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SPECIAL ISSUE: PEER-REVIEWED ACCEPTED ARTICLES

Undergraduate Research as a High Impact Practice: A Longitudinal Case Study of the LSAMP Summer Research Program at the University at Buffalo (UB)

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Undergraduate research experiences are a critical factor in STEM degree completion, graduate school attendance, and career persistence, particularly for underrepresented students. Despite its benefits, participation remains disproportionately low among Black and other minoritized students due to barriers such as limited awareness, time constraints, and anticipated negative faculty interactions. This case study examines the University at Buffalo's Louis Stokes Alliance for Minority Participation (LSAMP) Summer Research Program, which is designed to increase engagement and retention of underrepresented undergraduates in STEM. The program employs four core strategies: mentored research experiences, professional development and graduate school preparation, community-building activities, and a research methods curriculum. To evaluate the long-term impact of the program, this study analyzes publicly available LinkedIn profiles of 154 alumni who participated between 2012 and 2024. The analysis focuses on educational attainment, graduate school enrollment, and employment in STEM fields. Findings highlight how LSAMP's integrated support model fosters belonging, confidence, and academic persistence, contributing to a more diverse and equitable STEM workforce.

The Louis Stokes Alliances for Minority Participation (LSAMP)

On May 2, 2025, the National Science Foundation (NSF) canceled funding for the Louis Stokes Alliances for Minority Participation (LSAMP), nearly 35 years after the program was established by Congress. The termination aligned with the Trump administration's shift in federal priorities, reflected in

Executive Order 14,151, *Ending Radical and Wasteful Government DEI Programs and Preferencing*, issued in January 2025. This order required the termination of all federal activities related to diversity, equity, inclusion, and accessibility (White House, 2025), including the NSF's long-standing "broadening participation" initiatives designed to expand access to STEM for women and groups historically underrepresented in these fields. LSAMP awards were subsequently discontinued on the grounds that they no longer reflected NSF priorities, despite extensive evidence demonstrating the program's effectiveness in strengthening the domestic STEM workforce;

increasing community college transfer into STEM majors; providing high-quality summer STEM learning experiences; supporting STEM identity development; expanding funded undergraduate research opportunities; and fostering psychological, academic, and technical readiness (Barros-Bustos & Chicas-Mosier, 2026). Recent national data indicate that at least 6% of earned doctorates awarded to people of color (POC) between 1992 and 2022 went to LSAMP alumni, including 10% of mathematics and 12% of computer science doctorates earned by POC (Smart Graham et al., 2025).

The termination of LSAMP represents a profound loss for the students who relied on its support to complete STEM degrees and a shock to alumni who attribute their academic and professional trajectories to the program. Barros-Bustos and Chicas-Mosier (2026), in their analysis of LSAMP terminations nationwide, conclude that the decision was arbitrary, capricious, and lacking in strategic planning or transparency. Ending this congressionally mandated program sets a troubling precedent and restricts equitable access to high-impact educational opportunities for historically marginalized groups. In light of the sudden national loss of LSAMP funding, this paper documents the program's contributions to STEM education, and LSAMP's role in cultivating Black scientists and engineers.

LSAMP was established by the National Science Foundation in 1991 (renamed in 1999 for Ohio Congressman Louis Stokes) to increase representation of students historically underrepresented in STEM (URM), including Black or African American, Hispanic or Latino/a, American Indian and Alaska Native, Native Hawaiian, and Pacific Islander students. National data show these groups remain underrepresented

in the college-educated STEM workforce relative to their share of the U.S. population and in college enrollment. LSAMP alliances have grown from six alliances to over 450 participating institutions and employ coordinated strategies, mentored research, professional development and graduate-school preparation, community building, and research methods training, to promote access, retention, and degree completion (Baber & Jackson, 2018; Clewell et al., 2005).

