



# BEAM

Bridge to Enter Advanced Mathematics

# ANNUAL REPORT

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# 2019

A PROJECT OF THE ART OF PROBLEM SOLVING INITIATIVE, INC.

# LETTER *from the* EXECUTIVE DIRECTOR

Dear Friends,

This year, for the first time ever, a BEAM student returned to our program in a leadership role. Zavier, a computer science major at SUNY Albany, served as our Director of Student Life at the same Bard College site he attended as a 7<sup>th</sup> grader in the summer of 2011.

Over the past eight years, I think we've learned just as much from Zavier and his fellow students as they have learned from us. We taught them math, but they taught us how that math knowledge would play out in their lives, and what pieces we were missing. We brought the community together, but they showed us how the community could support them. When we helped them apply to college, we learned how to help them get over each hurdle in their way.

Along the way, BEAM has gotten not just bigger, but better at what we do. Our students are learning more math than ever before, and going on to ever more impressive programs. They're entering an incredible set of colleges and thriving there, often in STEM majors. And they're wonderful

human beings, who support each other, who return as counselors to support younger students, and who create the amazing community that is the BEAM family.

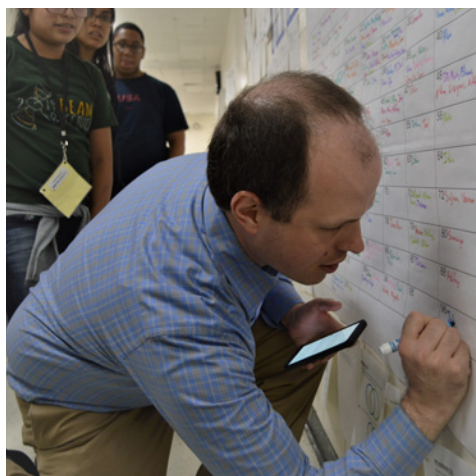
Most of this annual report focuses on our growth, and I think that's important. But just as important is what our students are experiencing, and the quality of the math, community, and life supports that we are committed to bringing them. As we reach more students, that commitment is essential to knowing that we're really preparing them for big STEM successes.

I hope you enjoy the report and the stories of how we've grown. As always, reach out and say hello. We so appreciate your support.

Sincerely,



Daniel Zaharopol  
Executive Director  
Art of Problem Solving Initiative, Inc.



Photos (from left): Dan adds solvers' names to the 100 Problem Challenge solution board; a group of 6<sup>th</sup> graders solves a problem together; Zavier poses for the camera.



# AT BEAM, OUR STUDENTS

## Discover the beauty of mathematics.

85% of students are more interested in math after our summer programs.

## Develop real expertise in math.

The median BEAM student grows 8% in ranking on the same math contests taken by top-performing affluent students.

## Succeed at great high schools and colleges.

More than 75% of our college students have enrolled at colleges ranked “very competitive” or higher by *Barron's Profile of American Colleges*.



**BEAM STUDENTS** are diverse, low income, and the first in their families to go to college.

**32%** identify as Latinx, **30%** as Black, **22%** as multiracial, **10%** as Asian, and **5%** as White.

**51%** are male and **49%** are female.

**77%** qualify for free or reduced-price lunch.

**60%** are first-generation college students.

# THE BEAM PATHWAY

Bridge to Enter Advanced Mathematics creates pathways for students from low-income and historically marginalized communities to become scientists, mathematicians, engineers, and programmers.

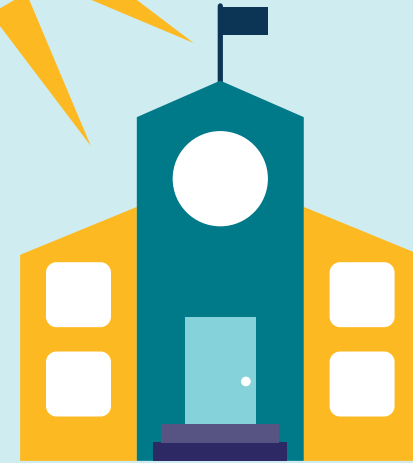
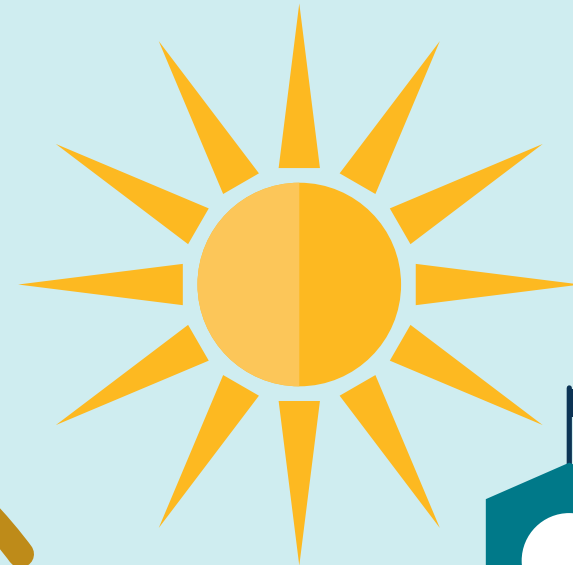
# BEAM



