



# Transition Points

## *Snapshots of a STEM Journey*



This series of research briefs is a look at how a STEM-focused museum youth development program prepared youth for college, through their own voices. Aimed at both practitioners and research-practitioners, the intent is to share what youth identified as being impactful to them about the Museum’s youth development program. It includes both successes and challenges youth faced as they adapted to their post-high school academic career.

There are 5 briefs in this collection:

- Brief 1: Skill Building for Success
- Brief 2: Meaningful Opportunities
- Brief 3: Staff-Facilitated Supportive Spaces
- Brief 4: Positive Peer Culture
- Brief 5: Sense of Belonging



Recommended Citation:

La Nguyen, C. & Price, C. A., (2022). Journeys Begin. Chicago: Museum of Science and Industry, Chicago. doi://123.45.6789.10



Supported by the Elizabeth Morse Genius Charitable Trust and the National Science Foundation.

# Developing *YOUth!*

## Research Brief #1: Skill Building for Success

*This is part of Transition Points, a series of briefs describing the lived experiences of some alumni of the Museum's youth development program as they matriculated through college. For more details, background and other briefs visit <http://bit.ly/12345>*

### **At a Glance**

One of the goals of the youth development program at the Museum of Science and Industry is to equip young people with skills necessary to succeed in education and endeavors after high school. This report explores how participants gained new skills while at MSI and how these skills may have helped them in college.

As part of the **Developing *YOUth!* Project**, we talked to youths from the Science Minors and Achievers (SMA) program at the Museum of Science and Industry, Chicago (MSI). This report is part of a series of briefs discussing the lived experiences of some of our participants as they graduated from the program and matriculated through college.

### **About the Study**

The **Developing *YOUth!* Project** is a mixed-method, longitudinal study following graduates of the Science Minors and Achievers program at MSI. The program focuses on high school youths from historically underserved communities and aims to prepare them for college. This study combines annual surveys with in-depth repeated interviews to follow participants through their college and professional careers. As of 2023, we will have followed our oldest cohort of participants for eight years, allowing us to look more broadly at how our participants' experiences with STEM and within STEM spaces has changed over time.

For these briefs, we drew upon qualitative research methods such as participant observation and multiple years of formal and informal in-depth interviews. We aim to center some of their lived experiences within STEM formal and informal spaces, including within the Museum itself.

This brief was prepared by Cindy La Nguyen, Ph.D. and C. Aaron Price, Ph.D.



# Skill Building for Success

## **While At MSI**

Participants in the Science Minors and Achievers program reported they appreciated that MSI's program set them up to be successful science educators on the Museum floor. Participants began their program as the Science Minors and then are part of a training period where they called the "In-Betweeners," and then became Science Achievers. Although most participants enjoyed the Achievers portion of the program, they nearly unanimously acknowledged the importance of the Minors program in helping them to develop the skills necessary for their success in the Achievers program. One participant, Brandy, shared:

*I think the structure is really good, as far as, you do Science Minors, and then In-Betweeners, and then Achievers. And the setup is good [...] I think it's a good transition. When I was in Minors, Science Achievers looked like they're having so much fun. But I think jumping into Achievers first would be too much. Science Minors is a good step before. It kind of slowly integrates you into that interaction with people, slowly integrates you into the process of communication of science.*

Our interviews and observations confirmed that the multi-level nature of the program provided the appropriate structure, feedback, and support for skill building necessary at each developmental level. Younger participants benefited from shorter sessions with highly structured activities as it provided opportunities to develop and refine the skills they would need later in the program. Older, more experienced participants appreciated the freedom of being able to access more of the Museum and exercise their autonomy.

## **While In College**

In college, many participants continued to credit the Science Minors and Achievers program for preparing them for success in different parts of their college and professional careers.

Participants talked about the various ways the program helped them develop skills that set them apart from their colleagues. Kevin explained that when working with other students on group projects in college, he came to the realization that not everyone has the strong foundation he felt he encountered in the program: "So when I got to the real world, I was like, wow, not everyone's an Achiever."

