messaging.
3. Community: Centering student and practitioner stories.
4. Collaboration: Leveraging partner networks to enhance reach.
5. Cultural Awareness: Tailoring outreach to context and audience.

Five years of outreach by MNT-EC demonstrate that successful technician education outreach relies on intentional design, strategic platform choices, and authentic, student-centered narratives. Partnerships were most effective when aligned with mutual benefit and maintained through consistent communication. Looking forward, the center will formalize its social amplification model to strengthen collaboration across ATE communities. This approach may serve as a scalable, low-cost mechanism for enhancing and measuring national impact.

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