## BEAM DISCOVERY · SUMMER AFTER 6<sup>TH</sup> GRADE

An intense five-week summer program where students learn advanced math, make friends with others who love math, and build the skills, confidence, and self-identity for success.

An opportunity to try out BEAM and see if it is a good fit.



## BEAM COLLEGE SUPPORT

Individual advisors help students navigate everything from understanding prerequisites and financial aid to securing internships, giving them the tools to succeed. Many students also come back to work at BEAM over the summer.

## BEAM PATHWAY PROGRAM

BEAM makes a 9-year commitment to each of our students who continues to the Pathway Program: we will support your academic and personal development to help you achieve your dreams in math and science.

## 8<sup>TH</sup> GRADE

Through weekly classes and individual advising, students learn algebra (even if their school does not offer it), continue with exciting enrichment mathematics, and gain access to great high schools and summer programs.



## BEAM SUMMER AWAY · SUMMER AFTER 7<sup>TH</sup> GRADE

A rigorous three-week summer program on a college campus where students dive deep into real proof-based mathematics, build a rich community of peers genuinely interested in math, develop independence, and have fun.



## HIGH SCHOOL

Weekly classes teach study skills and life skills, SAT prep, college prep, and more; enrichment classes provide deep and interesting math. Individual advisors help students succeed in school, overcome obstacles in life, and get accepted to great colleges.



# BEAM SUMMER AWAY

Last summer, 41 rising 8<sup>th</sup> graders lived on the campus of Harvey Mudd College for three weeks as the inaugural cohort of BEAM's Summer Away program for Los Angeles students. Each year at Summer Away, students dive deep into real proof-based mathematics. The classes offered at Harvey Mudd this summer included: Irrationals, Number Theory, Mathematical Games, Math Team Strategies, and Solving Big Problems.



*"The first cohort of BEAM Los Angeles students are a really special group. They're super quiet, but also incredibly funny. They took to the unusual board games at BEAM quickly; Forbidden Island and The Mind were both really popular, along with the more usual Set and Spot It (which was regularly played in multiple languages). One of the week-one classes was about combinatorial game theory, and even now students who were in that class are eager to challenge others to games of Nim. They built a number of impressive polyhedral structures out of Zome la kit of colored rods and slotted balls. They love Shrek, voting overwhelmingly for a Shrek movie marathon on our way to and from Six Flags."*

*Don Laackman, Program Coordinator, BEAM Los Angeles. Don joined BEAM after finishing his PhD in Mathematics at the University of California, Los Angeles.*



## BEAM SUMMER AWAY HARVEY MUDD IN NUMBERS:

41

students attended Summer Away.

85

percent of students said they were more interested in math at the end of the summer.

43

family visits were logged—a BEAM record!

30

students signed up to play *Lechuga*, a game created by the students a few days before (and, yes, named after lettuce).

14

students contributed to solving a single Challenge Problem, winning flash passes to Six Flags for the entire program.



At BEAM Summer Away at Harvey Mudd, each student chose their favorite problem of the summer. David (right) chose one from the class Solving Big Problems: Which path graphs are graceful? A graceful graph is one whose vertices and edges can be labeled such that the labels on each edge are the positive difference between the labels on its endpoints.



My favorite problem from this summer was:  
 was proving why path graphs  
 are all graceful. (Theorem)

Solution: (Proof)

$m = \#$  of edges

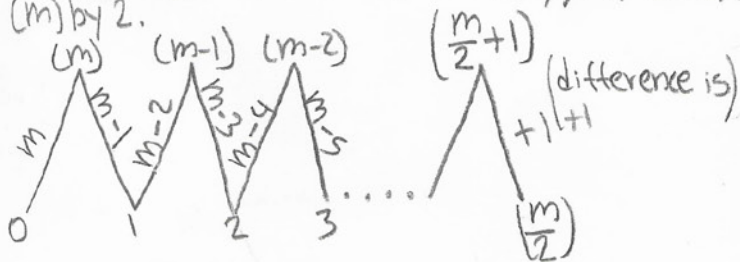
first vertex is always 0

Case 1: If the path graph has an odd integer for  $(m)$ , you subtract 1 from  $(m)$  and divide it by 2. Then you add 1 to  $(m)$  and divide that by 2 to get the last vertex.