Kevin felt that his time in the program gave him and his fellow Achievers important experience using and applying the scientific method, logic, reasoning, and critical thinking skills in order to solve problems. He further described realizing that the skills he learned in SMA were not always common outside of the Museum:

*[My new job,] it's a little bit more complicated [...] so there's a little bit more math and a little more—a lot more requirements, rather. But it's the same type of organizational logical thinking. Which is something that I definitely appreciate [...] my experience with the scientific process for, just because it's logic and reasoning. And I'm realizing now that that is a much rarer trait in the world than I had hoped.*

Participants shared that the Science Minors and Achievers program taught them to present complex information in an approachable manner. They learned how to break down complex concepts into simpler, easy, and fun to understand information. This was a skill they felt set them apart from their peers and was important for them in their college and professional careers. Rex said:

*I think that's a key thing that I've kind of noticed... looking at some other people my own age. They never really had those opportunities to get up and present in front of people. They never really had those opportunities to go and teach people things. And I think that like the Science Achievers program was kind of my opportunity to get that foundational knowledge... of being able to present things to people in an easily understood way. And since I had that opportunity, and other people I see didn't have that opportunity, I kind of credit the Achievers program with giving me that ability.*

### **Implications**

Throughout the program, participants were given various opportunities to develop their communication skills in ways that were geared toward their developmental needs during that time. By the time participants were teaching science to guests on the Museum floor or to other youths in the program, they had had many opportunities to build up and practice their presentation skills.

## Introducing Our Youth and Young Adults

These research briefs center the lived experiences of program alumni who began as youth and are now young adults. This is a little more about them.

### **Emma**

Emma identifies as a Black woman and graduated with a bachelor's degree in computer science. She is currently exploring opportunities as a software engineer. Emma hopes to have the freedom in her career to integrate her passion for art and design with her math and computer science skills.

### **Rex**

Rex identifies as a white man. He studied mechanical engineering before switching to and graduating with a degree in finance from the school of business at his university. Rex is now a program manager and data analyst at a defense company. At the time of our interview, he was also working on his Master of Science in Business Analytics.

### **Tiana**

Tiana identifies as a Black woman and graduated with a degree in Environmental Science and Policy. She hopes to design and coordinate programs that help engage youths and adults with STEM fields. Tiana aspires to do this work by becoming a director or manager of an education department at a cultural institution, such as museum.

### **Acknowledgements**

The **Developing YOUth! Project** is supported by the National Science Foundation and the Elizabeth Morse Genius Charitable Trust. We acknowledge contributions to this report from Faith R. Kares, Ph.D., and Alison L. Mroczkowski, Ph.D.

# Developing *YOUth!* Research Brief #2: Meaningful Opportunities

*This is part of Transition Points, a series of briefs describing the lived experiences of some alumni of the Museum's youth development program as they matriculated through college. For more details, background and other briefs visit <http://bit.ly/12345>*

## **At a Glance**

A major feature of MSI's Science Minors and Achievers program was our youths' active engagement with the Museum community. The following report explores how participants experienced community engagement through STEM education and how these experiences may have impacted their academic and career choices while in college.

As part of the **Developing *YOUth!* Project**, we talked to youths from the Science Minors and Achievers (SMA) program at the Museum of Science and Industry, Chicago (MSI). This report is part of a series of briefs discussing the lived experiences of some of our participants as they graduated from the program and matriculated through college.

## **About the Study**

The **Developing *YOUth!* Project** is a mixed-method, longitudinal study following graduates of the Science Minors and Achievers program at MSI. The program focuses on high school youths from historically underserved communities and aims to prepare them for college. This study combines annual surveys with in-depth repeated interviews to follow participants through their college and professional careers. As of 2023, we will have followed our oldest cohort of participants for eight years, allowing us to look more broadly at how our participants' experiences with STEM and within STEM spaces has changed over time.

For these briefs, we drew upon qualitative research methods such as participant observation and multiple years of formal and informal in-depth interviews. We aim to center some of their lived experiences within STEM formal and informal spaces, including within the Museum itself.

This brief was prepared by Cindy La Nguyen, Ph.D. and C. Aaron Price, Ph.D.



# Meaningful Opportunities

## **While At MSI**

Participants in the Science Minors and Achievers program felt their time in the program gave them opportunities to impact their communities. In particular, they felt their experiences teaching STEM on the Museum floor and interacting with guests were meaningful.