Research on LSAMP and related alliance models documents positive associations with URM enrollment, persistence, graduation, and graduate-school attendance, though effects vary by context and program components (Clewell et al., 2005; Donovan et al., 2021). The program's theorized mechanisms align with Tinto's student integration model: structured academic supports, faculty mentorship, and social integration reduce isolation and stereotype threat and increase belonging and academic engagement, factors linked to persistence in STEM (May & Chubin, 2003; Seymour & Hewitt, 1997; Tinto, 1975, 1993)

Institutional climate matters: predominantly White institutions (PWIs) can exacerbate microaggressions and perceived bias, increasing vulnerability to impostor syndrome among Black and other minoritized students (Dorve-Lewis, 2023; McGee, 2016). While individual URM groups have distinct

histories and experiences (first generation status, immigration status, socioeconomic status, etc.), they share the burden of navigating systems that often do not value their cultures or perspectives (McGee, 2016).

LSAMP countered structural barriers in STEM education by building inclusive learning environments, offering mentoring, and facilitating co-curricular engagement. The program advanced student development through coordinated recruitment efforts, structured retention pathways, and targeted preparation for graduate study and professional careers (Hamilton & Parker, 2011; Smart Graham et al., 2025). Recognized as a national model, LSAMP integrated leadership, faculty engagement, financial support, and evidence-based practices to help STEM students thrive academically, socially, and professionally (Baber & Jackson, 2018; Burt et al., 2023; Smart Graham et al., 2025).

The University at Buffalo LSAMP Summer Research Program applies LSAMP's integrated model through mentored, faculty-led research experiences, professional development, and

community-building activities. This study builds on prior evaluations by using systematically coded LinkedIn profiles, crosschecked with institutional LSAMP records, to assess long-term outcomes (2012–2024) for program alumni. The Methods section describes the coding protocol, validation steps, and limitations of using publicly available professional profiles.

Although prior evaluations document alliance-level gains, this study uses longitudinal, alumni-level professional data to examine long-term educational and career outcomes. This study asks:

- **RQ1**: What proportion of UB LSAMP alumni complete STEM bachelor's degrees?
- **RQ2**: What share enrolls in or completes STEM graduate programs?
- **RQ3**: What proportion enter and remain in STEM careers at follow-up?

Tinto's Theoretical Framework

Tinto's student integration model (1975, 1993) provides the theoretical anchor for LSAMP: academic integration (engagement with curriculum and faculty) and social integration (peer networks and belonging) jointly shape students' commitment to educational goals and their likelihood of persisting in college. For Black and other minoritized students in STEM, these integration processes operate within institutional climates that can either support or undermine persistence; hostile climates at predominantly White institutions (PWIs) can amplify stereotype threat and impostor syndrome, reducing retention.

LSAMP operationalizes Tinto's constructs by offering structured academic supports, faculty mentorship, and cohort-based social networks designed to strengthen both academic and social integration and, in turn, promote persistence and progression to graduate study.

Tinto also emphasizes the role of background characteristics, such as family dynamics, academic preparation, personal attributes, educational aspirations, social experiences, and financial resources, which interact with institutional contexts to shape students' commitment to their goals. For Black students in STEM, these interactions are often further complicated by systemic barriers and campus climates that can feel alienating (Brothers & Knox, 2013; McGee, 2016). LSAMP extends Tinto's framework by embedding mentored research, cohort-based programming, and culturally responsive supports that foster

both academic integration and social belonging. This study examines how LSAMP's holistic support model, particularly undergraduate research, is associated with degree completion, graduate-school enrollment, and STEM career outcomes.

High-Impact Practices

LSAMP centered undergraduate research, a recognized high-impact practice (HIP), alongside learning communities, internships, and targeted graduate-school preparation. These HIPs map directly onto Tinto's framework: mentored research fosters academic integration and scientific identity; cohort programming and community-building promote social integration and belonging; internships and professional development enhance students' perceived relevance and career commitment. Empirical studies show HIPs yield disproportionate gains for students historically underserved in higher education, improving persistence, sense of belonging, and graduate-school enrollment (Estrada et al., 2016; Finley & McNair, 2013; Kuh, 2008). By embedding HIPs across the student experience, LSAMP creates a longitudinal pathway from undergraduate research to internships and graduate-school readiness, operationalizing HIPs as a central organizing principle that helps ensure Black and other minoritized students gain access to transformative learning opportunities often unevenly distributed in higher education.

