



A Biogen Foundation Initiative

YEAR 3 ANNUAL REPORT
OCTOBER 2021

STAR Initiative Year 3 Report

Launched in 2018 by the Biogen Foundation through a 4-year, \$10 million investment, the STAR Initiative drives STEM education equity in Cambridge and Somerville, MA. Through STAR (Science, Teacher support, Access & Readiness), the Biogen Foundation is investing in six high performing nonprofits and coordinating a multi-stakeholder network that centers serving students historically underrepresented in STEM college and career pathways- notably, students of color.

This report highlights work the STAR Initiative accomplished in Year 3, the 2020-2021 school year.



SCIENCE | TEACHER SUPPORT | ACCESS | READINESS



Photo: Breakthrough Greater Boston

The Biogen Foundation
is thrilled to announce that we have
committed to continue funding the
STAR Initiative in Year 5!

A young boy with curly hair and a man in a light pink shirt are looking down at something together, possibly a book or a screen. The background is blurred, suggesting an indoor setting like a classroom or library.

STAR'S Continued Focus on Racial Equity

The STAR Initiative was designed to address the roots of racial inequities in STEM professions by ensuring students who have historically been underserved are reached well before college.

On April 5th, 2021, the Boston Globe hosted a dynamic panel with Biogen on [“Addressing Racial Inequity in STEM Education.”](#) The event featured remarks from Lt. Governor Karen Polito, leaders from three STAR partners including [Enroot](#), [Young People’s Project](#), and [Cambridge Agenda for Children](#), and most significantly, three students from Cambridge and Somerville Public Schools who participate in grantee programs.

STAR stakeholders on the panel emphasized the critical role that out-of-school time organizations, such as our STAR grantees, play in leveling the playing field for students who typically do not have equal access to STEM exposure and enrichment opportunities. Khari Milner, Director of the Cambridge Agenda for Children Out of School Time, drew on his personal experiences attending Cambridge Public Schools when he said that “many of the experiences that are most [critical for students to succeed] are those beyond and outside of school. Many students only start to get attention to what happens out of school once they’re near senior year when people ask ‘what are you going to do after high school?’”

STAR Initiative Grantees: Year 3



Despite declines in school attendance and participation across the nation because of the challenges presented by COVID, STAR grantees have served 897 students and 204 educators across Cambridge and Somerville in the 2020-2021 school year.

In the 2020-2021 school year, STAR served

897 students

204 educators

“The dedicated space to collaborate and align with different organizations and the schools in such a challenging, rapidly changing environment is so valuable. We are not just continuing our own programming, but also understanding how other organizations are operating and the challenges and opportunities they’re seeing when we’re not all co-located.”

— STAR GRANTEE, UASPIRE



Breakthrough Greater Boston (BTGB) prepares low-income students for success in college by providing them with academic support—including in STEM subjects—and college preparation and application support, from middle school through high school. Additionally, it trains the next generation of urban teachers using a unique Students Teaching Students model.

In Year 3:

- **BTGB Served over 400 low-income, high-need 6th–12th graders across Cambridge and Somerville**

STAR funding has enabled BTGB to expand to Somerville. They served their 3rd cohort of Somerville middle school students in 2020–2021, putting enrollment up to 140 students, and launched high school programming in the fall of 2020.

- BTGB students' daily average attendance was 96%, consistent with past BTGB numbers despite functioning in a virtual environment
- 74% of students met or exceeded learning goals in STEM content areas
- 87% of students made significant academic growth in math

- **BTGB trained a diverse cohort of 40 teachers in summer 2020**

100% of Teaching Fellows agreed that they “feel prepared to engage students in virtual learning”, 97% feel confident in implementing a lesson plan, 75% will pursue careers in education

- **BTGB's 4-year College Transition Program, launched with support from STAR in 2018, supported 30 graduating Cambridge seniors as they transitioned to college**



400

students served
in grades 6–12

96%

BTGB students daily
average attendance

100%

teaching fellows felt prepared
for virtual learning





Citizen Schools closes the opportunity and achievement gaps for students with hands-on STEM experiential learning and career mentorship. Through its Expanded Learning Time program, Citizen Schools offers targeted academic support and afterschool STEM apprenticeships taught by diverse career mentors and supported by Americorps members, to support the development of students' social-emotional skills and their interest in future STEM college and career pathways. Additionally, to foster a more sustainable way to embed experiential STEM learning with volunteers into schools, Citizen Schools provides professional development, coaching, assessments and standards-aligned curricular units to middle-school teachers through The Catalyst Program. Catalyst also engages diverse STEM professionals to serve as career mentors, creating real-world connections and exposing students to new career pathways.

