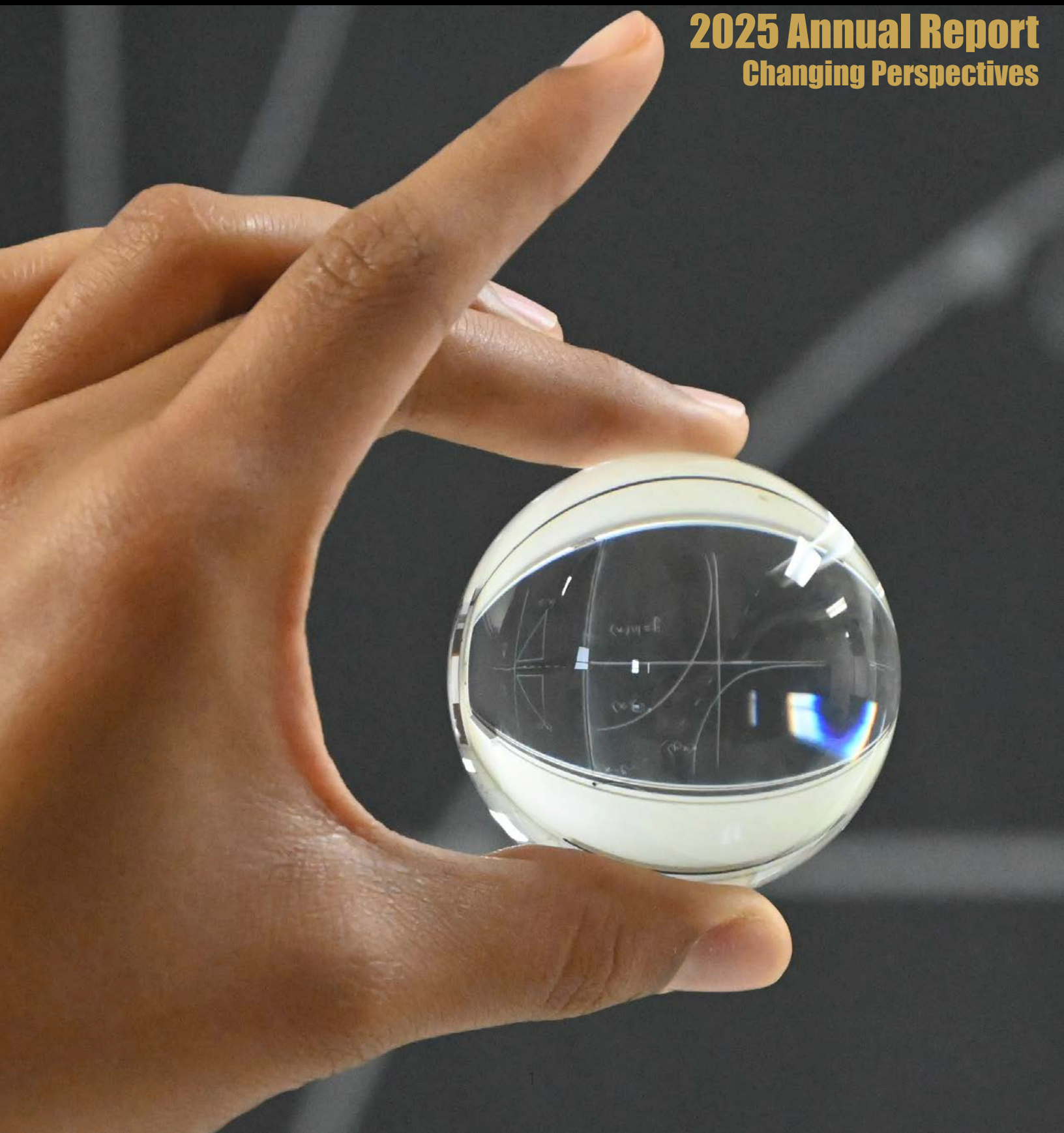
TEXAS STATE UNIVERSITY

Mathworks

2025 Annual Report

Changing Perspectives



MATHWORKS
2025 Annual Report, Changing Perspectives

MISSION

Mathworks at Texas State University is a center for innovation in mathematics education. Our mission is to research and develop model programs and self-sustaining learning communities that engages K-12 students from all backgrounds in doing mathematics at a high level.