Study Context

The State University of New York (SUNY) LSAMP Alliance, established in 1996 with NSF support, was a statewide collaboration of university centers, four-year institutions, and community colleges that aimed to increase URM participation and success in STEM (Donovan et al., 2021). The University at Buffalo is an original member of the alliance and implemented comprehensive, evidence-based strategies to support student engagement, retention, and progression to graduate education and STEM careers. The most recent grant cycle (2023) funded 14 institutions across New York State and prioritized five core objectives: enhancing retention through first-year

seminars and summer research; improving transfer pathways from two- to four-year colleges; expanding access to mentoring and internships; increasing graduate-school enrollment; and applying the Fostering STEM Identity through Transition (FIT) model to guide programming (London, 2015).

SUNY LSAMP reports that, since inception, the alliance has contributed to 16,044 bachelor's degrees, 1,807 master's degrees, and 376 doctoral degrees (Donovan et al., 2021). These aggregate outcomes provide a statewide benchmark for assessing local program effects. At UB, the LSAMP Summer Research Program aligned with alliance priorities, particularly mentored summer research, cohort supports, and graduate-school preparation, making it an appropriate case for examining long-term educational and career outcomes among alumni. The Methods section describes how we sampled and coded alumni LinkedIn profiles (2012–2024) and crosschecked key outcomes against institutional LSAMP records.

UB LSAMP Summer Research Program model

The University at Buffalo (UB) LSAMP Summer Research Program was a ten-week, research-intensive experience designed to support URM students in STEM through high-impact practices. The program combined full-time, faculty-mentored research with a credited Research Methods course, professional development workshops, and structured community engagement. The Research Methods curriculum covered research ethics, literature review, hypothesis development, and scientific communication; students also participated in weekly lab meetings, networking events, and presentations at a national undergraduate research conference and a campus research symposium. Enrichment activities, plant tours, service projects, and essential-skills training, connect technical learning to real-world applications. Upon completion, participants earned a Mentored Research digital badge suitable for LinkedIn and professional portfolios.

Participation in UB LSAMP Summer Program is selective: applicants submit grades, activities, and a personal statement; eligibility requires a cumulative GPA of 2.8 or higher. Cohorts are intentionally small (8–12 students) to enable deep mentorship, personalized support, and high-quality engagement.

Many participants were affiliated with campus enrichment programs (e.g., Honors College, Daniel Acker Scholars) and professional student organizations (National Society of Black Engineers (NSBE), Society of Hispanic Professional Engineers (SHPE)), reflecting academic strength and leadership potential.

LSAMP provided layered supports, tutoring, academic advisement, advocacy, conference sponsorship, recommendation letters, and curated communications about scholarships and jobs, which operationalized the program's aims to strengthen academic integration, social belonging, and professional readiness. Because participation is selective, findings from alumni profiles should be interpreted with attention to selection effects; nevertheless,

the program's combination of mentored research, cohort supports, and professional preparation maps directly onto the outcomes we code (STEM bachelor's completion, graduate-school enrollment, and STEM employment).

Methodology

Positionality statement

The research team is interdisciplinary and comprises scholars from diverse academic and cultural backgrounds. The first author is a Black woman who has served at the University at Buffalo for 32 years and has been deeply involved in LSAMP programming; her lived experience and professional expertise inform the study's design, interpretation, and commitment to equity in STEM. The second author is a White woman whose scholarship centers the voices and experiences of women, refugees, BIPOC, and LGBTQ+ communities; she brings research and evaluation expertise focused on diversity, equity, inclusion, and practices cultural humility through ongoing self-reflection about her own positionality and biases. Together, the authors' complementary perspectives shape the research lens, analytic choices, and interpretation of findings, and they commit to reflexive practices to mitigate bias and foreground underrepresented voices in STEM education research.

