

# HYPOTHEkids

Using hands-on science to  
open pathways and identities

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PRESENTED BY

## Siegel Family Endowment

We are a foundation focused on understanding and  
shaping the impact of technology on society.

### About Siegel

Siegel Family Endowment employs an inquiry-driven approach to grant making that is informed by the scientific method and predicated on the belief that philanthropy is uniquely positioned to address some of the most pressing and complex issues facing society today. Our grant making strategy positions us to be society's risk capital. We support high quality work that will help us derive insights to timely questions and has high potential for future scale. Our focus is on organizations doing work at the intersection of learning, workforce, and infrastructure. We aim to help build a world in which all people have the tools, skills, and context necessary to engage meaningfully in a rapidly changing society. Siegel Family Endowment was founded in 2011 by David M. Siegel, co-founder and co-chairman of financial sciences company Two Sigma.

### Our Focus on Learning

We strive to understand how we can better equip individuals with the knowledge they need to contribute to and engage with a rapidly changing society. Yet, we also recognize that every factor in a learner's education – from broadband access to safe and affordable housing to the development of social-emotional skills – can widen inequality and impact success. Our work supports and shapes programs and solutions that build lifelong learning opportunities and envision an education system that works for everyone, by addressing long standing social and economic inequities.

### Enduring and Frontier Skills

Siegel Family Endowment is committed to supporting organizations that are on the frontlines of building an equitable future by helping to nurture **enduring skills** and **frontier skills**. We seek to foster “**enduring skills**,” or the competencies and mindsets needed to thrive both in the present and in a changing world. These include both technical capabilities, as well as a variety of attitudes and mindsets. Examples of enduring skills include computational thinking, problem solving, collaboration, creativity, resilience, and the ability to learn, to name a few. At the same time, we want to ensure that emergent fields, such as biotechnology and generative AI, are equitable for all. Thus, we also support the development of “**frontier skills**,” that is the abilities, literacies, and pathways necessary to participate in and drive emergent industries - acknowledging that these skills also apply across many areas of life today.



## About Grantee

HYPOTHEkids is a STEAM (Science, Technology, Engineering, Art & Design, Math) education and youth talent development initiative with a mission to provide underserved students with hands-on science and engineering education and mentorship experiences such that they can thrive in the high-tech economy of tomorrow. HYPOTHEkids offers afterschool Science Clubs for elementary school students; robust science kits; a science educator training program for high schoolers; an intensive science research and applied engineering training and internship programs for high school students; and a host of other activities throughout New York City. In doing so, HYPOTHEkids provides students with hands-on experiences that spark their curiosity, help them see themselves as scientists, and go on to engineer a better future.

### KEY TAKEAWAYS

• **Supplementary STEAM programming offered through afterschool community-based organizations (CBOs) allow greater flexibility and reach than is often possible when school-based programs act on their own.** At the same time, CBOs offering afterschool science programs face significant challenges, such as a dearth of trained staff members and difficulties maintaining quality and consistency across a wide range of programs.

• **There are multiple ways for students to develop and express a science identity, all of which nonprofits can nurture and track.** While some students may pursue higher education in science and enter careers as scientists, others may develop a love of teaching

or science communication. For some, science identity may manifest itself as an appreciation for inquiry-driven approaches and engaged citizenship that draws on scientific curiosity.

• **Learners of different ages require STEAM programming that is developed especially for them.** A lower elementary school student may learn best through the use of hands-on materials that are developed especially for their level of dexterity and concentration. A high school student who is beginning to consider career pathways may be more attracted to programs that offer paid work opportunities within the life sciences. It's important to develop programming and access points that serve each unique population.

## Executive Summary

“Kids learn by doing.” That’s the maxim that underlies HYPOTHEkids, a New York City-based STEAM (Science, Technology, Engineering, Art & Design, Math) education and youth talent development initiative, according to Christine Kovich, the organization’s Founding Executive Director. HYPOTHEkids offers a range of programs that target different student populations—from hands-on Science Clubs for elementary school students to mentored research internships for high school students. At the core of all these programs is a commitment to serving students where they are, in ways that are engaging and situated in the real world.

HYPOTHEkids’ [Science Clubs](#) program is offered through CBOs that run afterschool programs throughout New York City. HYPOTHEkids develops, packs, and supplies materials for Science Clubs, and also trains existing CBO staff and provides instructors when programs are short-staffed. Working through CBOs, like those serving New York City’s housing authority, also allows HYPOTHEkids enormous reach to underserved students.

Science Clubs are just one part of HYPOTHEkids’ offering; it offers more intensive and career-oriented programs for older students. Through the [New York Bioforce](#) program, New York City high schoolers from low-income families gain experience conducting life science research and build connections with scientists at institutions throughout the city. The [Hk Maker Lab](#) partners with faculty at Columbia University to provide training and support to high school students creating design projects. Another program supports high schoolers in becoming science educators for HYPOTHEkids’ Science Clubs.

