

SUCCEEDS Project under NSF DUE: Evaluating Progress and Lessons Learned from Successive Scholar Recruitments and Summer Bridge Program Subsystems

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SUCCEEDS Project under NSF DUE S-STEM: Evaluating Progress and Lessons Learned from Successive Scholar Recruitments and Summer Bridge Program Subsystems

Introduction

The S-STEM program aims to support low-income students in STEM fields by offering comprehensive financial, academic, and professional assistance. The College of Engineering at the University leverages the S-STEM framework to strengthen first-year retention and graduation outcomes among student populations. The program integrates financial assistance, faculty and peer mentorship, and targeted preparatory initiatives, including the Summer Bridge Program (SBP). In Fall 2025, we took on a new cohort of transfer students. This paper aims to provide an update on the previous cohort and introduce the new cohort. [1]

From the first cohort of S-STEM scholars recruited in Fall 2024, we had two students leave the program before completing their first year, and one other withdrew for entrepreneurial reasons. The new cohort consists of transfer students starting their university degree program in Fall 2025.

The recruitment process for Cohort 2 followed the same methodology as Cohort 1. The S-STEM program at the University employs a process designed to select academically talented and committed scholars. For the new cohort, this multi-layered process began by filtering from an initial pool of PELL-eligible applicants who had been admitted to engineering programs at the University. The remaining students were ranked based on their high school GPA and intended majors, and the top 142 candidates across all engineering programs were invited to apply with an essay. Of these, 49 students submitted applications before being grouped by their intended major and interviewed by professors and investigators from their respective departments. The candidates were ranked using a rubric that prioritized academic potential, essay quality, and interview performance. The top 19 candidates were offered the scholarship and informed that, upon selection to the program, all scholars must attend the SBP. [5,7]

Demographics

Cohort	Intake	Gender		Race ¹					Department ²							1st Gen		Total ³
		M	F	A	AA	H	W	MR	BME	ChE	CME	ECE	CS	MIE	U	Y	N	
1	Fall '24	9	9	3	3	10	2	0	2	2	1	4	4	4	1	11	7	18 (15)
2	Fall '25	13	6	0	2	4	11	2	2	2	2	3	5	5	0	8	11	19

Table 1 – Scholar Recruitment Demographics

¹ Race - A: Asian, AA: African American, H: Hispanic, W: White, MR: Multi-Race. ² Department – BME: Biomedical Engineering, ChE: Chemical Engineering, CME: Civil,

Materials, and Environmental Engineering, ECE: Electrical & Computer Engineering, CS: Computer Science, MIE: Mechanical and Industrial Engineering, U: Undecided. ³ Total - At the start of the Fall 2024 semester, after recruitment, Cohort 1 had 18 scholars, which dropped down to 15 students before the end of the academic year. Before the Fall semester finished, a scholar had dropped out of their degree to pursue entrepreneurial interests. Another scholar withdrew from the degree program before the Spring 2025 semester after concluding that engineering was not aligned with their career goals, while the third scholar withdrew from the Spring 2025 semester and never registered for Fall 2025 [1,4,7]

Cohort 1 had a higher proportion of first-generation college students and included a significant number of Hispanic students. For those remaining in Cohort 1, the average GPA during their first semester at the University in Fall 2024 was 3.04. There were four instances of students earning D's, one F, and two students withdrawing from courses. In Spring 2025, the average GPA increased to 3.12, with two D's, four F's, and two students withdrawing from courses, resulting in one student being placed on academic probation. Fall 2025 saw an average GPA of 2.76, with two students earning D's, two earning F's, and one course withdrawal.

Most students in Cohort 2 were not first-generation and were primarily composed of White students. The distribution of scholars across engineering departments remained similar to Cohort 1, with higher numbers in the Mechanical and Industrial Engineering (MIE) and Computer Science (CS) departments. The average GPA for Cohort 2 in their first semester at the University was 3.86, with no instances of D's, F's, or course withdrawals.