Study design and data sources

Building on prior evaluations that document LSAMP-alliance gains in enrollment, persistence, and graduate-school progression (Baber & Jackson, 2018; Brothers & Knox, 2013; Clewell et al., 2005; Donovan et al., 2021; Gafney, 2010; Hamilton & Parker, 2011), this case study examines whether similar

patterns hold for UB LSAMP participants by analyzing publicly accessible LinkedIn profiles (2012–2024). Profiles were reviewed and coded in September 2025. LinkedIn was selected because participants received program training on creating professional profiles and because the platform provides consistent fields for education and employment. To validate LinkedIn entries, outcomes were validated against institutional LSAMP records compiled for annual reporting; crosschecks focused on enrollment year, degree awarded, and program participation.

Data were stored on secure university servers and reported in aggregate to protect individual privacy. Limitations include self-report bias, incomplete or outdated profiles, and selection effects arising from program selectivity and LinkedIn adoption; these are addressed in the Methods and Discussion.

LinkedIn coding protocol

- **Data collection dates**: Profiles were reviewed between August and September 2025.

- **Search strategy**: Summer program alumni were located on LinkedIn using name and crosschecking affiliation with the University at Buffalo. Institutional records were used to confirm major course of study and degree conferrals (consistent with LSAMP annual reporting). Data was organized by cohort year.
- **Coding rules**: Record highest degree and field; record current employment title and sector; when multiple concurrent roles were listed, record the primary role indicated by the profile summary or most recent position. Check dates to distinguish conferred degrees from current-student status.
- **Missing data**: Profiles lacking essential information were flagged; if critical outcomes could not be verified, the case was coded as "status unknown." Profiles with minor omissions (e.g., missing job title details) were retained.

Ethics and IRB

Because the study used only publicly available information and no contact with participants was attempted, the project was determined to be exempt from full IRB review. Ethical safeguards included using only public profile fields and reporting aggregated counts rather than identifiable details.

Data Collection

We identified 154 alumni who participated in the UB LSAMP Summer Research Program between 2012 and 2024 and manually reviewed their publicly accessible LinkedIn profiles in August and September 2025 (see Table 2 for sample characteristics). Relevant fields extracted included education (degree, institution, year), current enrollment status, employment history (employer, job title, sector), and professional credentials (certifications, badges). LinkedIn hosts over 1 billion users worldwide, including more than 220 million in the United States (Omnicore Agency, 2024). College students increasingly use LinkedIn as a portfolio-building tool (Li et al., 2021), and many universities leverage the platform to maintain alumni networks and access career information. Outcomes were crosschecked against institutional LSAMP records for program participation, degree awarded, and year. Data extraction and storage complied with university data-security policies; only aggregated counts are reported.

General Demographics

Table 1 summarizes participants' race/ethnicity and gender. By gender, 42% (n = 65) identified as female and 58% (n = 89) identified as male. By race/ethnicity, 47% (n = 72) identified as Black, 51% (n = 79) as Latino/a, and 2% (n = 3) as Native American. Percentages are calculated from the total

Table 1. Participant race, ethnicity, and gender (UB LSAMP summer cohorts, 2012–2024; n = 154)

Category	n	%
Gender		
Female	65	42%
Male	89	58%
Race/Ethnicity		
Black	72	47%
Latino/a	79	51%
Native American	3	2%

sample (n = 154). Race/ethnicity categories were mutually exclusive; gender options were limited to female, male, or other, and no participants selected "other."

Overview

This study used LinkedIn to analyze educational and career outcomes for 154 alumni who participated in the University at Buffalo LSAMP Summer Research Program between 2012 and 2024. Overall patterns are consistent with strong persistence in STEM pathways: most participants completed undergraduate STEM degrees and many progressed to graduate education or STEM careers.

Table 2 summarizes cohort participation and degree-completion outcomes. Of 154 participants, 130 (84%) had a confirmed STEM bachelor's degree, 5 (3%) had confirmed noncompletion, and 19 (12%) were classified as still completing an undergraduate degree program. Recent cohorts (2022–2024) include students who remain enrolled; these "still completing undergraduate" cases are reported separately in Table 2 and account for the lower completion counts in those years. Definitions used in the table are: "BS in STEM" -confirmed bachelor's degree in a STEM field as of follow-up; "Still completing undergraduate" -currently enrolled and not yet awarded a BS; and "Did not complete BS" -confirmed noncompletion. Categories are mutually exclusive within each cohort row and sum to the cohort size.

