MathILy-Er 2026 Final Report

Preface

This was the twelfth year of MathILy-Er. We were happy to have no major logistical or student-related issues, and had an enthusiastic cohort of students.

Program Preparations

Promotions

Electronic: Individual emails were sent to prior participants and promising applicants. MathILy continues to be listed on several high-traffic webpages, including MIT Admissions' "Preparing for MIT" summer programs page. The web traffic range was 10,00–27,00 hits/month, with ~44% of the traffic from abroad.

Print: The Minion sent about 150 fliers to contests.

Other Activities: We held a {MathILy, MathILy-Er, MathILy-EST} Yearly Gather at the Joint Mathematics Meetings, where at least 125 participants team-solved a Jonah-designed set of five simultaneous Battleship-style vegetable-placing puzzles. In late March sarah-marie offered an Art of Problem Solving Math Jam (about 60 participants) on Decorative Borders that included a {MathILy, MathILy-Er} Q&A.

Applications and Admissions

Statistics: We received 2304 Short Forms, 1030 Not-as-Short Forms, 958 EARs, and 834 completed applications. We admitted 46 students, for an admissions rate of 13% including both MathILy and MathILy-Er. Of those, 32 chose to attend. Thus, our current yield rate is roughly 70%.

Demographics: Applicants originated from at least 45 US states and 46 foreign countries (representing North/South America, Western/Eastern Europe, East/Central/Southeast Asia, West/South Africa, and the Middle East). The data in the following table was measured where possible and approximated otherwise; the final row reflects a during-program demographic survey.

Percentage 2026	Female	NB	East Asian	South Asian	Latinx and indigenous	Middle Eastern	Black
Short Forms	31%	0.5%	44%	24%	4%	5%	1%
EARs	28%	1%	54%	20%	2%	2%	0.3%
Attending	53%	0%	53%	6%	3%	0%	0%

Financial Aid: We awarded $30,000 in financial aid to MathILy-Er participants. $18,525 came from a Jane Street grant, $7300 from the AMS Young Scholars Program (Epsilon Fund), and $4175 from the Carina Fund.

Personnel

Academic: Lead Instructors were Dr. Corrine Yap (incoming Assistant Professor at Mount Holyoke College, outgoing Visiting Assistant Professor at Georgia Tech, PhD Rutgers University, 2023), Dr. Brian Freidin (instructor at Russian School of Math and curriculum development at BEAM, PhD Brown University, 2018), and Dr. Alice Mark (Professor of Practice at Vanderbilt University, PhD University of Texas at Austin, 2015). Apprentice Instructors were Noa Hunter (graduate student at University of Notre Dame), Jade Lintott (graduate student at Georgia Tech), and Kye Shi (graduate student at UCLA, MathILy 2015–16). Our Week of Chaos instructor was Dr. Tom Mainiero (Assistant Professor of Math and CS at St. Joseph's University of New York, PhD University of Texas at Austin in physics, 2015) and our Week of Chaos Apprentice Instructor was Natasha Ter-Saakov (graduate student at Rutgers, MathILy 2014–15).

Administrative: The Director-Er was Dr. Corrine Yap. The excellent {MathILy, MathILy-Er} Minion was again the ever-capable Madison Stuart (Smith College BA 2006 in Mathematics and German; graduate work in information science at the University of Michigan). The PRiME FACToRs were Steven Reid (third-year undergraduate at Georgia Tech) and Marlowe Weatherred (third-year undergraduate at Georgia Tech). The PRiME FACToRS had academic roles as well.