Together, these programs offer a new vision of science education in which students themselves are empowered to ask questions, experiment, and draw conclusions. Founding Executive Director Christine Kovich explains that HYPOTHEkids’ constellation of programs is not just moving the needle on scientific knowledge among students. “It’s changing their science identity,” Kovich says. “They can see themselves as scientists.” ■

# Programs and Examples

## Core Elements: What Makes the Program Work?

HYPOTHEkids' aim in its Science Clubs and other initiatives is to instill a sense of curiosity and science identity in students, and to cultivate a new, diverse generation of scientists. In doing so, it aims to leverage the resources of New York City itself—from youth-serving CBOs, to the City of New York's education and workforce development programs, to institutions of higher learning across the city, to emerging life science companies, to students themselves. That model situates learning within the community and seeks to elevate the city along with the aspirations and outcomes of its students.



Summer allows for the time and space to fully explore hands-on science. SummerRising provides free full day summer programming at school sites all over the city.

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## Working through Community-Based Organizations

Elementary schools are often unable to provide the type of hands-on science learning that helps students develop curiosity and a sense of identity as scientists. Grade school teachers must devote resources to the academic subjects that are regularly tested, and are often not trained in such methods or content. HYPOTHEkids aims to supplement their instruction through Science Clubs.

HYPOTHEkids offers its Science Clubs through afterschool programs run by CBOs that contract with the New York City Department of Youth and Community Development. This approach ensures that the program serves a ready audience of young learners who would not otherwise have access to high-quality, hands-on science learning opportunities. Furthermore, HYPOTHEkids does not have to devote resources to student

recruitment, and can instead focus on programming. This model allows easier scaling than would be possible if HYPOTHEkids were to run its own programming in its own space.

At the same time, working through CBOs poses some challenges. These programs often have high staff turnover and the staff that are in place often do not have experience in science education. As such, HYPOTHEkids has adjusted its strategy to train and deploy high school students as educators to local elementary schools. HYPOTHEkids is also training staff at public libraries to run Science Clubs. Scaling the program is contingent upon making the curriculum and training accessible to a range of community science educators and having the material resources to package enough kits to serve Science Clubs throughout the city.

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## Multiple Pathways to Science Identity and Careers

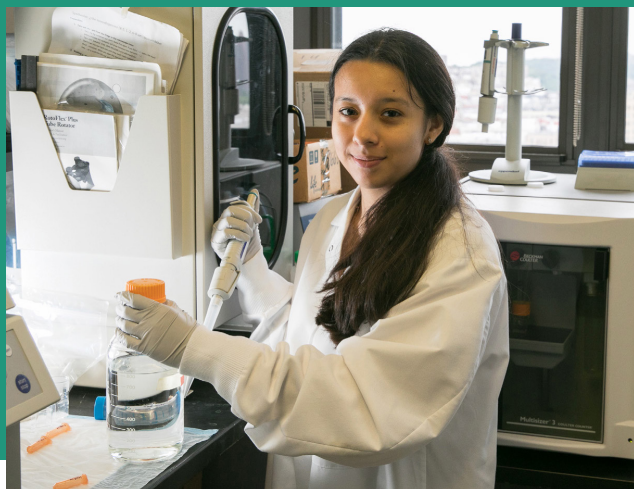
HYPOTHEkids was created partly to inspire students from historically excluded communities to pursue careers as scientists. For example, HYPOTHEkids' mentorship and lab programs for high school students offer explicit pathways toward career exploration and workforce participation. HYPOTHEkids' leaders hope that such programs will ultimately contribute to a more diverse science workforce in New York City.

Yet, HYPOTHEkids' programs are also designed to reach students who may choose career paths outside of the lab sciences. For example, HYPOTHEkids's program to train high school students as science educators in Science Clubs

for elementary school students is helping high schoolers to develop teaching and science communications skills. In another example, HYPOTHEkids piloted a program that allows students in the South Bronx to explore careers in public health. The organization is also working on programs that expand this pilot by bringing the program to high schools throughout the city and offering a pathway into public health and life science careers through partnership with community colleges. And all of HYPOTHEkids' programs aim to help students develop the future-resilient problem-solving and critical thinking skills necessary for success in all areas.



Students build their own stethoscope and listen to heartbeats as part of “My Body Alive,” a unit of 14 lessons connected to human anatomy.



Daniella Jimenez participated in HYPOTHEkids’ engineering program, paving the way for her to work in a biomedical engineering research lab.