These results indicate high rates of STEM bachelor's completion among UB LSAMP summer alumni, but they should be interpreted as associations among a selective participant group and subject to limitations from self-reported online profiles and incomplete follow-up for recent cohorts.

Triangulation of data

The triangulation of data significantly enhances the study's validity and reliability. Triangulation also enhances credibility by integrating multiple perspectives and data sources. By cross-referencing data derived from LinkedIn with institutional records and first-person alumni updates, we can achieve a more comprehensive understanding of each alumnus's graduate education and career trajectory. Pairing quantitative LinkedIn data with qualitative reflections from program alumni, mentors, and/or staff adds

Table 2. UB LSAMP summer program cohorts and degree outcomes, 2012–2024 (n = 154)

Cohort year	Summer interns (n)	BS in STEM (n)	Still completing undergraduate (n)	Did not complete BS (n)
2012	11	10	0	1
2013	11	11	0	0
2014	12	11	0	1
2015	14	14	0	0
2016	13	13	0	0
2017	12	12	0	0
2018	15	14	0	1
2019	12	11	0	1
2020	7	7	0	0
2021	9	8	0	1
2022	10	9	1	0
2023	17	8	9	0
2024	11	2	9	0
Total	154	130	19	5

depth and helps interpret outcomes beyond surface-level metrics. Moreover, triangulation will involve peer debriefing, wherein other researchers will review and discuss the coding and thematic findings. This process provides multiple perspectives, minimizing biases and enhancing the credibility of the interpretations drawn from the data (Proudfoot, 2023).

Managing missing cases

In cases where LinkedIn profiles are incomplete or missing information relevant to the study, a systematic approach was employed (Le Compte, 2000). Profiles with significant gaps that prevent meaningful analysis were excluded from the study, ensuring that the remaining data is robust and comprehensive. For profiles with minor missing data, such as a lack of specific job titles or endorsements, the analysis will proceed with available information, noting these gaps in the final analysis. This strategy maintains transparency regarding data limitations while still providing valuable insights into the alumni's career trajectories.

Results

This study examined outcomes for 154 UB LSAMP summer alumni; LinkedIn profiles and institutional records were reviewed August 2025 through September 2025. Overall patterns are consistent with high persistence in STEM pathways: many alumni completed STEM bachelor's degrees, and a substantial share were employed or enrolled in graduate study at follow-up (Table 3). In the full sample, 69% (n = 107) had at least one reported employment entry, 12% (n = 18) were enrolled in graduate school, and 12% (n = 19) were still completing undergraduate degrees. Smaller categories included confirmed noncompletion of a bachelor's degree (3%, n = 5), and 5% (n = 7) with unknown status due to insufficient public

Table 3. Participant status and degree outcomes for UB LSAMP summer participants (n = 154)

Category	*n*	*%*
Total participants	*154*	*100%*
Employed	*107*	*69%*
Current graduate students	*18*	*12%*
Current undergraduates	*19*	*12%*
Did not complete undergraduate degree	*5*	*3%*
Deceased	*2*	*1%*
Incarcerated	*1*	*0.6%*
Status unknown / information unavailable	*7*	*5%*

Table 4. Participant employment outcomes for UB LSAMP summer participants (n = 154)

Category	n	%
Employed in a STEM career	98	64%
Employed in a non-STEM career	4	2.5%
Postdoctoral appointment	5	3%

or institutional information. Two alumni were confirmed deceased; one alumnus was confirmed to be incarcerated. These counts are reported in aggregate, and no identifying information is disclosed, consistent with IRB guidance.

Percentages are calculated from the total sample (n = 154). Categories are not mutually exclusive: some individuals appear in more than one category (for example, a participant may have completed a degree but not be employed, or a deceased participant may have completed a degree). "Status unknown" indicates LSAMP staff could not verify current status at the time of data collection (August - September 2025). This distribution underscores LSAMP's success in moving students into STEM careers and graduate education, while maintaining low rates of attrition.