Throughout the SMA program, participants were given various opportunities to develop their communication skills and teach science to guests on the Museum floor as well as to other youths in the program. Participants described these teaching experiences as meaningful as they were placed in leadership positions that made them feel important, knowledgeable, and self-efficacious. These teaching experiences also made them feel like they were serving a purpose by making science accessible to everyone. Soon after graduating from the program, we interviewed Andy. He talked about how experiences teaching on the Museum floor made him feel:

***Volunteering at the Museum of Science and Industry, and you know, when a kid 'gets' something and they feel more inspired to be a future scientist, or doctor, or engineer, or poet, or anything. I feel like I made an impact on somebody's life [...] I think that makes me feel really good about myself.***

## **While In College**

After graduating from the Science Minors and Achievers program, participants continued to consider ways they could impact their communities. In most instances, our participants felt their time in the Science Minors and Achievers program contributed to their choices to focus on or even center community impact.

Many participants chose more formal ways to impact their communities through their chosen careers. After completing college and starting his professional career, Andy recalled the impact he felt Science Minors and Achievers had on him and his peers in the program:

***Being at the Museum, we kind of learn that, that you know, we have these passions, and STEM isn't just about doing all these cool science-y things. It's also about giving back to your community and inspiring the next generation of leaders to do the same thing. And you know, there's a lot of problems in our society that need to be tackled. And I think there is a way that [a] STEM skill set can be used to help solve those [problems]. Even if it's not directly STEM, but the learning processes that you learn via STEM... [That can] help you solve these problems.***

Floriana is currently pursuing a master's in education, which she is coupling with an undergraduate degree in Biology in order to become a high school science teacher. She explained that the lack of science literacy she witnessed in various communities during the COVID-19 pandemic drove her to consider what sort of impact and contribution she could make herself. She said,

***So it was during those experiences that made me think, 'Oh, when is the time that I got interested in science and I got comfortable in science?' And that was in school, in high school. And that's where I was like, 'Oh, I could be a teacher.'***

*[...] There is such a fundamental lack of science literacy and so many people are just uncomfortable with science. They're like, 'Ah, this is a lot of scary long words.' It was also MSI's program, that it was just like, 'hey, scientists aren't just old white men, you know, in lab coats, [scientist can be] everyone.'*

In addition, many participants also made efforts to engage with their community via STEM by volunteering as math and science tutors at community centers, teach a science class at their church, and facilitate youth science activities at local afterschool programs. Whether in a formal or informal sense, participants indicated that they felt they had the ability and sometimes the responsibility to engage with and impact their communities.

### **Implications**

While the Science Minors and Achievers program has a focus on science education, the program goes beyond teaching science concepts, logic, and critical thinking. According to our participants, a lasting feature of the program is its emphasis on community engagement with and through science. This emphasis has shown our participants the real impact they can have on their communities and inspired them to continue doing so.

The impact the program has on how participants might use Science to engage with their communities even after they've left the Museum, indicates that outcomes of the program may go beyond whether or not our participants end up enrolling in a STEM major or going into a STEM career. At the Museum, our participants were able to experience STEM in various forms, including as a way to actively engage with their communities

## Introducing Our Youth and Young Adults

These research briefs center the lived experiences of program alumni who began as youth and are now young adults. This is a little more about them.

### **Andy**

Andy identifies as an Asian American, Asian Indian American, and White man. He majored in Computer Science and Political Science. After spending some time working in Big Tech, Andy was able to narrow in on a career path that would allow him make use of his double major.

### **Kevin**

Kevin identifies as an Asian American and Korean American man. He graduated with a degree in Communication and works in client management at a finance-related firm. While he doesn't consider himself a typical "Science person," he loves teaching and presenting science to others and helping people think critically and make logical connections.

### **Floriana**

Floriana identifies as a Latinx, Mexican American, and white cis-woman. After graduating with a bachelor's degree in biology, Floriana is pursuing a degree in education and aims to become a high school science teacher.

### **Acknowledgements**

The **Developing YOUth! Project** is supported by the National Science Foundation and the Elizabeth Morse Genius Charitable Trust. We acknowledge contributions to this report from Faith R. Kares, Ph.D., and Alison L. Mroczkowski, Ph.D.