In Year 3:

- **Citizen Schools served 598 students in the Expanded Learning Time (ELT) and Catalyst (CAT) programs at 3 middle schools in Somerville**
- **All students enrolled in Citizen Schools programming received academic support and enrichment through hands-on learning projects focused on skill development**
- **Citizen Schools' programs led to increased student interest in STEM education and careers:**
 - 81% of students who completed STEM apprenticeships indicated an interest in pursuing advanced education and/or careers in STEM field
 - 30% of students participated in at least one STEM Apprenticeship in SY '20-'21



598

students served
in 3 middle schools

81%

showed interest in
careers in STEM

30%

participated in at least one
STEM apprenticeship

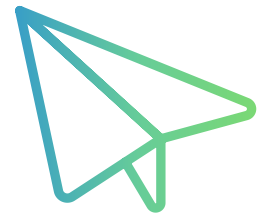


Photo: Citizen Schools



Enroot empowers immigrant youth in high school by providing academic support, including STEM subjects, and inspiring out-of-school experiences such as internships in STEM-related businesses. **STAR funding has helped Enroot grow the number of students it serves by more than 30% already, with more growth expected in Year 4.**

In Year 3:

- Enroot supported 155 students consistently throughout the school year and supported over 200 students total across their programs and events.
- Enroot’s partnerships with STEM related companies that provide opportunities for students continued to strengthen despite the challenges presented by the pandemic. Enroot continues to connect students to virtual internships, job shadowing, career fairs, STEM career panels, office visits and college visits.
 - 22 Enroot students now participate in virtual internships, 17 are in STEM related internships.

- Enroot continued to support students in pursuing postsecondary education including in STEM subjects: Enroot supported 200 students in submitting college applications in the 2020-2021 school year—5 times more students than the previous year.
- Enroot expanded professional development offerings for Enroot staff and volunteers to include a 4-part anti-racism training.

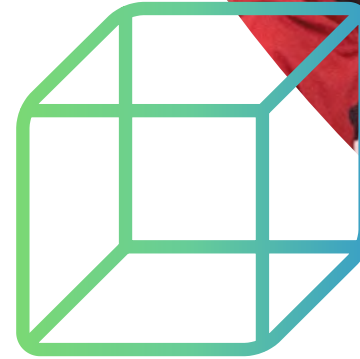


Photo: Enroot

30%

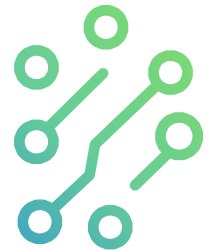
growth in year 3, already exceeding year 4 goals

200+

students supported across programs and events

5x

more students submitted college applications than in previous years





Lesley University contributes to the “Teacher Support” component of the STAR Initiative. Lesley supports teachers to increase student engagement, particularly in STEM subjects, through formal and informal professional development and by co-designing and using more hands-on, student-centered learning activities. In Year 3 of STAR, Lesley University held regular meetings and professional development sessions with members of math and science departments in both Cambridge and Somerville public school districts. They connected educators and families to resources including science kits for remote learning and supported collaborative curriculum development efforts with math and science teachers.

In Year 3:

- **Series of remote learning workshops:** Lesley provided a series of workshops focused on design, delivery and inclusivity in remote learning. Educators from Cambridge and Somerville public schools and Citizens Schools participated in these workshops. Lesley reached over 360 participants (175 unique educators) through these workshops, providing crucial supports for teachers working in a challenging virtual environment.
 - 92% of participants reported increased ability to teach remotely
 - 67% felt they had improved their teaching practice
 - *I didn't feel great before and now I have more background knowledge that helps me teach curriculum-based content...and watching the chat explode and*

checking in with kids about how they are doing and the activities. I definitely feel more confident.