Employment outcomes (Table 4) show that 64% (n = 98) of participants held positions in STEM fields, 2.5% (n = 4) were employed in non-STEM fields, and 3% (n = 5) held postdoctoral appointments. Engineering roles were the most common occupational category among STEM-employed alumni. These results should be interpreted as associations among a selective participant group and are subject to limitations from self-reported online profiles and incomplete follow-up for recent cohorts.

Table 5 illustrates the diversity of STEM career pathways pursued by alumni, with roles spanning general engineering, specialized fields, technical support, health and safety, and leadership positions. These titles reflect professional roles reported by alumni and were standardized (e.g., "Software Developer" and "Software Engineer" retained as distinct entries where reported). The range of job titles reflects the adaptability of LSAMP alumni and their integration into multiple sectors of the STEM workforce.

Table 5. UB LSAMP summer participant professional job titles (condensed by category, 2012–2024)

Engineering - General	Engineering - Specialized	Technical support roles	Health & Safety	Leadership
• Analytics Engineer • Applications Engineer • Controls Engineer • Design Engineer • Electrical Engineer • Industrial Engineer • Manufacturing Engineer • Mechanical Engineer • Principal Engineer • Process Engineer • Project Engineer • Quality Engineer • Senior Engineer • Test Engineer	• Bridge Engineer • Civil/Structural Engineer • Software Developer • Software Engineer • Research Engineer • Systems Engineer	• Research Technician • Quality Technician • Technical support roles	• Industrial Hygienist	• Manager

Table 6. Graduate school enrollment among UB LSAMP summer participants (2012 – 2024; n = 154)

Category	n	%
Currently enrolled in a STEM graduate program (PhD)	12	8%
Currently enrolled in a STEM graduate program (master's)	5	3%
Enrolled in a post-baccalaureate program (pre-MD)	1	0.6%
Total (enrolled in graduate/post-bac programs)	**18**	**12%**

Table 7. Graduate degrees conferred among UB LSAMP summer participants (2012–2024; n = 154)

Degree conferred	n	%
STEM PhD	9	6%
STEM master's	44	29%
MD	3	2%
MBA	3	2%
Total (degrees conferred)	**59**	**38%**

Graduate school enrollment is consistent with persistence in STEM. Table 6 shows that 18 alumni (12% of the full sample, n = 154) were enrolled in graduate-level programs. Of these, 12 (8% of n = 154) were enrolled in STEM PhD programs, 5 (3% of n = 154) were enrolled in STEM master's programs, and 1 (0.6% of n = 154) was enrolled in a post-baccalaureate pre-medical program. Percentages use the full sample as the denominator; graduate-school enrollment may co-occur with employment (e.g., part-time work or research appointments). These figures highlight LSAMP's role in building pipelines for advanced STEM training.

Table 7 documents graduate degrees earned by alumni. Twenty-nine percent (n = 44) of participants had earned a STEM master's degree, 6% (n = 9) had completed a STEM PhD, 2% (n = 3) had earned an MD, and 2% (n = 3) had completed an MBA. These outcomes are associational and align with prior LSAMP evaluations showing increased representation of program students in advanced STEM and professional fields.

Table 8. Participation and outcomes for UPR students in UB LSAMP summer program (2012–2024; n = 25)

Category	n	%
Total UPR students	25	100%
Working in a STEM profession	10	40%
Enrolled in a STEM PhD program	6	24%
STEM master's conferred	4	16%
PhD conferred	3	12%
MD conferred	2	8%
Current undergraduates	7	28%

Table 9. Non-STEM outcomes for UB LSAMP summer participants (2012–2024; n = 154)

Category	n	%
Enrolled in a non-STEM graduate program	3	2.0%
Employed in a non-STEM industry	4	2.6%
Subtotal (listed categories)	7	4.5%

Table 8 highlights outcomes for students from the University of Puerto Rico (UPR), who have participated through a longstanding partnership. The inaugural UB LSAMP summer program cohort included 11 students, seven from UB and four from the University of Puerto Rico (UPR), Cayey. Through a sustained partnership with a UB Chemistry faculty member, UPR students have regularly traveled to Buffalo to participate in the program. To date, 25 UPR students (16%) have participated in the UB summer program, creating a pipeline to UB's doctoral program in Chemistry.