These graphs shows the different edges. For a graph to be graceful, it needs to have edges labeled  $(0-m)$  that are different (Graceful graph) definition

Case 2: If the path graph has an even integer for  $(m)$ , you divide  $(m)$  by 2 and add 1. To get the last vertex, you divide  $(m)$  by 2.



This formula works because it has edges labeled  $(0-m)$  that are different from each vertex, which makes a different edge making the formula true.

I chose this problem because:  
 I learned so much on being able to be consistent on what I'm doing when solving a math problem. This theorem was really hard to prove, but this problem was really interesting to me. I felt like I grew my math skills from this problem.

"I really think of this as an emblematic BEAM problem," writes Don Laackman. "It took work to build up to just understanding the statement of this theorem, and then proving it required careful thought; it's also a problem that connects to open math problems very quickly (there's no known criteria to automatically say whether a given graph is graceful or not)." See more student work at: [beammath.org/news/favorites](http://beammath.org/news/favorites)

## CECILY'S FIRST YEAR TEACHING AT BEAM

"WHEN I ARRIVED AT BARD COLLEGE, I was nervous about working with 13-year-olds and didn't know what I should expect in the classroom. Turns out my fears were unfounded. The kids were AWESOME. They started off shy, but soon they were all shining with their vibrant and unique personalities, befriending each other and the staff alike. In the classroom, they were interested and engaged and insightful. Every single one of them pushed themselves to grow and learn and come out stronger than they came in. They all started in different places and they all ended in different places—but every single one of them ended as a better mathematician, and probably also better future-adult than they came in as."

*Cecily Santiago was a first-time faculty member at BEAM Summer Away at Bard College, 2019. She is a doctoral student in mathematics at the University of Minnesota. The excerpt above is from a letter Cecily sent us after the summer. Read the full letter at: [beammath.org/news/teach](http://beammath.org/news/teach)*



## JOHN'S BEAM EXPERIENCE

"BEAM HAS DONE SO MUCH FOR ME. BEAM Summer Away was my first time away from home. I was scared; my parents were unsure, too. But the program was awesome! Marcus's logic class really challenged me. Marcus is the kind of teacher who will let you struggle. Because he let me figure things out for myself, when I eventually understood how to reason through a problem, I was really proud. I also met Quentin at Summer Away, and he's still one of my closest friends.

Later, BEAM helped me get into Bard High School Early College, which I wouldn't have even known about without BEAM. At Bard, I earned my Associate's Degree. Then, when I was applying to college, Ruthi helped me write and rewrite my essay, and really made it better. Now that I'm at Fordham, Ayinde has taught me how to advocate for myself with the financial aid office and how to talk to my teachers when I'm having problems.

This past summer was my fourth year as a counselor at BEAM. I love being able to give back to the students. It's so rewarding to see their faces when they finally understand a problem. I love building such great bonds with the kids, just like I created with my own counselors."

*John Embaba is majoring in chemistry on the pre-med track at Fordham University. He attended BEAM Summer Away at Bard College in 2012.*



## SHAHZAD'S SUMMER AS A BEAM COUNSELOR

"FOR A LOT OF PEOPLE, MATHEMATICS CAUSES ANXIETY because it forces you to engage with a sense of not knowing. But the culture at BEAM is that math is enjoyable, that the struggle is part of the beauty of math. As a counselor, I saw how BEAM students learned to process and solve problems, which put my own academic studies in a new light and greatly improved my thinking about problem solving. I've worked with many programs, and I've never had an experience as amazing as working with BEAM."

*Shahzad Kalloo was a counselor at BEAM Discovery New York City, 2019. He is a graduate student in pure mathematics at the University of Houston.*



## VIRI'S MATHEMATICAL JOURNEY

"UP UNTIL THE LAST MOMENT before boarding the bus to go to BEAM Summer Away at Bard College, I still thought maybe I wouldn't go. I was scared. Even my parents were a little hesitant, because I had never been away from home. But my mom said, 'Go, who knows when you'll get another opportunity like this.' So, I got on the bus. Everyone else was excited; I was the only kid crying. But once I got to Bard, Summer Away was great!

I really enjoyed being around other kids who loved math. I made so many friends who I'm still in touch with. I was challenged like I never had been before. The course I remember best is combinatorics: thinking about how many ways you can count a certain number of objects. Why is it these formulas work? How you can you prove that?