— Cambridge out-of-school-time program staff about science curriculum and implementation help

- **Hands-on science learning during remote learning:** Lesley provided 250 Somerville middle school students with four science kits each (1,000 science kits in total) to increase engagement and content understanding during a school vacation period.
- **Developed in-depth online learning materials and activities,** all aligned with school districts’ curriculum and learning priorities: The online site had 18,866 hits on **10 STEAM activities** and 2,647 hits on **9 science activities** for Instructables used by Somerville Public Schools and Cambridge Youth Programs



Photo: Lesley University

92%

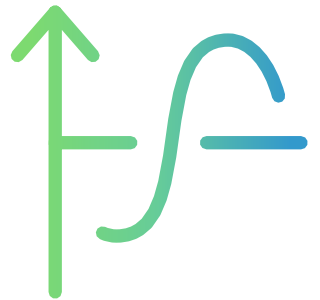
participants reported increased ability to teach remotely

67%

educators felt they had improved their teaching practice

18k+

hits for STEAM online activities





uAspire ensures that low-income students have the financial information and resources necessary to find an affordable path to and through college. uAspire serves high school students in Cambridge and Somerville. **STAR funding has enabled uAspire to expand their services to include college persistence support.** They now continue supporting students in their first two years of college. Being in the STAR grantee network enables uAspire to better connect with and serve students interested in STEM education and career pathways.

In Year 3:

- **uAspire served 383 high school students and 458 college students across Cambridge and Somerville.**
- **uAspire expanded financial advising beyond 12th grade to continue supporting students through their first two years of college through their new Succeed Advising program**
 - In year 3 they served 2 cohorts of Cambridge and Somerville high school graduates in Succeed Advising
 - 90% of Somerville students and 85% of Cambridge students responded to the text outreach support uAspire provided for them in their first year of college
 - 195 students successfully renewed their FAFSAs
- **81% of Cambridge students and 80% of Somerville students who received high school and postsecondary advising persisted to the fall of their 2nd year of college**
- **uAspire maintained its core virtual advising program with high school seniors in Cambridge and Somerville**
 - 240 students submitted FAFSAs
 - In the fall of 2020, 75% of Cambridge high school seniors and 80% of Somerville high school seniors that uAspire worked with enrolled in college



2nd year

uAspire has expanded efforts to support students at college levels

75%+

students enrolled in college

81%+

Cambridge and Somerville students persisted through 2nd year of college



Photo: uAspire



Young People's Project

The Young People's Project uses Math Literacy Work to develop the abilities of elementary through high school students to succeed in school and in life, and in doing so involves them in efforts to eliminate institutional obstacles to their success. **STAR funding is helping YPP expand their student-driven math literacy programs from Cambridge into Somerville.**

In Year 3:

- YPP employed 48 High School Math Literacy Workers and 6 College Math Literacy Workers in their **Computational Thinking Lab**.
- 12 middle school student scholars and 2 high school teaching fellows from 3 Cambridge middle schools and the high school participated in **YPP Math Playbook from December to June**.
 - Students explored, created and shared their ideas about transformative math experiences for themselves, their schools and their community. This included thinking about the many barriers of virtual learning.
- YPP collaborated with the National Math Festival to produce an online **Flagway Tournament** where students participated in online games to help them master earlier grade math content necessary for success
 - 43 students across 4 Cambridge upper schools participated this year
- YPP's after school support program continued to **positively engage and impact students despite the challenges of remote teaching and learning**.
 - 100% of participants expressed enjoyment, feeling safe and belonging
 - 100% of scholars feel that they can solve real world problems and make a difference in their community with what they learn and do at YPP

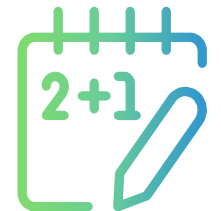


54

math literacy workers joined the **Computational Thinking Lab**

15

middle to high school scholars and teachers participated in the **Math Playbook**



43

Cambridge students across 4 schools participated in the **Flagway Tournament**



Photo: Young People's Project

Measuring STAR's Impact

In the fall of 2020 Biogen Foundation funded two new part time STAR Data Specialist positions to work for Cambridge and Somerville Public School districts. These positions help support and optimize the connection between the work of STAR grantee organizations and schools through analyzing multiple angles of STAR's impact.