Among the 25 students from the University of Puerto Rico who participated in the UB LSAMP program, 24% (n = 6) are currently enrolled in a STEM PhD program (3 at UB, 3 at other universities), 40% (n = 10) were working in STEM professions (including medicine and other health related professions), and 16% (n = 4) had earned a master's degree. Three UPR students have earned a PhD (two at UB), two earned an MD, and one earned a PharmD, while 28% (n = 7) are still undergraduates.

Percentages are calculated from the total UPR sample (n = 25). Categories are not mutually exclusive (some individuals appear in more than one category, so column totals may exceed n). Degree and enrollment status were verified through institutional records and alumni updates as of September 2025. This partnership illustrates LSAMP's reach beyond UB and its role in fostering pipelines into doctoral education.

Table 9 shows that a small fraction of alumni pursued non-STEM pathways: 2% (n = 3) were enrolled in non-STEM graduate programs and 2% (n = 4) were employed in non-STEM industries (n = 154; verification through September 2025). These distributions are consistent with the program's stated focus on broadening participation in STEM fields.

Discussion

Consistent with prior LSAMP evaluations, the UB LSAMP Summer Research Program alumni show high rates of STEM bachelor's completion, graduate-school enrollment, and STEM employment. These patterns align with statewide (Donovan et al., 2021; Gafney, 2010; London, 2015) and national LSAMP reports (Baber & Jackson, 2018; Brothers & Knox, 2013; Clewell et al., 2005; Hamilton & Parker, 2011; Preuss et al., 2023; Yang et al., 2023) documenting increased representation of program students in advanced STEM and professional fields. Interpretation emphasizes association rather than causation. The study's observational design and selective program enrollment mean outcomes may reflect both program effects and pre-existing student characteristics (motivation, academic preparation, enrichment affiliations).

Analysis of 154 UB LSAMP alumni from 2012 to 2024 addresses three research questions: (1) *What proportion of UB LSAMP alumni complete STEM bachelor's degrees* (2) *What share enrolls in or completes STEM graduate programs* and (3) *What proportion enter and remain in STEM careers at follow-up*. Findings reveal high rates of undergraduate degree completion, graduate school enrollment, and employment in STEM fields. Sixty-nine percent of participants are currently employed, with 64% working in STEM careers. Thirty-eight percent have earned advanced degrees, including STEM master's degrees (29%) and PhDs (9%), and an additional 12% are actively pursuing graduate or post-baccalaureate education. Outcomes for University of Puerto Rico participants were particularly strong, with 40% employed in STEM professions and 40% enrolled in graduate school, including 24% pursuing a STEM PhD.

The recent termination of federal funding for LSAMP underscores the urgency of these findings and highlights the program's demonstrated value for Black, and other underrepresented students in STEM. The UB LSAMP model, grounded in research-informed practices and high-impact educational experiences, has consistently supported the success of program students. As institutions and policymakers consider the future of undergraduate research and equity-focused programming, these findings offer a

clear argument for sustained investment in initiatives that demonstrably expand access, opportunity, and achievement in STEM.

While LinkedIn provides a valuable resource for tracking alumni outcomes, using this data for research presents several limitations. Profiles are self-reported and may be incomplete, outdated, or selectively curated, particularly among early-career professionals or those outside tech-centric fields (Jeske & Shultz, 2016). Moreover, not all individuals use or update LinkedIn, introducing selection bias that favors professionally active users while underrepresenting those in non-traditional roles, unemployed, or disengaged from digital professional networks. Ethical concerns also arise, as users may not anticipate their publicly available data being repurposed for research.