That was just the beginning for me. Then BEAM helped me go to summer programs at Johns Hopkins Center for Talented Youth and NYU, and to get into Columbia. It was so important to receive help from Ayinde, who is someone who looks like me and has had experiences like mine.

I am very grateful to BEAM, especially to Dan, Lynn, and Ayinde, who have helped me so much. Even my parents came to know them as wonderful people who would always be there to assist us. My mathematical journey really started with BEAM."

*Viri Neri is a first-year student at Columbia, where she received a full scholarship and is planning to major in math. She attended BEAM Summer Away at Bard College in 2014.*



# THE BEAM PATHWAY PROGRAM / SATURDAY CLASSES

Beginning in 8th grade, BEAM students can take Saturday classes taught by BEAM staff and volunteers.

## THINGS YOU NEED TO KNOW TEACHES LIFE AND STUDY SKILLS:

- 8th graders learn about high school admissions and can take algebra
- 9th and 10th graders learn study skills and life skills
- 11th graders do SAT prep
- 12th graders do college prep

## MATH ENRICHMENT CLASSES CONNECT STUDENTS BACK WITH THE MATH THEY LOVE:

- Number theory
- Genetics
- Circuit design
- Programming and more

## NUMBER THEORY WITH DAN ZAHAROPOL

Number theory is a classic introductory topic in theoretical mathematics. "I was a topologist in grad school, which is more about the shapes of weird and higher-dimensional objects," says BEAM founder and executive director Dan Zaharopol, "but I always enjoy teaching number theory because it's such a perfect way to explore abstract math while also seeing new depth in the same numbers you learned about in kindergarten." While Dan admits that teaching probably shouldn't be his first priority as executive director, he can't stay out of the classroom entirely.

"Probably the most famous theorem in number theory is called Fermat's Last Theorem, which was finally proved hundreds of years after it was first proposed. We *definitely* weren't going to get to that," Dan writes. "But one of the most widely-used early results of number theory is actually called Fermat's Little Theorem, which is a pretty beautiful goal to set for yourself."

Dan's class started off just playing around with numbers and finding patterns. Soon, they were exploring modular arithmetic, and by the end the class proved Fermat's Little Theorem, completing their introduction to number theory.

DAN ZAHAROPOL, BEAM's Executive Director, founded BEAM in 2011 to help students from all backgrounds find joy in math and achieve at a high level. Under Dan's leadership, BEAM has grown from 17 students in its first summer to now serve more than 400 students each summer. Dan received an undergraduate degree in math from MIT and a master's degrees in both mathematics and teaching mathematics from the University of Illinois.

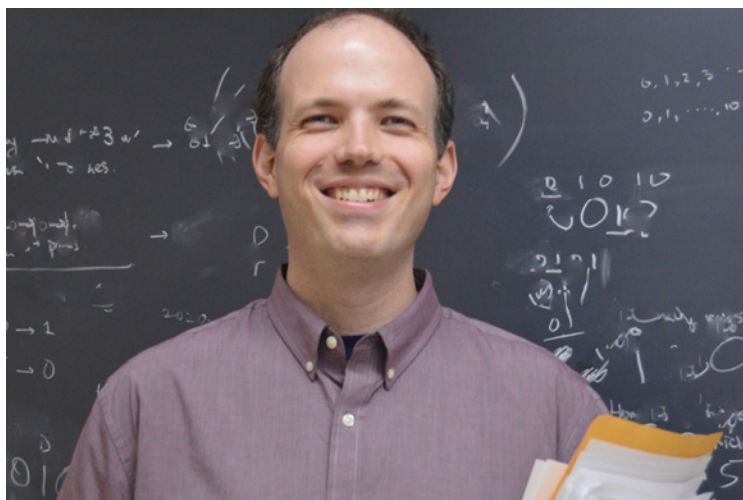
## HERE ARE SOME PROBLEMS FROM DAN'S CLASS:

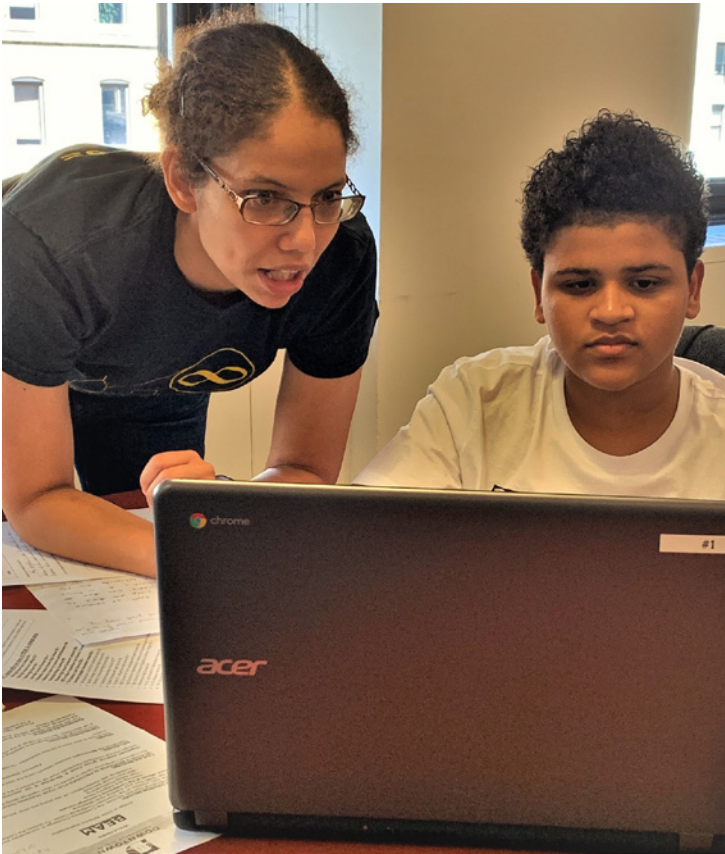
(1) Take any 3-digit number with different first and last digits. Reverse the order of the digits, and subtract the smaller from the larger. Now take this new number, reverse its digits, and add those two numbers together. You'll get 1089. Why does this always happen?

(2) Show that, if  $n$  is any odd integer, then  $n^2 - 1$  is divisible by 8.

(3) Use Fermat's Little Theorem to prove that for any integer  $n$ ,  $n^7 - n$  is always divisible by 42!

**FERMAT'S LITTLE THEOREM:** For any prime  $p$  and any integer  $a$  that is not divisible by  $p$ ,  $a^{(p-1)} - 1$  is divisible by  $p$ . "It's not at all obvious that you should find a pattern like that in the integers," says Dan.