Advisory Amalgam: These individuals were available for advice on academic and practical aspects of MathILy-Er.
Dr. Douglas J. Shaw, mathematics faculty at University of Northern Iowa
Dr. Ruth Haas, (retired) mathematics faculty at University of Hawaii
James Cocoros, mathematics faculty at Hunter High School
Dr. Dylan Shepardson, mathematics faculty at Mount Holyoke College
Dr. Carol E. Fan, operations researcher (currently Operations Data Science Lead at Apple)
Dan Zaharopol, Executive Director of BEAM
Dr. James Tanton, mathematician
Dr. Joshua Greene, mathematics faculty at Boston College
Dr. Emily Peters, mathematics faculty at Loyola University Chicago
Wing L. Mui, Seattle-area comic store owner, artist, and former mathematics teacher
Dr. Thomas Hull, mathematics faculty at Franklin&Marshall College
Dr. Josh Laison, mathematics faculty at Willamette University

Student Demographics

US States and Districts represented by MathILy-Er students, roughly from east to west: Massachusetts, New York, New Jersey, Pennsylvania, Maryland, Virginia, Florida, Georgia Illinois, Colorado, New Mexico, Wyoming, Washington, and California.
Countries outside of the US, roughly from east to west: Canada, South Korea, China, Philippines, Ukraine
Gender breakdown: There were 17 female participants and 15 male participants.

Age: There were four 14-year-olds, thirteen 15-year-olds, eleven 16-year-olds, and four 17-year-olds. Three student birthdays fell within the program.
Academic background: 18 students had taken some Calculus before the start of the program; 2 had not yet taken Precalculus.
Fourteen students had attended summer mathematics programs before

What Happened at MathILy-Er 2026?

Academics

Classes: Each weekday we had 4 hours of morning class, 1 hour of Daily Gather, and 3 hours of evening problem session, for at least 8 contact hours per day. Weekends varied, but Saturdays usually consisted of 4 hours of morning class and 1.5–2 hours of Life Seminar. Mathematical conversations also occurred outside of class.

The basic curricular structure was two weeks of core curriculum, called Root Class (after the Root of a graph theoretic tree, and after the idea that the material strengthens student grounding much as the roots of a tree do), followed by one week of short topical classes, called the Week of Chaos, followed by two weeks of a focused topic, called Branch Class (after branches of mathematics, and after the idea that tree branches grow from a strong trunk nourished by roots).

Root Class: The 32 students were split into two Root classes, one taught by Corrine and Noa with some assistance from Marlowe, and the other taught by Brian and Jade with some assistance from Steven. The material in Root Class included Farey and Stern-Brocot sequences, linear algebra over $\mathbf{F}_2$, enumerative combinatorics, graph theory, combinatorial game theory, and disease modeling. Students also learned and practiced various proof techniques. All the material was treated with full proofs given by the students.

Week of Chaos: Students indicated which of 40 potential topics they would be excited to learn about, from which instructors decided on a list of 18 classes offered. These were: These were: Counting Chunks (hyperplane arrangements, Natasha), Counting to the Extreme (extremal combinatorics, Corrine), Friendly Monsters (point-set topology, Noa), From Poof to Proof! (proof writing, Corrine and Steven), Get your ducks in a row (cardinality, Brian), Illusionist Geometry (projective geometry, Alice), Let's Get Bilingual (zero sets of polynomials, Noa), My hat, it has 3 corners (hat problems, Brian), Polyno-ps: eculiar olynomials (polynomials in finite fields, Noa), A prime point of view (p-adics, Brian), Roundabout Ronda's Ridiculously Remarkable Rannygazoo Ritual (circle dynamical systems, Tom), Scheduling Snacks (Latin squares, Natasha), String Theory? Knot!! (knot theory, Alice and Marlowe), Take Me to Your Leader (voting methods, Corrine), Through the Looking Glass (reflection groups, Alice), (Un)-Lazy River Flows (flows on graphs, Natasha), Vlad Blippity's Counter-Codswallop Machines (finite state automata, Tom), Wackturnions: An Existential Crisis (quaternions, Tom).

Student preferences guided placement of each student into 5 classes. 15/18 of these classes used specific material from the Root curriculum, and each main topic in the Root curriculum was used in at least one class.