Beyond these issues, LinkedIn lacks contextual information about personal motivations, systemic barriers, and programmatic impact, limiting the depth of analysis. Platform constraints, such as visibility settings, algorithmic filtering, and inconsistent data structures, further restrict access to comprehensive datasets. Critical variables like income, first-generation status, and caregiving responsibilities, which may significantly influence outcomes, are typically absent from LinkedIn profiles. While LSAMP was designed to address structural barriers to URM students' participation in STEM, persistent challenges remain, including limited awareness of opportunities, unequal access to those opportunities, financial constraints, and familial responsibilities. These limitations should be carefully considered when interpreting program outcomes.

The small sample size limits generalizability of findings to all underrepresented students in STEM. However, the study offers valuable insight into the structure and mechanics of the UB program, which can serve as a replicable model for other institutions. While the sample may not capture the full diversity of Black and other minoritized student experiences, the program's design principles, intentional mentorship, research immersion, and community-building, are broadly applicable across STEM populations. Moreover, evidence suggests that strategies tailored to support URM students often enhance outcomes for all students by fostering inclusive, high-impact learning environments. Future research with

larger, more diverse cohorts could further validate these findings and explore variations in impact across institutional contexts.

While LSAMP participants demonstrate strong STEM outcomes, it is important to recognize that self-selection may influence these results. Self-selection bias occurs when participants opt into a program voluntarily, often because they already possess certain motivations, interests, or resources. In the case of LSAMP, students who apply are typically highly motivated, academically prepared, and actively seeking research opportunities to advance their skillsets. As a result, their outcomes, such as retention, graduation rates, employment, and graduate school enrollment, may not reflect what would happen for a broader population of students who did not opt in. Nevertheless, LSAMP student successes underscores the potential impact of targeted support structures. Future studies could explore how similar interventions might benefit students with less academic preparation or fewer initial resources, thereby expanding the reach and equity of STEM pathways.

Future Work

The data presented here are continuously updated, reflecting the dynamic career trajectories of UB LSAMP alumni. Frequent job changes necessitate ongoing spreadsheet maintenance to ensure accuracy. While quantitative tracking provides valuable metrics, follow-up qualitative interviews with participants would yield richer, more nuanced insights into their experiences and motivations. Currently, eight students (5%) have unknown status, which may warrant further outreach or contextualization in longitudinal analyses.

Selection bias could be mitigated by integrating qualitative data and conducting matched comparisons with non-participants who share similar academic and demographic profiles (e.g., GPA, major, race/ethnicity). Such approaches would strengthen estimates of program impact and illuminate the mechanisms by which programs like LSAMP support student success.

As noted in the introduction, the National Science Foundation terminated LSAMP program funding following federal policy changes enacted in January 2025. The University at Buffalo received

formal notification on May 2, 2025, less than one month before the 2025 Summer Research Program was scheduled to begin, that its LSAMP award had been discontinued. To honor commitments made to the ten students selected in March 2025, the program team rapidly assembled alternative support from the State University of New York (SUNY) and the UB Office for Inclusive Excellence. As of this writing, there are no plans to offer a summer research program in 2026 or in the foreseeable future, representing a profound loss to the institution and to the undergraduate research landscape on campus.

This policy shift underscores the importance of documenting LSAMP's long term outcomes, particularly as the program's discontinuation limits future opportunities to evaluate its impact. Given the program's termination, examining the trajectories of past participants provides a critical lens for understanding LSAMP's enduring contributions to STEM persistence. Considering the recent NSF funding cuts that led to the termination of LSAMP, the question becomes: where do we go from here?

With limited resources, institutions must make strategic decisions about where to invest for the greatest impact. This case study underscores the transformative benefits of undergraduate research, arguing that universities must prioritize funding for these experiences to ensure students, especially those from underrepresented backgrounds, continue to reap the rewards of early exposure. Yet universities themselves face mounting financial pressures, including disruptions in National Science Foundation and National Institute of Health funding mechanisms and broader economic challenges affecting research institutions. LSAMP has long struggled with inconsistent support from host campuses, often due to these financial constraints, and this instability has hindered its long-term success.

Despite these challenges, the demand for undergraduate research remains strong. Developing sustainable funding models is essential to broaden access. While the current political climate has disrupted LSAMP in its existing form, the imperative to find a way forward that centers equity, opportunity, and institutional commitment, is more urgent than ever.

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