## HERE'S A PROJECT THAT SARAH'S CLASS COMPLETED:

Find the four adjacent digits in the 1000-digit number that have the greatest product. What is the value of this product?

```

73167176531330624919225119674426574742355349194934
96983520312774506326239578318016984801869478851843
85861560789112949495459501737958331952853208805511
12540698747158523863050715693290963295227443043557
66896648950445244523161731856403098711121722383113
62229893423380308135336276614282806444486645238749
30358907296290491560440772390713810515859307960866
70172427121883998797908792274921901699720888093776
65727333001053367881220235421809751254540594752243
52584907711670556013604839586446706324415722155397
53697817977846174064955149290862569321978468622482
83972241375657056057490261407972968652414535100474
82166370484403199890008895243450658541227588666881
16427171479924442928230863465674813919123162824586
17866458359124566529476545682848912883142607690042
24219022671055626321111109370544217506941658960408
07198403850962455444362981230987879927244284909188
84580156166097919133875499200524063689912560717606
05886116467109405077541002256983155200055935729725
71636269561882670428252483600823257530420752963450

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## PROGRAMMING IN PYTHON WITH SARAH HUNT

Learn Programming with Python introduces students to the basic structures of computer programming through the Python programming language. “Python is syntactically very simple, but it’s also extremely powerful,” says BEAM staffer Sarah Hunt. Sarah stresses that programming often begins not sitting at a computer, but with a pencil and paper. She writes, “It’s important to ask yourself questions before you begin to program: What is the problem? What are the constraints? What tools do I have available?” The class that Sarah teaches at BEAM assumes no previous programming experience, and introduces students to programming concepts through small projects, like create-your-own-adventure games, web applications, and data analysis.



*SARAH HUNT is a Program Coordinator for BEAM New York City. Sarah joined BEAM after completing her PhD in Biomedical Engineering at the University of Minnesota. At BEAM, Sarah supports and teaches our high school students and coordinates Saturday programming. She was also the Co-Site Director for BEAM Summer Away at Bard College in 2019.*



# THE BEAM DIFFERENCE

BEAM provides comprehensive support to ensure success in advanced mathematics for low-income and historically marginalized students.

## BEAM UNDERSTANDS *the* NEED.

Gaps in access to advanced STEM work start early and have serious consequences. On the National Assessment of Educational Progress, only 1.78% of Black 8<sup>th</sup> graders and 3.63% of Hispanic 8<sup>th</sup> graders score at the “Advanced” level in math, versus 12.93% of white 8<sup>th</sup> graders and 31.89% of Asian 8<sup>th</sup> graders.

## BEAM MEETS STUDENTS *and* FAMILIES WHERE THEY ARE.

We partner with schools in New York City and Los Angeles that serve low-income and historically marginalized communities, looking for students with high potential and interest in math; grades and test scores are not a barrier.

By going directly to schools, we go the extra mile to reach, enroll, and support families who are not “plugged in.”

## BEAM KNOWS STEM *and* STEM EDUCATION.

We understand the STEM pathway because we have walked it ourselves: 25% of our program staff members have STEM PhDs and 83% have STEM Bachelor’s degrees or higher.

We search the country for exceptional educators in whom our students can see themselves represented. Our instructors are college professors and K-12 teachers who design their own classes.

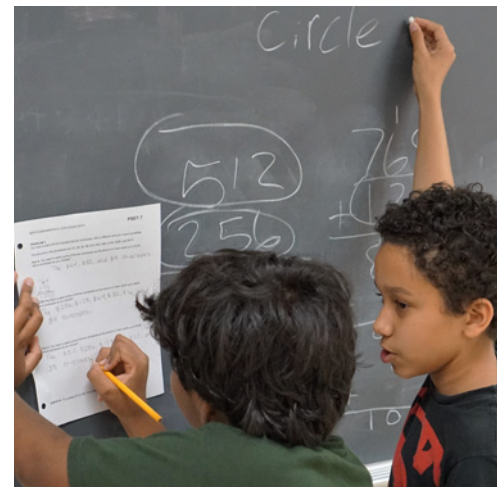
Our classes cover the same topics as enrichment programs for high-performing affluent students, such as number theory, combinatorics, logical reasoning, and more.

BEAM develops a genuine love of mathematics in our students.

