

Developing an Ecosystem of STEM success for Built Environment Scholars

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NSF S-STEM: Developing an Ecosystem of STEM success for Built Environment Scholars

Abstract

The National Science Foundation S-STEM program at NYC College of Technology (City Tech), Developing an Ecosystem of STEM success for Built Environment Scholars (Award Number 2150432), focuses on supporting and developing scholars in the majors relating to the Built-Environment which include Civil Engineering Technology, Construction Engineering Technology, Electrical Engineering Technology, Mechanical Engineering Technology and Environmental Control Technology. The S-STEM program aims to reduce financial barriers for low-income students by providing scholarships. SSTEM scholars are provided with faculty mentors and opportunities to engage in cohort building activities that include field trips, research, workforce internships, and networking sessions. The project began in 2022 and has successfully recruited five cohorts of students serving a unique cohort of 83 scholars to date, 49 of which have graduated. The goal of the program is to get the scholars to complete their degree and enter the STEM workforce or pursue graduate school. Students both currently in the S-STEM program and those who have recently graduated feel strongly that this program has helped them immensely in their academic development in their fields of study and their professional development.

Keywords

mentoring, high-impact practices, cohort-building, retention

Introduction

Built-environment majors are typically used to describe the interdisciplinary field that addresses the design, construction, management, and use of these man-made surroundings. The S-STEM program, Developing an Ecosystem of STEM success for Built Environment Scholars (SSTEM BES), focuses on supporting and developing scholars in the majors relating to the Built-Environment housed in the Departments of Construction Management and Civil Engineering Technology (CMCE), Electrical and Telecommunications Engineering Technology (ETET), Mechanical Engineering Technology (MET), and Environmental Control Technology (ENVC). These majors include Civil Engineering Technology, Construction Engineering Technology, Electrical Engineering Technology, Mechanical Engineering Technology and Environmental Control Technology. The principal goal of the SSTEM BES is to increase low-income students' retention and graduation rates and their prospects for graduate studies and placement.

Background

The focus of the NSF SSTEM program is to support low-income students through their education with a goal of entering the workforce. The US Bureau of Labor Statistics projects STEM employment to grow by 8.1 percent from 2024 to 2034. The reported median wage for STEM occupations (\$103,580) was more than twice the median wage for non-STEM occupations (\$48,000) in 2024. (U.S. Bureau of Labor Statistics, 2025). The U.S. Chamber of Commerce Foundation highlights persistent racial and gender disparities in STEM fields and significant

income implications. (U.S. Chamber of Commerce, 2022). This data indicates that the SSTEM program aligns with industry employment needs and low-income students entering the STEM workforce will likely achieve upwards economic mobility.

Program components

The SSTEM program provides scholarships to low-income students supplemented by activities and support systems to help them graduate on time and prepared to enter the workforce or graduate school. The activities aim to promote academic success through faculty mentoring, cohort development, research, and internships.

Scholarships - Each scholar is awarded an annual scholarship if they maintain eligibility and timely progression towards degree completion.

Mentoring - Scholars are given consistent mentoring from a designated faculty member throughout their participation in the grant. Mentoring includes: (1) course advisement and progress meetings to identify early concerns; (2) oversight of optional summer research experience; and (3) guidance through the process of career counseling and job placement services.

Cohort building – Scholars participate in a variety of cohort-building activities with the goal of developing a strong sense of belonging, particularly challenging for a commuter campus. They participate in the following events: (1) welcome event and program orientation; (2) annual networking luncheon; (3) field trips; and (4) professional meetings, and conferences.

Undergraduate research – Scholars are provided opportunities to participate in undergraduate research and receive an additional stipend. Students participate in workshops to prepare them for entry into the workforce or pursuit of advanced graduate studies.

Internship - Scholars will be provided opportunities to participate in internship experiences and receive an additional stipend. The SSTEM program has established industry partners that provide these experiences to the student. Scholars are encouraged to join the LinkedIn page and Handshake, the online career development tool used by the Professional Development Center.

Cohorts

To date, we have recruited five cohorts of students, totaling 83 unique students (49 graduates to date). Figure 1 summarizes the breakdown of each cohort.

Figure 1: Cohort Summary

	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5
# S-STEM Scholars	20	15	18	19	11
# Graduated (to date)	16	13	14	6	NA
Date started	Spring 2022	Fall 2022	Fall 2023	Fall 2024	Fall 2025

Evaluation

The program is evaluated on an annual basis using a variety of data collection methods, including enrollment, retention, and graduation data, pre/post surveys, interviews, and cohort tracking.

Spring 2025 Student Experience Survey

A Student Experience Survey was conducted in Spring 2025. The survey was designed to capture student perspectives on key aspects of their experience in the S-STEM Program, including access to networking opportunities, future recruiting efforts, employment and future goals, peer leadership and mentorship support, and overall satisfaction with the program.

Program Satisfaction and Value

- Students rated their overall program experience very highly and its value for academic and professional development even higher.
- Open-ended feedback about the S-STEM Scholar Program highlighted three consistent themes:
 - financial support that reduced stress and allowed students to focus on studies;
 - access to internships, mentorship, and networking opportunities; and
 - a supportive community of peers and faculty

Future Goals and Support Needs

- Most students intend to pursue higher education beyond their current degree (79%).
- Among Spring 2025 graduates, top post-graduation needs included job placement (57%), graduate school access (43%), mentorship (43%), and networking opportunities (29%).
- Career ambitions ranged from engineering and construction management roles to leadership in the built environment, with many emphasizing sustainability and community impact.

Program Engagement and Benefits

- Students reported high levels of engagement in networking events (71%), which they found valuable for professional connections and motivation.
- Students identified internships, mentorship, and research experiences as the most valuable program benefits.

Fall 2025 Cohort Entry Experience Survey

To better understand expectations upon entry, a survey was distributed to Cohort 5 in Fall 2025. This survey captured students' initial perspectives, including their expectations, motivations, and priorities.

Expectations and Motivation for Joining the Program

- Students identified internships as the most influential factor in their decision to apply for the program, accounting for approximately 23% of total decision importance.
- Financial assistance, research experiences, and being part of a community formed a second tier of importance, each contributing 17% to overall decision-making.
- Field trips (13%) and faculty advising/mentoring (12%) were ranked as less influential in the initial decision to join the program.

Program Value and Anticipated Support Needs

- Financial support and employment potential after graduation were each selected by 90% of respondents.
- Faculty advisement/mentorship and professional development opportunities were selected by 80% respondents.
- Internships, networking, and community-building opportunities were also widely valued, selected by 70% of respondents.

Graduate Student Survey

To understand the Graduating scholars experience, a survey was distributed to determine their current employment status, career goals and overall experience in the program.

Program experience and value ratings

- High overall satisfaction and program value.
- Financial support reduced barriers and stress.
- Advising and mentorship helped students stay on track.
- Internships, research and networking supported career readiness.

Carer plans

- Earn engineering licensure credentials.
- Secure full-time employment immediately after graduation.
- Advance in project management.
- Work toward senior-level roles in engineering leadership.
- Build long-term career growth with a goal of entrepreneurship.

Results

Students described the S-STEM Scholar Program as life-changing, citing reduced financial burdens, expanded academic and career opportunities, and strong mentorship. Many shared personal stories of resilience and growth, underscoring the program's critical role in helping them persist and succeed.

Acknowledgements

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