

# STAYING IN SCIENCE

## EXAMINING THE PATHWAYS OF UNDERREPRESENTED YOUTH MENTORED IN RESEARCH

LONGITUDINAL RESEARCH OVERVIEW

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American Museum of Natural History

in partnership with

Alan J. Daly, Consulting; Eclipse Education Research & Evaluation Group;  
Education Development Center; & SRI International



AMERICAN MUSEUM  
OF NATURAL HISTORY



# STUDY OVERVIEW

The American Museum of Natural History is engaged in a 10-year longitudinal study examining the experiences and pathways of over 560 NYC academically successful youth from backgrounds historically excluded in STEM who have participated in mentored science research experiences as part of the NYC Science Research Mentoring Consortium. The study traces youth trajectories from their participation in a high school out-of-school science research mentoring program through college and into the first years of their careers.



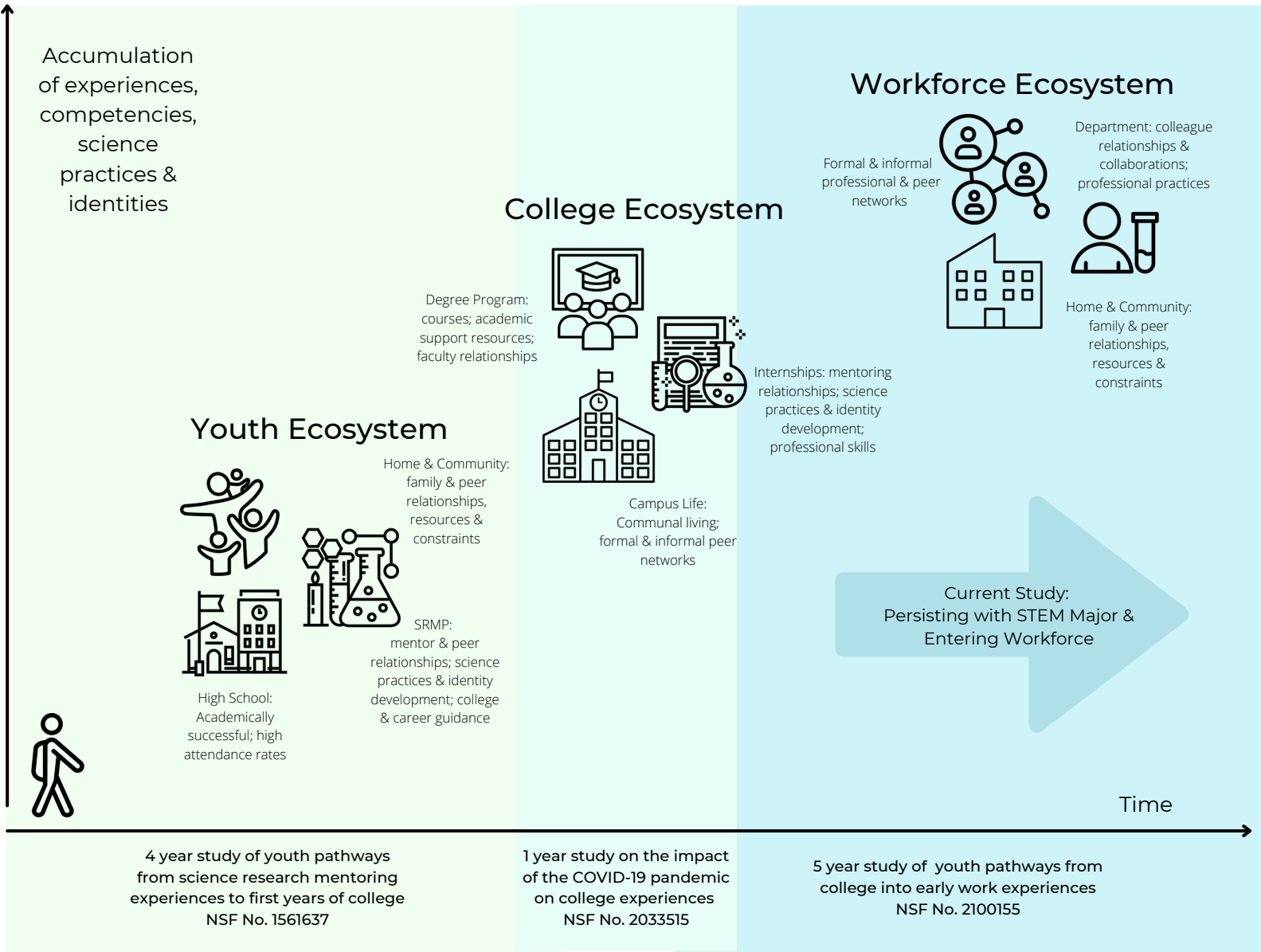
## NYCSRMC CONSORTIUM

The NYCSRMC is a partnership among 24 academic, research, and cultural institutions across NYC who share the goal of engaging youth in authentic STEM research experiences alongside scientists, including:

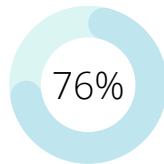


# RESEARCH

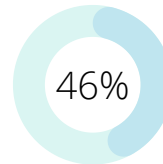
**AIM** Longitudinal study exploring the potential of our science research mentoring programs (SRMP) in supporting students "staying in science"



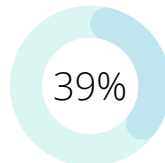
Student participants (N=560) represent the population at the center of concerns about equitable science participation (National Research Council, 2016); we see them as holding the potential for building a more diverse and equitable STEM workforce.