# Developing *YOUth!*

## Research Brief #3: Staff-Facilitated Supportive Space

*This is part of Transition Points, a series of briefs describing the lived experiences of some alumni of the Museum's youth development program as they matriculated through college. For more details, background and other briefs visit <http://bit.ly/12345>*

### **At a Glance**

The Science Minors and Achievers were successful due in part to the dedicated Museum staff who were responsible for the youth development program. The following report explores how participants felt staff were a crucial component of the supportive space they found in the Museum. Further, we discuss participants' various experiences with and without supportive networks once in college.

As part of the **Developing *YOUth!* Project**, we talked to youths from the Science Minors and Achievers (SMA) program at the Museum of Science and Industry, Chicago (MSI). This report is part of a series of briefs discussing the lived experiences of some of our participants as they graduated from the program and matriculated through college.

### **About the Study**

The **Developing *YOUth!* Project** is a mixed-method, longitudinal study following graduates of the Science Minors and Achievers program at MSI. The program focuses on high school youths from historically underserved communities and aims to prepare them for college. This study combines annual surveys with in-depth repeated interviews to follow participants through their college and professional careers. As of 2023, we will have followed our oldest cohort of participants for eight years, allowing us to look more broadly at how our participants' experiences with STEM and within STEM spaces has changed over time.

For these briefs, we drew upon qualitative research methods such as participant observation and multiple years of formal and informal in-depth interviews. We aim to center some of their lived experiences within STEM formal and informal spaces, including within the Museum itself.

This brief was prepared by Cindy La Nguyen, Ph.D. and C. Aaron Price, Ph.D.





# Staff-Facilitated Supportive Space

## **While At MSI**

Participants in the Science Minors and Achievers program felt that the Museum was a space where they could be themselves. They described a support network at the Museum that helped them feel safe to both be themselves and discover new aspects of their personalities. The Museum staff, and specifically the program facilitators, were critical in shaping their support networks and in fostering this environment.

Participants reported feeling that the staff genuinely cared about them and their well-being. Furthermore, participants reported feeling that this care and attention was unique to the Museum and made an impact on their lives and how they felt about themselves.

Pia described how one staff member's personality and positive energy set the tone each Saturday morning:

***Melanie is always, um, she's just [laugh]... a lot, but in the best way, you know? [She's] really excited all the time. And it's really nice to see her get so excited every Saturday. She's like 'Happy Saturday, everybody!' So that makes it easier to wake up at nine and see her there, really excited. And she's always very encouraging, especially to people she knows she needs to help get out of their shell a bit more. So that's always really nice.***

Participants were especially appreciative of how staff were intentional about acknowledging each of them as unique individuals. The program staff did this by making a point of learning each person's name, asking each participant in the program how their week went, and celebrating each person's good news or accomplishments. Some participants felt that the program staff also helped them uncover aspects of their personalities they had not been given a chance to discover yet. Ana shared,

***I didn't realize that I was this kind of more quirky, bubbly kind of person because I was just always so shy and reserved as a kid. I think one of the people that brought that out was Melanie because she was just wild and crazy. I think she kind of caught on to me a little bit and I realized that, okay, I can totally express myself because this woman's being so expressive, and I didn't have to fit a mold of being a quiet scientist just focused on her work. I could have a personality too and be successful..***

Participants also cited opportunities they had at the Museum to meet and learn from adults who were professionals in the industry or academics in participants' fields of interest. Floriana described getting the chance to tour a science lab at a nearby university and getting to meet two women who were PhD students in a STEM program there.

***MSI did this Women in Science Expo and for one day they were like, 'okay, all the Achievers, go and [tour this Lab at Northwestern University]. And that was really helpful because we got to meet these two [women in a] PhD program at Northwestern [University]. They gave me all these really important tips and useful bits of insider advice that I would not have gotten elsewhere... Ultimately, I did decide to do a biology research program, so [I'm] grateful for that lab visit because that [was] the first time I was taught how to use a micropipette and learn what a lab looks like, proper protocol in a lab... it was so useful because when I started at [my university], they just assumed that you knew [all of] tha***

## While In College

As young adults attending college, our participants were no longer checking in with SMA staff each Saturday morning. They did not have SMA staff members encouraging them to speak with confidence and assert their presence. Instead, most participants described transitioning into a space without an existing supportive network, especially not a formal network, such as the one they had at the Museum.