## BEAM PROVIDES 10 YEARS *of* COMPREHENSIVE SUPPORT

We know high school algebra (or even advanced math) alone isn’t enough to succeed in a STEM major. That’s why we provide comprehensive support from the summer after sixth grade through college graduation, helping students access opportunities, develop self-identity, and more.

It’s also not just about us: our students build a community of peers who love math, making friends for a lifetime.





# NEXT YEAR *at* BEAM

## **WE ARE WORKING FOR CHANGE NATIONALLY.**

BEAM has been developing plans to reach underserved students across the country. When fully launched, this project will include everything from access to high-quality online materials in elementary school through to a national summer residential program and support and mentoring through college.

The first stage launches in summer 2020, when Albuquerque Public Schools and the Memphis Teacher Residency will offer local versions of our Discovery program with our support, curricula, and manuals. If the pilot is successful, we plan to scale up to more school districts, universities, and community groups in future years. Funding for BEAM's work in this pilot is provided by the Bill & Melinda Gates Foundation, and evaluation will be conducted by Mathematica Policy Research.

## **WE ARE BUILDING OUR INFRASTRUCTURE IN NEW YORK AND LOS ANGELES.**

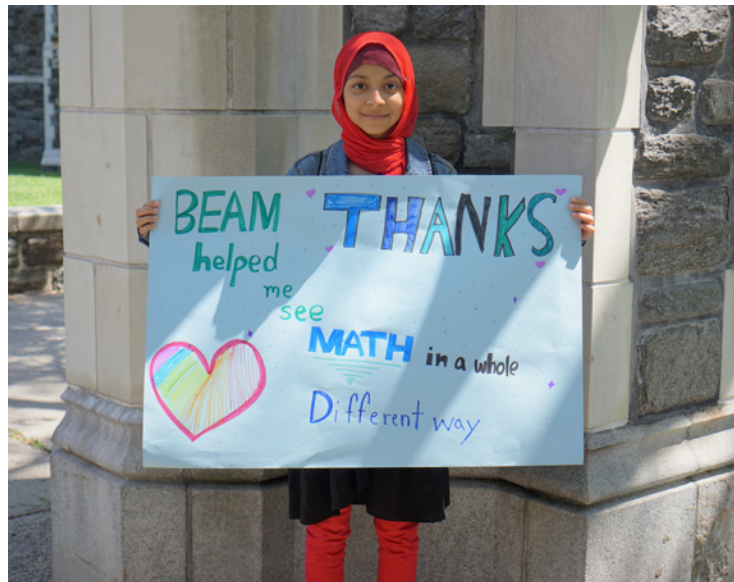
Now that BEAM truly is a national organization, a lot has been going on behind the scenes to coordinate all our programs. Meanwhile, in Los Angeles BEAM staff are developing programs for students as they grow older, and in New York we are laying down the guidelines for what a mature BEAM implementation looks like. Both New York and Los Angeles will be inviting local boards over the coming year to help with program planning, fundraising, and leadership.

## **OUR FIRST STUDENTS ARE GRADUATING COLLEGE.**

BEAM will be learning what it means to support college graduates, because our first cohort will be completing college next year! We look forward to supporting them as they enter the workforce and helping with the final steps of their educations.

## **BEAM SUMMER PROGRAMS ARE TURNING 10!**

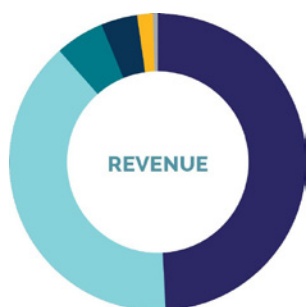
Stay connected and watch out for more information in 2020.





# FINANCIAL HIGHLIGHTS *for the year*

Ending May 31, 2019



Foundation grants	\$1,737,142
Individual donations	\$1,389,013
In-kind contributions	\$184,075
Corporate contributions	\$143,536
Government grants	\$57,223
Events & other income	\$18,492
<b>TOTAL</b>	<b>\$3,529,481</b>



BEAM programs	\$2,142,880
Management and general	\$412,074
Fundraising	\$134,636
USA Mathematical Talent Search Program Services	\$59,621
<b>TOTAL</b>	<b>\$2,749,211</b>

Bridge to Enter Advanced Mathematics (BEAM) is a project of the Art of Problem Solving Initiative, Inc.

**THE AOPS INITIATIVE BOARD OF DIRECTORS ARE:**

**Richard Rusczyk (*President*)**

Darryl Hill (*Secretary*)

Jeff Hoffman

Sandor Lehoczky

Nanayaa Dadson (*Treasurer*)

Kristin Kearns-Jordan

Paul Sherman

Kiran Kedlaya

Susan Schwartz Wildstrom

## THANK YOU DONORS

BEAM programs are provided at no cost to students and families.  
Your support creates possibility.  
*We couldn't do it without you.*

## HONOR ROLL

**\$250,000+**

Anonymous  
Bill & Melinda Gates Foundation  
Lynn Hsu and Paul Sherman\*  
Aakanksha Sarda and Alex Schwendner\*  
Science Sandbox, an initiative of the Simons Foundation\*

**\$100,000 - \$249,000**

Anonymous  
Alfred P. Sloan Foundation\*  
Jack Kent Cooke Foundation\*  
The Lehoczky Escobar Family\*  
Edwin Gould Foundation\*<sup>†</sup>

**\$25,000 - \$99,999**

Anonymous (x2)  
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**\$10,000 - \$24,999**

Anonymous (x2)  
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Anonymous (x2)  
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Anonymous (x10)  
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Sergei Bernstein and Robin Dahan\*  
Maury and Joseph Bohan\*  
Jane Boon-Pearlstone\*  
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Overdeck Family Foundation\*  