“We think that the most valuable aspects of STAR as of now is greater student reach, the continued strong partnership we maintain with the foundation, strengthening our programming, and the deepened collaboration and networking amongst organizations. The creation of the two new data collection and management roles is a huge success and an extremely valuable offering as a result of STAR's critical role in advocating for these positions.”

— STAR GRANTEE, ENROOT



STAR

Measuring STAR's Impact

STAR OUTCOMES & RESEARCH QUESTIONS

The two STAR Data Specialists developed an initial evaluation plan outlining research questions for the first phase of their work.

RESEARCH QUESTIONS

OUTCOMES

How have the profiles of students served in STAR programs changed since the STAR initiative began?

**GENERAL:
Understanding who
is being served**

What is the profile of students served by STAR initiative programs?

How has participation in STAR programs impacted the interest students have in STEM?

**SHORT TERM:
Students develop
interest in STEM**

How do students' interests in STEM compare between those enrolled in STAR programs and peers who are not?

***Have students improved habits of mind for 21st century learners?
(Ex. persisting, problem solving, communication)***

**MID-TERM:
Students develop
capacities to be
successful in STEM**

Are STAR students more likely to enroll and persist in high level math and science courses or take additional STEM courses?

Measuring STAR's Impact

In the spring of 2021 the STAR Data Specialists compiled and analyzed data to respond to the first questions, namely, *who is STAR serving?*

A key finding was confirmation that STAR grantee organizations are serving STAR's target audience—students from groups most underrepresented in STEM college and career pathways (“underrepresented students”) including students of color, low income students and English language learners.

In the 2020-21 school year, STAR grantees served 897 students across both school districts:

77%
students of color

30%
hispanic

58%
low income

26%
english language learners

55%
female

14%
special education

Key Takeaways

The proportion of underrepresented students participating in STAR is higher, and in some cases much higher than the proportion of these students in each district.

- In both Somerville and Cambridge, the percentages of students of color and students from low-income families in STAR programs are much higher than the percentages in each respective school district.
- This held, to a lesser degree, with non-native English speakers and female students.
- The percentage of Hispanic students served by STAR programs in Somerville was higher than that the percentage seen in the Somerville Public Schools district.
- The percentage of Hispanic students served by STAR programs in Cambridge was comparable to that of the Cambridge Public Schools district.

“In this year of the pandemic, the STAR network group and monthly liaison meetings have provided not only con-tinuity but also community. It has been valuable to hear about common challenges that the liaisons have been facing, share practices that have been working well for us, and to get the opportunity to share in one another’s successes.”

— STAR GRANTEE, BREAKTHROUGH
GREATER BOSTON

Key Takeaways

While overall STAR programs have been serving a high percentage of students typically underrepresented, there has been a trend showing a decrease in the overall percentage of those students in STAR programs over the past two years, most notably in the Hispanic student population. This decrease has happened in Cambridge and Somerville.

With the support of the STAR Data Specialists, STAR grantee organizations and school districts, we will seek to better understand the drivers of these decreases. One likely factor could be the disproportionately negative impact of the COVID-19 pandemic on our most vulnerable students and families. Obstacles that have prevented students from participating in programs range from families struggling to meet basic needs such as housing, to students not having sufficient wifi access.

“America really does have a caste system. It manifests in our education systems in subtle and not so subtle ways. There’s no way to solve it if we’re not willing to lean into it and talk about it. STAR has been a place we’ve been able to talk about it.”

**– MAISHA MOSES, EXECUTIVE DIRECTOR
THE YOUNG PEOPLE’S PROJECT**

During Year 4 the STAR Data Specialists will look at multiple data points to assess the impact of STAR on students’ interest in, awareness of, and preparation for STEM college and career pathways.

