

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

**STEM Identity Formation through Undergraduate Mentoring Experiences and
Middle School Learning in an Urban Informal Afterschool Program**

By

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The Afterschool STEM Mentoring Program was launched as a public-private partnership in New York City, United States, in the fall of 2010 with two goals: 1) to provide no-cost, local informal science, technology, engineering, and math (STEM) enrichment to middle school students in underserved neighborhoods; and 2) to build the teaching and communication skills of a large number of STEM graduate students and post-doctoral researchers through clinical service learning. This study focused on a new iteration of the program which recruited a cohort of undergraduate STEM majors from a consortium of municipal public colleges; these undergraduates participated as teacher-mentors. The undergraduates and the middle school students were all from groups historically underrepresented in STEM fields, necessitating an intersectional approach to STEM identity. Conducted in the academic year 2015-16, this case study analyzed interviews with five undergraduate mentors and eight middle school students, with convergent data from field notes taken during classroom observations, and quantitative survey responses from 80 middle school participants and 37 middle school students from a control group. The study found that pairing undergraduate STEM majors in a mentoring setting with middle school students from similar backgrounds and neighborhoods nurtured a generative instinct in the undergraduates to recreate supports they had benefited from in their own childhoods. Common supports among both student groups included authentic science practices and hands-on experiences, as well as the approval and encouragement from science teachers, role models, and family members. Undergraduate STEM majors found the experience of serving as a near-peer mentor beneficial in strengthening their identity as a knowledgeable leader, and they derived inspiration from watching their middle school students learn and grow in confidence. The findings of this study suggest that providing STEM leadership and teaching opportunities to historically underrepresented STEM majors can lead to stronger identity and persistence, and providing more local enrichment experiences with near-peer, culturally resonant STEM mentors can encourage middle school learners to inhabit intersectional identities with room for imagining future careers in STEM.

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