### 3 Leveraging Community Assets

Through all of its work, HYPOTHEkids draws on the assets that are found within the community it serves. Scientists at local companies and universities serve as mentors to students. CBOs throughout New York City provide the space for Science Clubs through their partnerships with HYPOTHEkids. Universities lend faculty for HYPOTHEkids’ programs. Local businesses participate in volunteer programs to package HYPOTHEkids’ science kits.

These partners and community assets are important not just for sustaining HYPOTHEkids’ programs, but also for helping students develop the networks and relationships that can help them be successful in the future. Over 90 percent of high school students who participated in HYPOTHEkids’ summer programs have gone on to pursue

STEM degrees at four-year colleges. Paid internships allow students to construct competitive resumes and gain valuable work experience.

In one example, Daniella Jimenez, a West Harlem student, participated in HYPOTHEkids’ engineering program at Columbia University, paving the way for her to work in a biomedical engineering research lab. Jimenez continued to work in this lab while completing her bachelor’s degree at City College (CUNY). Jimenez is now pursuing a master’s degree at Columbia and mentors students who are currently participating in HYPOTHEkids’ Bioforce program. Jimenez’s experience illustrates how the HYPOTHEkids program can be transformational for students who would not otherwise have access to educational and career opportunities in the sciences.

### 4 Maintaining Flexibility and Meeting Students Where They Are

HYPOTHEkids operates within a shifting context. There is no bigger example of this than the COVID-19 pandemic, during which CBOs, schools, universities, and businesses initially shuttered their doors and went online. When schools and afterschool programs reopened, they faced enormous challenges: increased costs, reduced staff, and few resources to help students overcome the challenges and traumas that the COVID-19 pandemic had surfaced.

HYPOTHEkids has remained flexible in responding to these challenges. For example, in its first in-person programming since the pandemic began, HYPOTHEkids

focused on supporting students in math education. Using a fun, hands-on unit called Mathcrush, staff hoped to help students recover some of the learning that they had missed during school closures and remote instruction. But staff realized that students were dissatisfied with the program. The students felt ashamed about their math abilities and were struggling to connect with other students, in-person. So HYPOTHEkids switched its focus to “My Body Alive,” a hands-on anatomy and physiology themed unit that allows students to feel more connected to themselves and to their fellow students.



# Impact and Next Steps

## Impact

HYPOTHEkids' numbers are impressive. Annually, its Science Clubs serve over 2,000 elementary school students. Hundreds of high school students have participated in science education and career development through HYPOTHEkids. A healthy proportion of those high school students have gone on to major in STEM disciplines in college. Dozens have completed coveted, paid internships in research labs throughout New York City.

HYPOTHEkids has also created impact measurements that track the various forms of science identity that it seeks to cultivate, beyond just pursuit of science majors in higher education. Through surveys, HYPOTHEkids tracked the following areas of progress among elementary aged participants:

- A 16 percent increase in STEAM confidence
- A 17 percent increase in understanding of what engineers do
- A 13 percent increase in students indicating they might choose a STEM career

But these numbers only tell part of the story. HYPOTHEkids also seeks to understand the impact its programs have had on each individual student and the ways in which that impact is felt across the community as a whole. The organization collects stories of how HYPOTHEkids programs have impacted students. For example, Beatrice Mhando grew up in Harlem and served as a summer STEAM mentor for multiple years. She also completed the Hk Maker Lab program and an engineering internship. After graduating from college, Mhando returned to her neighborhood and now works in the communications department at Columbia University's School of Engineering and Applied Science. Mhando says that participating in HYPOTHEkids programs "opened my eyes to the field of STEM, especially biomedical engineering."

HYPOTHEkids is working toward expanding impact by asking the following questions:

- What opportunities are there for scaling high-touch STEAM education and training programs in less resource-intensive ways?
- How can we help create career opportunities in science and engineering for students who don't pursue four year STEM degrees?
- How can we leverage the human, business, higher education, and governmental assets of New York City in education programming?



TOP: During the pandemic, HYPOTHEkids took the Science Clubs to the streets of NYC in collaboration with **Street Lab**.

BOTTOM: The Hk Maker Lab program supports high school students as they identify and create solutions to biomedical problems.

## Next Steps

HYPOTHEkids invites partnership from community members and organizations across New York City in a variety of ways.

- 1 HYPOTHEkids welcomes queries from individuals with a passion for STEAM education who would like to serve as paid Science Club mentors at sites throughout New York City.
- 2 Practicing scientists and engineers in New York City can share their work with young scientists through virtual meetings or can host and mentor high school students in their labs.
- 3 Reach out to [HYPOTHEkids](https://www.hypothekids.org) to learn more about Science Clubs or any of their other projects.

To learn more and contact Siegel Family Endowment, visit [www.siegelendowment.org](https://www.siegelendowment.org)