Measuring STAR's Impact

Underrepresented Populations in STAR vs Somerville Public Schools

This table displays the percentage of each population that is identified with each underrepresented group.

SCHOOL YEAR	*Of Color		Hispanic		English Language Learners (ELL)		Female		Low-Income		Special Education (SPED)	
	STAR	SPS	STAR	SPS	STAR	SPS	STAR	SPS	STAR	SPS	STAR	SPS
2018–2019 STAR N= 387; SPS N= 2431	86%	66%	59%	44%	59%	40%	51%	47%	58%	48%	17%	22%
2019–2020 STAR N= 505; SPS N= 2455	83%	66%	54%	45%	54%	40%	50%	47%	60%	50%	17%	23%
2020–2021 STAR N= 406; SPS N= 2289	74%	65%	50%	46%	49%	40%	53%	47%	52%	49%	14%	23%

STAR: All Somerville students participating in programs with any of the five student facing STAR grantees in the given school year

SPS: Students enrolled in Somerville Public Schools in grades 6-12 in the given school year

*Note: “of Color” refers to any student who is NOT a white person of non-Hispanic ethnicity. For Citizen Schools, only students who participated in their ELT program are included.

Measuring STAR's Impact

Underrepresented Populations in STAR vs Cambridge Public Schools *Part I*

This table displays the percentage of each population that is identified with each underrepresented group.

SCHOOL YEAR	*of Color				Hispanic				English Language Learners (ELL)			
	STAR	CPS	CPS OST	CPS NO OST	STAR	CPS	CPS OST	CPS NO OST	STAR	CPS	CPS OST	CPS NO OST
2018-2019 STAR N= 556; CPS N= 8210 OST N= 933	83%	62%	57%	64%	16%	15%	12%	16%	12%	6%	3%	7%
2019-2020 STAR N= 588; CPS N= 8215 OST N= 445	86%	61%	79%	60%	15%	15%	21%	15%	11%	5%	5%	5%
2020-2021 STAR N= 491; CPS N= 7938 OST N= 1783	80%	62%	83%	56%	12%	15%	13%	16%	6%	4%	5%	4%

STAR: All Cambridge students participating in programs with any of the five student facing STAR grantees in the given school year

CPS: Students enrolled in Cambridge Public Schools in grades 6-12 in the given school year

CPS OST: CPS students grades 6-12 who have participated in at least one out-of-school time program during the given school year

CPS No OST: CPS students grades 6-12 who have not participated in any out-of-school time program during the given school year

Though extensive data has been collected on OST participation, it is not comprehensive. Data on OST participation outside of STAR has only been collected in Cambridge, not Somerville

*Note: "of Color" refers to any student who is NOT a white person of non-Hispanic ethnicity

Measuring STAR's Impact

Underrepresented Populations in STAR vs Cambridge Public Schools *Part II*

This table displays the percentage of each population that is identified with each underrepresented group.

SCHOOL YEAR	Female				Low-Income				Special Education (SPED)			
	STAR	CPS	CPS OST	CPS NO OST	STAR	CPS	CPS OST	CPS NO OST	STAR	CPS	CPS OST	CPS NO OST
2018-2019 STAR N= 556; CPS N= 8210 OST N= 933	54%	50%	42%	52%	70%	45%	34%	49%	16%	23%	14%	26%
2019-2020 STAR N= 588; CPS N= 8215 OST N= 445	60%	50%	37%	50%	73%	45%	69%	44%	16%	23%	25%	23%
2020-2021 STAR N= 491; CPS N= 7938 OST N= 1783	57%	49%	55%	47%	60%	44%	60%	40%	14%	24%	21%	25%

STAR: All Cambridge students participating in programs with any of the five student facing STAR grantees in the given school year

CPS: Students enrolled in Cambridge Public Schools in grades 6-12 in the given school year

CPS OST: CPS students grades 6-12 who have participated in at least one out-of-school time program during the given school year

CPS No OST: CPS students grades 6-12 who have not participated in any out-of-school time program during the given school year