Summer Bridge Program

The 2024 Summer Bridge Program for Cohort 1 was a one-week residential program designed to provide first-year scholars a robust foundation to college at the University. It included focused, informative sessions by on-campus resources, as well as special introductions to the various engineering departments. [6,7]

The 2025 Summer Bridge Program, offered to the second cohort of students, was shorter than the previous year's version, though similar in format. Unlike the last iteration of the SBP designed for first-year freshmen, this iteration omitted several introductory sessions about college adjustment and campus navigation, as the transfer students were already engaged in degree programs and familiar with academic life through their community college experience.

Over three days, the scholars participated in a series of on-campus activities and seminars, including campus tours, alumni panels, and departmental sessions led by representatives from the University's various engineering disciplines, as well as the University Counseling Center. Students also explored key campus facilities such as the Makerspace and attended a field trip to the Museum of Science and Industry.

Most sessions lasted up to 45 minutes each, with a 15-minute intermission following every hour or at the conclusion of a session if it exceeded one hour. Additional time was allocated for sessions such as alumni panels and field trips, which could last up to three hours.

Like Cohort 1, Cohort 2 was automatically enrolled in a special section of ENGR 101 (Engineering Success Seminar) in their first semester at the University. Similarly, they were also paired with dedicated faculty advisors who conducted regular meetings during the semester to track their academic progress and provide guidance. To assess the program's effectiveness, pre- and post-SBP surveys were administered to evaluate changes in students' confidence within their majors and their awareness of campus resources. [2, 7]

SBP Survey Results

Fear	Fears before SBP	Fears after SBP
N/A	6	10
General Finances	7	5
Commute/Transportation	4	2
Family Needs	3	2
Difficulty	2	1
Housing Costs	2	1
Career Path Navigation	1	1
Extreme Scenarios	0	1
Burnout	3	0
Stress	1	0
Support	1	0
Work Scheduling	1	0

Table 2 – Fears about not finishing a degree at the University, before and after Summer Bridge Program for Cohort 2

Table 2 depicts Cohort 2 students' responses to the survey question: "List all the reasons your fear might cause you not to finish your engineering degree at the University." Similar surveys were conducted both prior to and following the implementation of the SBP. The responses identified common concerns, such as apprehensions regarding commute time, which are frequently associated with the inability to afford on-campus or nearby housing. Financial insecurities remained a prominent concern both prior to and following the SBP, with some students also expressing fears of unforeseen personal or family emergencies that could impede their progress. The difficulty of balancing employment and academic schedules continues to be a persistent issue. Notably, one student's response indicated no longer being concerned about financial or housing issues, believing only an extreme circumstance could prevent graduation. The number of students with no concerns increased from 6 before the SBP to 10 afterward,

whereas concerns related to finances decreased from 7 to 5, and concerns about commuting or transportation diminished from 4 to 2.

Previously, we reported the responses of Cohort 1 students to this question, with persistent barriers primarily being financial stress, coursework rigor, and the need for expanded mentorship frameworks [7]. Finances and financial stress reappear in both Pre-SBP and Post-SBP surveys among the new cohort, with the concerns related to coursework appearing solely in the pre-SBP surveys.

The survey also included other questions to gauge the scholars' knowledge on various key components of the scholarship and the university that they would benefit from through this scholarship, like mentoring, on-campus programs, course requirements, faculty/staff positions that can help undergraduate students, etc. Across all questions, the scholars indicated a higher level of understanding about these components after the Summer Bridge Program. [7]

Results and Conclusions

A total of nineteen scholars have been successfully shortlisted, offered, and admitted to the second cohort of the S-STEM SUCCEEDS scholarship program, and participated in the Summer Bridge Program. The current enrollment of the first cohort has decreased to fifteen, resulting in a combined total of thirty-four recipients of the S-STEM scholarship across both cohorts.

Nearly all scholars possess a clearer understanding of the requirements associated with the SUCCEEDS scholarship and support systems as provided by the University. Surveys conducted before and after the Summer Bridge Program showed notable improvements in scholars' preparedness and confidence.