Most participants turned to older students in their major, graduate students, and professors to find mentors to support their development. However, the ease of access to these networks seemed to vary for our participants. In particular, several of our white and/or men participants described finding and accessing a mentor or supportive network with ease. Cam found support from a professor and graduate students through something as simple as an email. When asked about how he secured a position on a research team while he was an undergraduate student, Cam said:

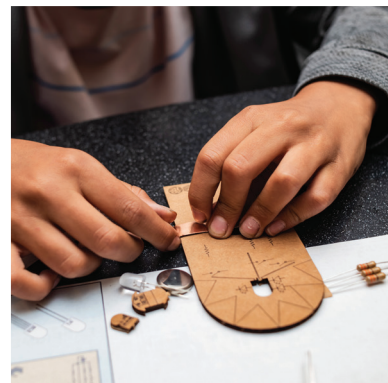
***I just emailed him. And then we had some interviews. And then he accepted me. And I talked to a bunch of different graduate students before I joined the team to find out which one I would like to join. And then I decided on this one, so I joined this one. And then yeah, then it got ramped up last year.***

The participants who talked about contacting professors and graduate students with ease were more often those whose identities appeared to align with those in the majority in STEM spaces, i.e., white and/or men. On the other hand, many of our women of color, and especially our Black Women participants, had a much more difficult, if not impossible, time accessing mentors and networks that were supportive of their developmental needs. In some cases, these participants even reported facing people in mentoring positions who were very much unsupportive.

In a unique situation, one participant's university did provide an immediate and supportive network for students of color in STEM. Before even starting a STEM program at her university, Brandy was contacted by the university's office specializing in support for students of color in STEM majors. This office organized a specialized orientation where Brandy and other students of color could meet each other and situate themselves on campus before the start of the term.

## Implications

Staff at the Museum were responsible for facilitating a supportive space for participants in the program. Once outside of the Museum, our participants encountered variations in the support they felt by their receiving STEM community or institutions. Their varied experiences suggests that access to a supportive network fostered by staff (i.e., faculty and other academic leadership) is not necessarily a guarantee for all of our participants once they leave our program and start college.



# Introducing Our Youth and Young Adults

These research briefs center the lived experiences of program alumni who began as youth and are now young adults. This is a little more about them.

## Pia

Pia identifies as a Black Caribbean American woman. Early in her undergraduate career, Pia pursued a major in neuroscience. While she still loved science, she realized her passion and calling was in theater, creative writing, and the arts.

## Ana

Ana identifies as an Indian Asian American and white woman. She is currently pursuing a Master of Science in Data Science. Ana hopes to work in data science, cognitive science, and artificial intelligence.

## Floriana

Floriana identifies as a Latinx, Mexican American, and white cis-woman. After graduating with her bachelor's in Biology, Floriana is pursuing a degree in education and aims to become a high school science teacher.

## Cam

Cam identifies as a white man and graduated with a degree in mechanical engineering. He is currently pursuing a Master of Engineering in Mechanical Engineering while interning at an aerospace and defense company.



## **Acknowledgements**

The **Developing *YOUth!* Project** is supported by the National Science Foundation and the Elizabeth Morse Genius Charitable Trust. We acknowledge contributions to this report from Faith R. Kares, Ph.D., and Alison L. Mroczkowski, Ph.D.

# Developing *YOUth!*

## Research Brief #4: Positive Peer Culture

*This is part of Transition Points, a series of briefs describing the lived experiences of some alumni of the Museum's youth development program as they matriculated through college. For more details, background and other briefs visit <http://bit.ly/12345>*

### **At a Glance**

Youth in the Science Minors and Achievers program at the Museum of Science and Industry found that their peer community was essential and important part of their experiences in the program. In the following report, we discuss how participants felt the program was positive and inclusive. In contrast, we take a look at how the lack of a positive peer community impacted some of participants once they were in college.