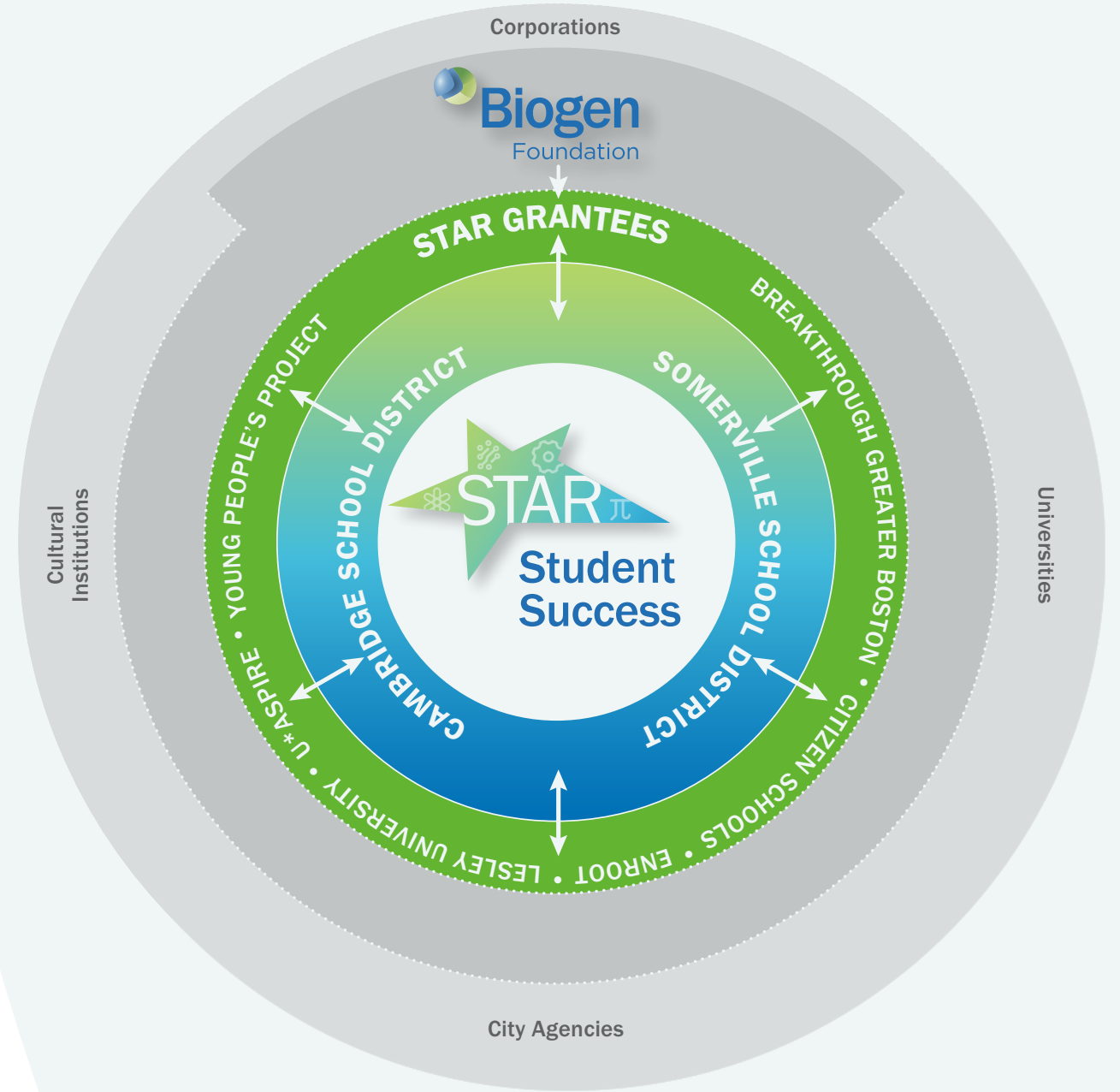
Though extensive data has been collected on OST participation, it is not comprehensive. Data on OST participation outside of STAR has only been collected in Cambridge, not Somerville

*Note: "of Color" refers to any student who is NOT a white person of non-Hispanic ethnicity

STAR's Collective Action

The STAR Initiative has helped grantee organizations and schools build and deepen relationships as a foundation for a coordinated, sustainable network whose collective impact is greater than the sum of its partners.