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Nanayaa Dadson  
Glen and Cynthia Dawson\*  
Alan Deckelbaum\*

**\$1,000 - \$4,999, cont.**

Doty Family Foundation\*  
 Kevin and Anne T. Driscoll\*  
 Jason Engelberg  
 Katharine and Thomas Ewald\*  
 Craig Falls and Allison Cromwell\*  
 Barbara Fantechi\*  
 Mario Giacalone\*  
 Larry Guth and Amy Pasternak\*  
 Jeffrey Hoffman  
 Karen Johnston\*  
 Debra Kittay and Joshua Parker\*  
 Robert Konigsberg and Elizabeth Osthimer\*  
 Allyson Laackman  
 Marina and Sergey Levin\*  
 Jan-Willem Maessen and Andrea

**\$200-\$999**

Anonymous (x25)  
 Syed Ashrafulla  
 Julia Bator  
 Amanda Bennett and Jamie Gray\*  
 Michelle Bentivegna and Michael Price\*  
 Andrea Bierstein and Martin Fleisher  
 Tim Black\*  
 Ray Brunsberg  
 Ruthie Byers\*  
 Fanny Chen  
 In memory of Dan Chen  
 Craig Chu  
 Columbus Academy on behalf of Jordan Ellenberg  
 Lisa Danz\*  
 Caleb Das\*  
 Robert Davis  
 Marisa Debowsky\*  
 Joanne Dillon\*  
 Rich Dooley  
 Samuel Duncan\*  
 Gee Eng\*  
 Jacki Eris and Stephen Aczel  
 On behalf of Franklin Templeton  
 Jacqueline Frey  
 Holman Gao\*  
 Julietta Garbasz  
 Arash Gharib  
 Michael Hall and Shieva Kleinschmidt  
 David and Lynne Hambrick  
 Sachi Hashimoto\*  
 Catherine Havasi and Jason Alonso\*  
 John Hawley  
 Anika Huhn\*  
 The Iandoli Family  
 Michele Joerg

**Up To \$199**

Anonymous (x38)  
 Rohan Agrawal\*  
 Aaron Anderson  
 Ed Antoine\*  
 Reuben Aronson\*  
 Andre Arslan  
 Ginous Assil  
 George Azzi  
 In honor of Cheryl A. Batzer

Humez\*  
 Eric Mannes\*  
 Seth Misshula\*  
 Gustavo Palazzi and Marina Niceta de Palazzi\*  
 Gregory Price\*  
 Dana Scott and Chris Shabsin  
 Jay and Anu Shah\*  
 Youlian Simidjiyski\*  
 Theodore Singer\*  
 Gaurav Singh\*  
 Noah Snyder and Malia Jackson\*  
 Lois Whitman\*  
 Peter Woodman  
 Sarah Wu\*  
 Winston Luo\*

Kyoko Kitamura  
 Alexander Krol  
 Thomas Lawler  
 Marc-Paul Lee  
 Jason Lin  
 Susan Loepp  
 YQ Lu\*  
 Lillian and Tim Lyons  
 Jill Martin  
 Mathematicians for Equality  
 Dan May  
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 Dr. Mohamed Omar  
 David Patrick\*  
 Laura Punnett and Rafael Moure Eraso\*  
 Theodore Reynolds  
 Emily Riehl\*  
 Katherine Rorschach and David Savitt  
 Sameer Shah\*  
 Adachi Shin  
 Tara Smith  
 Alec Stais\*  
 Lori Thomas\*  
 Charlie Towers  
 Allen Uzzell  
 Tony Valderrama and Stephanie Cheng  
 Jake Wildstrom\*  
 Jeffrey Wong\*  
 Jo Wright\*  
 In honor of Dan Z.  
 Ben Zinberg  
 Zoheri Logue Giving Fund

Bee-Decked, LLC  
 Kevin Benjamin  
 Yasha Berchenko-Kogan\*  
 Abhiruk Bhattacharjee  
 Meena Boppana  
 In honor of Erika Briggans-Jones  
 Margit Burmeister\*  
 Diana and Jamie Burr, in honor of BEAM's Laura Glass-Johnston

**Up To \$199, cont.**

In honor of Sylvia C. and Will G. Joe Cartwright and Susan Punnett  
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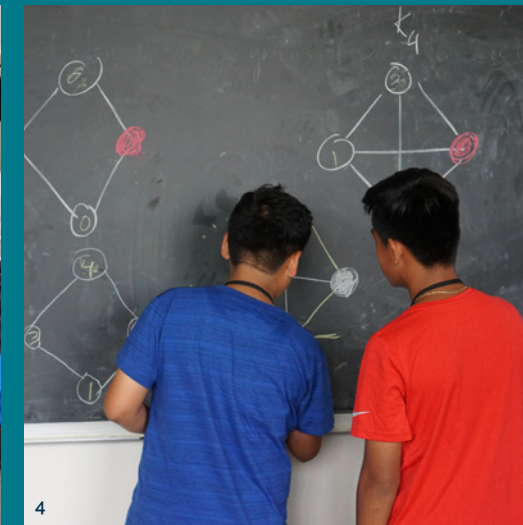
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1. At BEAM, students build a community of peers who love math.

2. During Open Math Time, BEAM Discovery students spend two hours each day working on math of their choice.

3. Students at BEAM Discovery participate in relays, where students choose to work collaboratively or competitively.

4. At BEAM Summer Away at Bard College, students toppled sandpiles, not the kind you find at the beach, but mathematical objects. It turns out that mathematical sandpiles

can be used to model many natural systems from earthquakes to pathways of neurons in your brain.

5. The most recent BEAM cohort to enter college (who attended Summer Away in 2014), were admitted to a diverse list of selective public and private colleges, including Columbia, Dartmouth, Howard, Princeton, Spelman, SUNY and CUNY schools, Swarthmore, and Vanderbilt.

6. Students from BEAM Summer Away at Union College had a great time at Zoom Flume Water Park.

# BEAM

Bridge to Enter Advanced Mathematics

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