As part of the **Developing *YOUth!* Project**, we talked to youths from the Science Minors and Achievers (SMA) program at the Museum of Science and Industry, Chicago (MSI). This report is part of a series of briefs discussing the lived experiences of some of our participants as they graduated from the program and matriculated through college.

### **About the Study**

The **Developing *YOUth!* Project** is a mixed-method, longitudinal study following graduates of the Science Minors and Achievers program at MSI. The program focuses on high school youths from historically underserved communities and aims to prepare them for college. This study combines annual surveys with in-depth repeated interviews to follow participants through their college and professional careers. As of 2023, we will have followed our oldest cohort of participants for eight years, allowing us to look more broadly at how our participants' experiences with STEM and within STEM spaces has changed over time.

For these briefs, we drew upon qualitative research methods such as participant observation and multiple years of formal and informal in-depth interviews. We aim to center some of their lived experiences within STEM formal and informal spaces, including within the Museum itself.

This brief was prepared by Cindy La Nguyen, Ph.D. and C. Aaron Price, Ph.D.



# Positive Peer Culture

## **While At MSI**

Most youth described the peer culture in the Museum as quite positive, which contributed to the supportive environment. Participants specifically identified diversity and a widespread sense of ambition and motivation among youth to contribute to the program's positive peer culture. Youth often commented that peers in the program were extremely diverse in terms of their gender, racial and ethnic identities, religion, socioeconomic status, family immigration status, school experience (public, private, homeschooled), and the area in which they lived (urban, suburban, rural). Nearly every alumnus we interviewed mentioned that they appreciated the diverse nature of the group and found it to be a strength of the program. Ray said,

***Before the Museum, I didn't really actually know any Black people. [Here,] I got to meet people that had different views, that had different interests, that, you know, showed me things that I wouldn't have seen before. [...] It just, it helped me to see the world less in terms of 'us vs. them'. But also, you know, that the rest of the world is a much more beautiful place.***

Youth repeatedly described the culture of the SMA program as accepting and inclusive. Some participants commented that they believed the diversity of the youth in the program helped to create that culture. Tiana likened the culture of the SMA to that of a family, saying:

***It's basically a family outside of your house. Cause that's how I feel when I go to the museum. [...] It means, not everybody in a family gets along... but when you have that [level of] of respect, and you have that level of acceptance, you know that no matter what, you're going to be accepted and it makes you feel important. It makes you feel empowered.***

## **While In College**

The same youth, however, had different experiences in college outside of the MSI community. Emma identifies as a Black African American woman and majored in Computer Science at a large public university. She joined and was active in multiple student organizations for Black Students in STEM at her college, which she described as mostly helpful earlier in her college years. While Emma did find some supportive peer and mentor networks within these organizations, the classes in her major lacked diversity and were predominantly white.

***Being like, the only Black woman in my class or sometimes the only Black person, I think that I was kind of expecting that, but I didn't realize how isolated I would feel until like, I was actually in those situations***

Emma's response was to normalize the experience.

***I think that... I don't know. I just kind of like, just put my head down and do what I have to do. I try not to think about it too much, because it just didn't go away. Like, it just became the normal for me. Because like in my instance, sometimes I'm the only woman on my entire team, or the only Black person on their entire team and so—or both, usually both. It just became normal for me. And it was familiar, like the feeling of being isolated, or like being alone, that was familiar to me. And so after a while, I just didn't even process it as much as I did in the beginning.***

But that normalization had its consequences:

*The other kids, they had study groups and things of that sort. And, for me, it was very hard to find people that I connected to who were also in my major. And so, I mainly did all my homework... I pretty—well I never had a study group, to be honest. And the only time I ever worked with another person was in office hours with my professor or the TA's or something like that. So I think that having to navigate that experience by myself, for the most part, [was] really, like challenging and stressful.*

At the time of our interview, Emma had recently graduated and was on the job market, looking for a position as a software engineer. She was unenthusiastic about her career prospects, explaining that she was passionate about art, creativity, and community-building, but that she rarely encountered and did not expect to find positions that allowed her to do what she loved within her expertise as a software engineer.

### Implications

While The diversity of the Museum experience was valued by the youth. However, for many that diversity was absent in the colleges they attended. Instead of finding a home with their peers, they felt alone. Some changed schools, some changed majors, and some stuck with it but graduated with less optimism and enthusiasm for STEM and their future as a whole.