STEM ecosystems cultivate relationships that maximize each stakeholder's unique contribution to ensuring all students have equitable access to STEM resources and opportunities. Typically, these networks have one backbone organization, or network manager (Root Cause in the case of STAR), that facilitates COLLECTIVE ACTION amongst stakeholders. These can include: schools and districts, out-of-school-time programs, leading STEM institutions (i.e. higher education, industry leaders, science centers, etc.), the private sector, public agencies and other community-based organizations, young people, and their families. There is no better place poised to lead the way in building a strong local STEM education ecosystem than the Greater Boston area, home to Kendall Square—one of the world's most powerful life sciences and technology hubs.



STAR's Collective Action

Drawing from the Network to Navigate the Pandemic

The 2020-2021 school year continued to present many challenges to schools and nonprofit organizations that serve children and families. STAR grantee organizations all had to pivot and continuously adapt how they reached and engaged students. The relationships formed through the STAR Initiative network over the past few years enabled STAR organizations to lean on and support one another's work with students in creative, innovative ways. One example of collaborative work that simply would not have happened without STAR was the Math Ambassadors, an initiative launched by Somerville Public Schools with STAR partners Citizens Schools, Breakthrough Greater Boston and the Young People's Project.

- A group of students in Somerville public schools advocated for discussions with teachers and administrators about equity in mathematics because they saw bias in how students were being placed in 9th grade math classes. As a result, they launched the Math Ambassadors group. Students met weekly to engage in conversations around equity in mathematics—what it looks like, feels like, and how it shows up in outcome data. They also met three times with a group of math teachers and administrators to push staff to grapple with issues of

bias and racism and encourage them to think more creatively and equitably about proposed solutions.

- STAR grantees supported the district in this endeavor in key ways: Students were recruited from Citizen Schools and Breakthrough Greater Boston, and the Young People's Project provided financial support for student participants.
- The Math Ambassadors group will meet again in the fall to continue these important conversations.

"I see myself as a mathematician and a designer because of the work we started last year. It boosted my confidence as both."

— STUDENT PARTICIPANT
YOUNG PEOPLE'S PROJECT



Looking Ahead

As the STAR Initiative moves through Year 4, our key focus is on sustaining and deepening the collaborative work through the long term. The Biogen Foundation is committed to the STEM education equity and ecosystem building work happening through STAR. **This is why we have committed to funding the STAR Initiative beyond our initial 4 year investment—through Year 5.**

At the core of the STAR initiative is the mindset that we are better together. Our investment has enabled six high performing nonprofits to strengthen their collective work across two school districts. We know that in order to continue to strengthen this STEM education ecosystem building in Cambridge and Somerville over the long term, we need to build a strong coalition of funders. We are committed to funding this unique and powerful collaboration and are actively exploring new partnerships with additional companies, foundations or other funders who are interested in supporting this work beyond Year 5. Please reach us at BiogenSTAR@rootcause.org if you are interested in joining us in sustaining the incredible work that's been happening, and to expand and deepen its reach.