Students in Cohort 1 were enrolled in a specialized section of the college first-year seminar course to facilitate their academic progression at university. This course is a mandatory course for all first-year engineering students during their initial semester, designed to foster students' personal, academic, and professional development. The S-STEM section uniquely offered a multidisciplinary community context supported by the cohort, rather than through a traditional major-specific curriculum. Preliminary data suggest that scholars valued the cohort-based instructional environment for its inherent sense of community; perceived the course topics as largely advantageous to their first semester experience; and recognized that their support network extended beyond the confines of the course. [8]

These findings are based on data from the S-STEM program at one institution and are descriptive in nature. As such, they may not generalize to other institutional contexts or student populations.

Future Work

For the remaining students of the first cohort, the subsequent step involves continuing their faculty mentorship and pairing them with individual industry mentors to enhance their technical and professional competencies, foster an engineering identity, and establish a supportive

community for their career development as they approach the conclusion of their sophomore year. [3]

For the new cohort, the persistent barriers and concerns identified in Table 2 will be addressed through regular meetings with mentors within the established mentoring framework to improve areas such as financial literacy and support. The recruitment process and SBP subsystems have evidently increased the likelihood of retention and academic readiness among low-income engineering scholars, with no program withdrawals reported to date for the new cohort in comparison to the first cohort.

We will continue to monitor the academic performance of all thirty-four scholars each semester and observe any changes in their engineering major choices, with long-term studies potentially yielding valuable insights into the enduring impact of the program on scholar achievement.

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References

- [1]. R. Nazempour, H. Darabi, B. Bilgin, A. Felder, S. Reckinger, R. Revelo, P. Nelson, J. Abiade, and D. Ozvin, "An Integrated Program for Recruitment, Retention, and Graduation of Academically Talented Low-Income Engineering Students: Lessons Learned and Progress Report," in *ASEE Annual Conference Exposition*, 2022.
- [2]. R. Nazempour, H. Darabi, R. Revelo, P. Nelson, A. Felder, D. Ozevin, and J. Abiade, "Implementation of an Introductory Engineering Course and its Impact on Students' Academic Success and Retention," in *2020 ASEE Virtual Annual Conference Content Access*, 2020.
- [3]. H. Darabi, R. Nazempour, A. E. Felder, S. M. Reckinger, D. Ozevin, R. A. Revelo, J. Abiade, and B. Bilgin, "Reporting the Progress and Latest Status of an Ongoing S-STEM Project," in *2021 ASEE Virtual Annual Conference Content Access*, 2021.
- [4]. H. Darabi, R. Nazempour, S. Reckinger, P. Nelson, R. Revelo, J. Abiade, D. Ozevin, A. Felder, B. Bilgin, and Y. Siow, "An Integrated Program for Recruitment, Retention, and Graduation of Academically Talented Low-Income Engineering Students," in *2020 ASEE Virtual Annual Conference Content Access*, 2020.
- [5]. H. Darabi, P. C. Nelson, R. Nazempour, R. A. Revelo, L. C. Nitsche, and J. Abiade, "Board 35: An Integrated Program for Recruitment, Retention, and Graduation of Academically Talented Low-income Engineering Students," in *2019 ASEE Annual Conference & Exposition*, 2019.

- [6]. R. Nazempour, H. Darabi, P. Nelson, R. Revelo, Y. Siow, and J. Abiade, "Execution Details and Assessment Results of a Summer Bridge Program for Engineering Freshmen," in *2019 ASEE Annual Conference & Exposition Proceedings*, 2019.
- [7]. H. Darabi, S. M. Reckinger, R. A. Revelo, B. Bilgin, M. Kotche, E. A. Sanders, and N. Rachakonda, "BOARD #314: 2024-2025 Progress Report for the S-STEM Project: Removing the Disparity in Success-Related Outcomes Between Academically Talented Low-Income Engineering Students and Other Engineering Students," in *2025 ASEE Annual Conference & Exposition*, Montreal, QC, Canada, Jun. 2025
- [8]. E. Sanders, M. Kotche, and H. Darabi, "WIP: Reflections from a Multidisciplinary, Cohort-Based First-Year Seminar for Low-income, Academically Talented First-Year Engineering Students", in *2025 ASEE Annual Conference & Exposition*, 2025.