Positive youth development (PYD) programs rightfully focus on the positive aspects of what youth bring to an experience and what they can achieve. However, more work may need to be done to prepare them for situations without the kind of scaffolded support PYD programs offer. Certainly, more research needs to be done about the transition from high school to college for these young adults.

## Introducing Our Youth and Young Adults

These research briefs center the lived experiences of program alumni who began as youth and are now young adults. This is a little more about them.

### Emma

Emma identifies as a Black woman and graduated with a bachelor's degree in computer science. She is currently exploring opportunities as a software engineer. Emma hopes to have the freedom in her career to integrate her passion for art and design with her math and computer science skills.

### Ray

Ray identifies as a white, Latino, and Jewish man. At the time of our last interviews, he was an engineer working in research and development for a manufacturing company. In addition, he was working on his Master of Engineering in Mechanical Engineering.

### Tiana

Tiana identifies as a Black woman and graduated with a degree in Environmental Science and Policy. She hopes to design and coordinate programs that help engage youths and adults with STEM fields. Tiana aspires to do this work by becoming a director or manager of an education department at a cultural institution, such as museum.

### Acknowledgements

The **Developing YOUth! Project** is supported by the National Science Foundation and the Elizabeth Morse Genius Charitable Trust. We acknowledge contributions to this report from Faith R. Kares, Ph.D., and Alison L. Mroczkowski, Ph.D.

# Developing *YOUth!*

## Research Brief #5: Sense of Belonging

*This is part of Transition Points, a series of briefs describing the lived experiences of some alumni of the Museum's youth development program as they matriculated through college. For more details, background and other briefs visit <http://bit.ly/12345>*

### **At a Glance**

Participants of Science Minors and Achievers program reported they felt supported and respected during their time in the program. This positive treatment created a strong sense of belonging for them at the Museum. In this brief, we discuss ways in which our participants continued to seek a sense of belonging after leaving our program going to college. We found that some of these spaces may fall short especially for our Black Women participants.

As part of the **Developing *YOUth!* Project**, we talked to youths from the Science Minors and Achievers (SMA) program at the Museum of Science and Industry, Chicago (MSI). This report is part of a series of briefs discussing the lived experiences of some of our participants as they graduated from the program and matriculated through college.

### **About the Study**

The **Developing *YOUth!* Project** is a mixed-method, longitudinal study following graduates of the Science Minors and Achievers program at MSI. The program focuses on high school youths from historically underserved communities and aims to prepare them for college. This study combines annual surveys with in-depth repeated interviews to follow participants through their college and professional careers. As of 2023, we will have followed our oldest cohort of participants for eight years, allowing us to look more broadly at how our participants' experiences with STEM and within STEM spaces has changed over time.

For these briefs, we drew upon qualitative research methods such as participant observation and multiple years of formal and informal in-depth interviews. We aim to center some of their lived experiences within STEM formal and informal spaces, including within the Museum itself.

This brief was prepared by Cindy La Nguyen, Ph.D. and C. Aaron Price, Ph.D.



# Sense of Belonging

## **While At MSI**

We found that, overall, participants in the Science Minors and Achievers program felt a strong sense of belonging which contributed to their feeling supported by the Museum. To our participants, the sense of belonging and feeling supported by the Museum extends beyond what the Museum provides them. Rather, it describes a relationship they perceive with the Museum that it is reciprocal: they belong to the Museum and the Museum belongs to them.

Participants described feeling proud that others associated them with the Museum, which they perceived to have a prestigious reputation. They described a sense of ownership over their role at the Museum and felt trusted with responsibilities. In addition, their access to Museum spaces, staff, and institutional knowledge contributed to their sense of belonging. Karani described attending a formal event at the Museum made him feel recognized as both belonging to the Museum, but also belonging to a larger STEM community:

*You know, I do the Museum's Columbian Ball, I do a Black Creativity gala [...], I got a tuxedo on, a bowtie, you know. And I'm meeting people [...] I like to make people smile and stuff and, and I'm telling them about science, I'm telling them about the TV show, and not only that, I'm telling them about just life in general. And I'm having these mature conversations with adults that are in STEM fields. And, and I'm loving it [...] I'm just like, 'This is awesome.' [...] Just being a young Black man, and just my circumstances, [...] I got a taste of what it was like to not be average. I got a taste of what it was like to shock somebody. And I was like, 'I'm never going back. I love this. This is amazing.'*