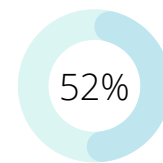
Identify as people of color



Almost half are from families with one or more parents born outside the U.S.



Over a third are first generation to enter colleges



More than half are multilingual, communicating with their families in languages other than or in addition to English

Accumulation of  
experiences,  
competencies,  
science practices  
& identities

## Key Constructs

## What We Learned



Home & Community:  
family & peer  
relationships,  
resources &  
constraints



Mentored Research:  
mentor & peer  
relationships;  
science practices &  
identity  
development;  
college & career  
guidance



High School:  
coursework,  
grades,  
relationships with  
teachers & peers



College & Career  
Goals: resources  
and obstacles to  
pursuit of STEM



90% of youth report they are making they are **making valuable contributions to the scientific community and have a strong sense of belonging and connectedness** to program mentors and peers. Youth also report opportunities to **learn science practices** while engaging in authentic research at statistically significant higher rates at their research sites than at their schools. These program features equip youth to successfully engage in STEM coursework and research internships.

Using the large scale administrative dataset, our analysis of the comparison group shows that **participating in the mentoring program is positively related to students' course taking and school attendance**—two important key factors in academic success across the board and within subject areas.

**Seventy-five percent of participants intend to major in STEM.** Our analysis of social networks surfaced a set of **relational features of persistence that may be especially critical for youth**, specifically adults and peers who serve as mentors, role models, cultural brokers, and supports during the transition from high school to college. While youth regularly reported concerns about obstacles in their academic and personal experiences, **they also felt they had the necessary support to be successful.**

Time

Accumulation of experiences, competencies, science practices & identities

## Key Constructs

## What We Learned



Home & Community: family & peer relationships, resources & constraints



**Friends and peers were identified as the most utilized source** for both academic and personal/social support during the pandemic.



Campus Life: communal living; formal & informal peer networks



**Increased sense of isolation** had the largest impact on students' academic and personal motivation and productivity; students reported an **inability to create community and a sense of belonging, particularly for students of color**. Mental health resources were inconsistent and difficult to access.



Internships: mentoring relationships; science practices & identity development; professional skills



Closed/restricted campuses led to **missed opportunities for peer collaboration, hands-on experiences with science practices, and access to academic support**. Students reported seeking resources related to career pathway planning, class content support, and finding jobs and internships.



Degree Program: courses; academic support resources; faculty relationships



Faculty varied widely in their approach to online instruction; many **students felt isolated, cut off, and hindered in their ability to fully participate in online coursework and develop relationships** with faculty and their classmates.



Time

# College & Workforce Ecosystem

We aim to examine the factors that shape whether youth in our study diverge from or continue to pursue STEM majors and careers. Our mixed-methods approach enables us to explore the following key aspects of youths' experiences as they move through college and into their first workplace experiences.

Accumulation of experiences, competencies, science practices & identities

## Key Constructs

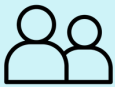
## Mixed Methods Approach



**Future Plans.** Intended plans for college and career; shifts towards or away from their planned major.



**STEM-Related Internships/Work Experiences:** Details of where youth are doing internships and jobs, what kinds of work they are doing and what supports are available to youth in those contexts (including messaging and activities that foster inclusivity and access).



**Mentor Relationships:** Who, when, and in what contexts youth identify and utilize mentors and the types of support those mentors provide to youth.



**Application & Use of Science Practices:** Tracks opportunities to apply & use the science practices they had the opportunity to develop while in mentored research in contexts of college, internships, and, when appropriate, first jobs.



**Evolving Identity:** How youth perceive that they can do science and can envision themselves in science careers.



**Feelings of Belonging/Othering:** How youth feel welcomed in communities and their experiences with overt & covert biases and microaggressions.



**Awareness & Use of Resources:** Whether youth & adults are knowledgeable about the structures and activities that can be used to address and manage experiences that create othering/marginalization and if these resources are useful.

- Annual Alumni Surveys
- Annual Social Network Surveys
- Annual Interviews with Case Studies
- Youth as Co-Researchers Methods: Photovoice, Visual Ethnography



Time

# ACKNOWLEDGEMENTS

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## STAY CONNECTED WITH US!

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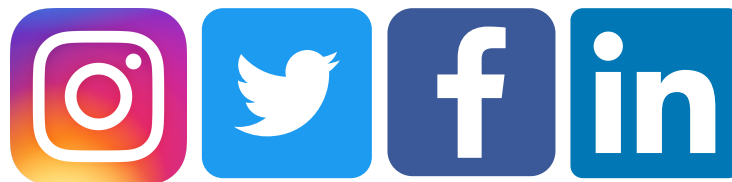
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Findings from this study will be shared via social media platforms through the NYC Science Research Mentoring Consortium.

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Watch our NSF STEM For All Video Showcase Film featuring additional findings of this study here:

<https://stemforall2021.videohall.com/>

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