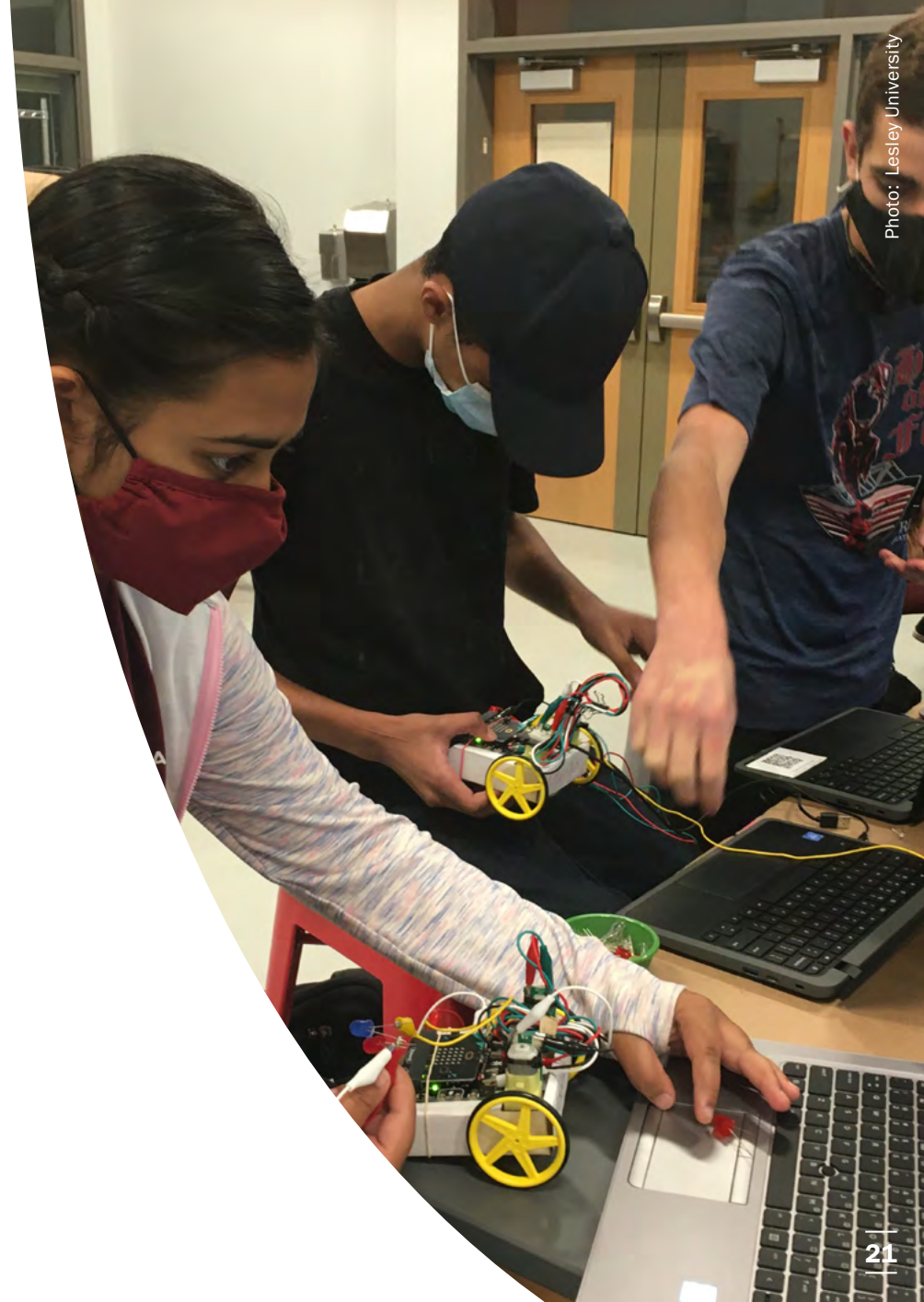


Photo: Lesley University



The Biogen Foundation supports access to science education and to essential human services for children and their families in the communities in which Biogen facilities are located. The Biogen Foundation is committed to sparking a passion for science and discovery, supporting effective science education initiatives and strengthening efforts to make science education and science careers accessible to diverse populations.

Through STAR the Biogen Foundation is supporting the development of an equitable STEM education ecosystem that bridges the gap between the area's most marginalized students and the science and tech capital of the east coast, Kendall Square, Cambridge, Massachusetts.

To learn more about STAR and learn about upcoming events with our partners, please sign up for our listserv



Root Cause is a purpose-driven consulting group that exists to enable more people and families to achieve lifelong success. Root Cause partners with foundations, nonprofit organizations, businesses, school districts, and public agencies to develop, implement, and measure strategies that improve people's lives.

Since 2004, the Root Cause team has pioneered evidence-driven approaches to strategy, measurement, learning and improvement, and collective action to ensure more people achieve lifelong success. We have helped more than 400 partners improve people's health and well-being, increase education and youth development outcomes, and strengthen the economic security of people and families nationwide.

[Learn more at rootcause.org](https://www.rootcause.org)

This report was produced by Root Cause in collaboration with the Biogen Foundation.