## **While In College**

In college, participants continued to think of the Museum as a community where they belonged. That sense of belonging to the Museum community fueled their commitment to the program when they were still in it, as well as their continued commitment to the Museum at present through their participation in this study. While in college and thinking back on her time at the Museum, Floriana said,

*It was a community aspect. I think it gave me a lot of like social interactions that I didn't get [otherwise] and it was just a lot. It was a supportive fun environment where I got to learn and I got to work with other peers like myself, interact with the guests. It was just, I don't know, it helped me come out of my shell and definitely made me much more confident and much more extroverted than I thought I could be.*

For many of our participants, the sense of belonging and feeling of support from a STEM community was not easy to find in college. Some participants reported feeling different from the communities they encountered in college. They described realizing that some of the people they'd meet did not care about the same things they cared about, were not as experienced with different types of people, and did not share the same interests and motivations as they did. As a result, some participants like Pia, felt not only isolated, but scrutinized:

*I feel like it felt mostly like I was trying to connect to other people and there was just like a very clear, I don't know. We're just not thinking the same way or that we're not*



*coming from the same place or same background. And so I would just... I felt most times, I felt like I was genuinely just like, being my truest self and it just felt like people couldn't meet me where I was or they expected something different from me from how I was acting—they like didn't expect me to act the way I was. And so that made me feel more isolated.*

Emma described joining a student organization for Black students in Engineering at her university. While this organization helped her feel some sense of belonging in her early years of college, as she advanced in her degree, the demands of her computer science program took up all of her time and energy. Beyond the demands on her time, her major in computer science was even more disproportionately white than the rest of the school of engineering so that she became more isolated from peers who she felt understood her.

*Actually, some people have told me that they believe that I'm in the position that I'm in or I'm at the companies that I'm at, because of the fact that they're trying to, like meet a quota. And I think that knowing that there's some people in my environment, or I've even had mentors tell me, 'oh, you only got that, because you're a Black woman,' and, 'you know, they're trying to increase diversity measures.' And I think that, other people having that perspective, I think that that bothers me more.*

*Well, I won't say more, but that bothers me, because it's like, you know, it's not like we're—Black Women are taking over tech companies [...] Black people in general make up less than probably 3% of most big tech companies. And then, you know, they could have chosen any Black guy [...]. I'm pretty sure I wasn't the only one [...] that they had as an option, so...*

## Implications

Many universities have student groups and organizations that are meant to give students options in finding a space where they can feel like they belong. While these spaces are critical and necessary, they may not be enough. Finding a community to belong to might be a normal part of adjusting to life on a college campus, but we found that especially for our Black Women participants like Emma and Pia, this search was marked by feelings of isolation and scrutiny surrounding their identities. Furthermore, while programs and organizations may exist to help support students of color at universities and especially in programs that are historically predominantly white, access to these communities require students of color to exert extra time and energy.



# Introducing Our Youth and Young Adults

These research briefs center the lived experiences of program alumni who began as youth and are now young adults. This is a little more about them.

## Karani

Karani identifies as a Black man and is taking a break from pursuing his undergraduate degree in Computer Science and Finance in order to take advantage of opportunities to apply his specialized skill set working with video, film, and content creation. He is currently working as a video and media content creator for a multi-platform sports media company.

## Emma

Emma identifies as a Black woman and graduated with a bachelor's degree in computer science. She is currently exploring opportunities as a software engineer. Emma hopes to have the freedom in her career to integrate her passion for art and design with her math and computer science skills.

## Pia

Pia identifies as a Black Caribbean American woman. Early in her undergraduate career, Pia pursued a major in neuroscience. While she still loves science, she realized her passion and calling is in theater, creative writing, and the arts.



## Acknowledgements

The **Developing YOUth! Project** is supported by the National Science Foundation and the Elizabeth Morse Genius Charitable Trust. We acknowledge contributions to this report from Faith R. Kares, Ph.D., and Alison L. Mroczkowski, Ph.D.