canada/USA

2019 Year-End Report

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Mathcamp is a project of the Mathematics Foundation of America, EIN 57-1035414.

Looking back: Mathcamp 2019 at Lewis & Clark



"I never imagined what a significant part of my life Mathcamp would become. Here, I can truly be myself and trust that I will be accepted and understood."

- Caitlin Cook (Bowling Green, KY)



Mathcamp 2019 was held June 23–July 28 at Lewis & Clark College.

From Reno, Nevada, to Lincoln, Nebraska, from Fortaleza, Brazil to Gdańsk, Poland, this year's campers came from 31 U.S. states, 3 Canadian provinces, and 7 other countries. There were 60 girls, 67 boys, and one non-binary student. We welcomed back 63 alums (including a fifth-time camper!). We also welcomed 65 fantastic new campers, selected through a competitive application process (from 403 applicants!) based on their excellent essays, recommendations, and Qualifying Quiz solutions.

Challenge yourself with a Quiz problem!

In the game of Flip Flop, players stand in a circle and take turns saying the numbers 1, 2, 3, etc., going clockwise.

When they get to a multiple of 7, the player whose turn it is says FLIP instead, and the direction switches: if they were going clockwise before, they now go counterclockwise, or vice versa.

When they get to a multiple if 8, the player whose turn it is says FLOP instead. The direction stays the same, but the next person is skipped over.

For a number n that is a multiple of both 7 and 8, the player says FLIP FLOP. Direction reverses and you skip over the next person. This means n+1 is said by the person who said n-2.

(a) Show that no matter how many people are in the circle, eventually each person will get a turn to speak.

(b) Suppose we replace 7 and 8 by arbitrary integers K and M respectively. For what values of K, M is every player eventually guaranteed get a turn to speak (regardless of the number of players)?



"Mathcamp is about finding a family and building a home together."

- Valerie Yuen (Forest Hills, NY)



Math at Mathcamp 2019



"I learned what it meant to truly take control of my education, to want to wake up early to go to class, to enjoy every waking moment."

- Jasmine Zhang (Newtown, PA)



Classes

On the first day of camp, each Mathcamp student chooses an academic advisor, whose role is to help address the question: What kind of academic experience do you want to create this summer? The possibilities aren't endless, but they're vast: from "Knot Theory" to "Weierstrass \wp -Functions" to "Chaos in Voting", students had over 120 classes to choose from. Here is just one example, from mentor Bill Kuszmaul:

The Combinatorics of Boarding an Airplane

Suppose 100 people board an airplane in a random order. When each person gets to their assigned seat, they pause for one unit of time to put their luggage in the overhead bin, possibly holding up everyone behind them. How long will it take, on average, before everyone gets to sit down?

This topic has led to actual academic papers in math and theoretical computer science. In this class, we'll be considering the simplest version of the question. Along the way, we'll see several beautiful ideas from probability and combinatorics, including a famous theorem of Erdős and Szekeres that proves the existence of long monotone subsequences within any permutation.

Projects

The Project Fair is when our work outside classroom hours comes together. Some students presented posters on mathematical topics like knight's tours and the asymptotics of spanning trees. Others worked on hands-on projects, tinkering with electronics, modeling the dorms, and learning traditional methods of change ringing to sound all 6! = 720 permutations of six bells.



"Manifolds, tensors, bijections, oh my. Spelunking, rafting, TAU and pi. There's no experience quite like this. A place for friends, a mathematical bliss."

- Ezra Erives (Lexington, MA)



Outside the Classroom at Mathcamp 2019



Field Trips & Activities

We enjoyed stunning views of Mount Hood from campus, and explored downtown Portland and beyond: we hiked up to Latourell Falls, climbed down into Ape Cave (a lava tube!), and visited the Pacific Ocean. Campers stayed cool all summer with liquid nitrogen ice cream, and sported our unofficial uniform, sarongs. Song and dance often burst out in the main lounge, culminating in a fantastic hip-hop cardio talent show act.

Annual Puzzle Hunt

Each year, the staff design a day-long Puzzle Hunt, heralded as one of our best field trips. This year's Hunt was themed around "a trip to the zoo" (a metaphorical follow-up to the actual Portland Zoo!). For a challenge, try to solve the puzzle below: "Hammerdead Shark."

- Olya Akimova (Moscow, Russia)

"Mathcamp was better

than any of my dreams!

I will never run out of stories

from this wonderful place."



- wife of an emperor edtech company
- dead language
- gaze
- type of fish
- archaeological site

cars have them

- fantasy novel loud noise
- Romantic poet
- Swiss mathematician Star Wars character Semitic language

mythological monster

church decoration





"Having the ability to shape my and others' experience here has been amazing for increasing my ability to take initiative and make awesome things happen."

- Viola Brockman (Newton, MA)



Supporting Mathcamp



Fiscal Year 2018–19 Revenue

\$ 4	421,190
\$	28,000
\$ 1	126,810
\$ 1	73,692
\$	32,642
\$	33,956
\$	956
	\$ 4 \$ 5 \$ 1 \$ 5 \$ 5 \$



Mathcamp 2020 will take place this summer at Champlain College in Burlington, Vermont for five exciting weeks, from July 5 to August 9. We look forward to welcoming new campers and alumni from all walks of life, and from all over the world, all sharing a love of math!

Mathcamp gives a formative intellectual and social experience to incredible kids, and one of our guiding principles is that camp should be accessible to every qualified student – whether or not they can afford the tuition. Admission is irrespective of financial aid, and we fully meet the need of every Mathcamper.

Donations keep Mathcamp open to all.

Mathcamp is *free* for U.S. and Canadian families with household incomes of \$65,000 and below, and we even offer *travel grants* to cover plane tickets to camp. Need-based financial aid is also available for middle-income families and international students. The first \$28,000 of our \$150,000+ aid budget comes from the National Science Foundation and the American Mathematical Society, and the rest comes from the program's supportive alumni, families, and friends.



Fiscal Year 2018–19 Expenses

A Mathcamp 2019	\$ 666,397
• College Campus - 43%	
 Staff Salaries - 34% 	
• Other Camp Expenses - 23%	
B Alumni Programming	\$ 2,513
C Administrative	\$ 19,635
D Fundraising	\$ 18,425



Give today: www.mathcamp.org/donate