Branch Class: During the last two weeks of the program, students took one of two Branch classes. The courses were What to Expect When You're Expecting the Unexpected (probabilistic combinatorics)

taught by Corrine and Kye with assistance from Steven, and Fractions All the Way Down (continued fractions) taught by Alice and Noa with assistance from Marlowe.

Pedagogy: All classes were conducted through inquiry-based learning, with time split between instructor-led discussion, work in groups at the board, and student presentations. Students were assigned to take comprehensive notes for future class reference, which were reviewed by an instructor and then copied and distributed to the class.

Feedback: Students received feedback in several ways. Class presentations were met with immediate feedback from instructors and students, both for mathematical correctness and style. Students received written comments on their problem solutions, almost always on the following day. Near the end of Root and Branch classes, students wrote introspective self-evaluations on their progress at MathILy-Er which were read and discussed by the instructors. Then, individual interviews were held with the students to discuss what they had written, as well as other areas for improvement.

Daily Gathers: The instructors gave one Daily Gather each. Math Movies were shown during the Daily Gather time once per week in three of the weeks. The remaining Daily Gathers were given by visiting mathematicians, two of whom were from MathILy, and the remaining nine of whom were external visitors.

Extracurriculars

Life Seminars: Five Life Seminars were held over the weekends, each with a general theme but with a lot of time for open questions. The first was on miscellaneous life matters, such as writing emails and imposter syndrome. The second focused on college, the third on mathematical careers, and the fourth on applying to MathILy.

All-program activities: On the first Sunday afternoon, the program walked to Preston Park (about a 10-minute walk from our dorm) to eat watermelon while playing orthogonal questions. On the third Sunday, we walked to Baskin-Robbins in Ardmore to celebrate National Ice Cream Day.

Social activities: This year, the students played a lot of games including Codenames, Bananagrams, Spot It, and Pandemic. Students frequently held movie nights using the TV in the lounge. On the Sunday evening after Week of Chaos, students participated in a staff-organized photo scavenger hunt across campus. On the following Saturday, a group of students organized and ran a puzzle-solving treasure hunt.

Administrative Matters

Campus Location: Haverford is located in Haverford, Pennsylvania, a suburb of Philadelphia. The town is walkable and safe, and the SEPTA station is a 15-minute walk or a 5-minute drive from the middle of the Haverford campus. The campus itself is an arboretum with several nature trails.

Facilities: The campus was small and easy to navigate. We were assigned our own dormitory with air-conditioned rooms. The lounge in the dorm was spacious enough for multiple activities to happen simultaneously. The classrooms were spacious and all but one of the boards was a chalkboard.

COVID-19 Protocols: All students and staff took rapid tests on arrival and every day for the first five days. In the meantime, we remained unmasked around each other. The only place on campus where we regularly encountered people from outside our program was the dining hall, and we masked there. We also ate all our meals outside, or in a separate room in the dining hall.

Post-Processing

Post-program staff meetings: After the official end of the program, the staff met to discuss and evaluate various aspects of the program. We will update some of the staff documentation and curriculum documents based on this discussion.

Finances summary:

The income from student fees (some discounted) was $167,420.
Donations from Jane Street for financial aid and visitor travel were $18,525+$824.
Donations from the Carina and Polynera funds for financial aid were $4175.
Our Epsilon Grant award was $5,000.

Total MathILy-Er income: $195,944.

Administrative expenses (insurance, fliers, etc.) totaled approximately $3349.
Total wages (instructors, PRiMEs, Minion, Directors) were approximately $49,857.
Wage-related administrative costs (payroll taxes, etc.) were $1,895.
Travel costs (visitors, instructors) were $4,760.
Program expenses (supplies) were approximately $3,670.
Site expenses from Haverford College were $107,544.

Total MathILy-Er expenses: $171,075.

The net income of approximately $24,869 was significantly more than expected, and comes from a variety of sources. Primary among these budgeting for a staff member who was not needed, fewer director hours logged than budgeted for, and Haverford not charging for use of a copier.