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From the Director

Dear Friends,

It is always a pleasure each year to reflect on the continued successes of the Mathworks programs and our alumni. Highlights of our annual report include:

- Reports on the continued results from our summer programs for students, pre-service and in-service teachers, undergraduates, and graduate students. This includes feature stories about the longer-term impact of the program on our alumni and what they are doing now.

- New funding from the G. R. White Trust and how this is helping broaden Mathworks' outreach to rural communities; as well as new funding from Jane Street Capital that connects Mathworks to one of the most outstanding quantitative trading firms in the country, with a focus on developing future leaders and creative problem-solvers.

- Updates on our ambitious capital campaign to raise an additional $6M for the Mathworks Endowment to sustain and enhance Mathworks programs for future generations. Funding raised supports scholarships for students, undergraduates and graduate students while supporting new and innovative research that is a vital part of our core mission. The Endowment allows Mathworks programs to outreach to students and teachers throughout Texas and beyond.

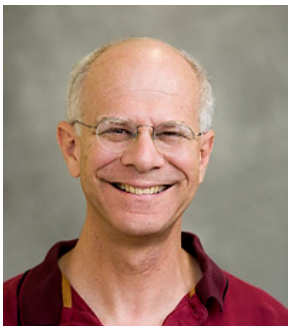
The future for Mathworks has never looked brighter. We had record numbers of students applying to our summer programs which bring together outstanding students and teachers in a unique learning community. The participants are immersed in doing mathematics together and share in the excitement of mathematical exploration and discovery. They learn to think deeply about problems, develop the perseverance to tackle any new challenge, and grow as future leaders for Texas and the nation.

Most importantly, we thank you for your continued interest and support. We invite you to share this information with others who you think might be interested in these programs for either their own families or friends. Please be sure to contact me anytime you have questions, concerns, or suggestions for ways that we can continue to grow our impact. Meanwhile, I hope you will enjoy reading about what we are doing and consider visiting our programs this coming summer.

With all best regards,

Max

Max Warshauer, Mathworks Director
Regents Professor of Mathematics



Mission

MISSION STATEMENT

"Mathworks at Texas State University is a center for innovation in mathematics education. Our mission is to research and develop model programs and self-sustaining learning communities that engage students from all backgrounds in doing mathematics at a high level."

Texas State University goals and initiatives for 2023 - 2029 promote effective outreach at the core, "*Enriching Community, Collaboration, and Partnerships .... Build community relations, collaborations, and partnerships with external stakeholders ... increase engagement in activities and program that promote a welcoming community and a sense of belonging...*"

Three Pillars with a Research Focus

Summer Math Programs
Mathworks offers three core programs, a half-day Junior Summer Math Camp (JSMCH), a residential Junior Summer Math Camp (JSMCR), and an Honors Summer Math Camp (HSMC). The JSMCH prepares students in grades 3 - 8 for algebra and more advanced math; the JSMCR teaches students in grades 6 - 8 to do more advanced problem solving; and the HSMC introduces students in high school to the joy of mathematical exploration and discovery, with research opportunities for more advanced students. Students in all programs learn to think deeply of simple things (Arnold Ross) and to work collaboratively with others.

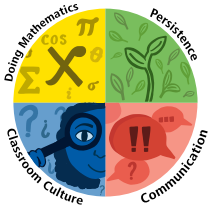
Curriculum
The Mathworks curriculum, *Math Explorations (ME1 ME2, and ME3)*, is a 3 volume state adopted middle school curriculum for students in grades 6 - 8. Students work through challenging and engaging problems that concludes with algebra 1 in *ME3*. The JSMCH provides professional development for pre-service and in-service teachers, preparing the teachers to make this challenging curriculum come alive in the classroom.

Research
The element that ties everything together is research about new and innovative ways of teaching, with research opportunities for undergraduate and graduate students interested in mathematics and mathematics education.

Summary

- Mathworks programs provide opportunities for undergraduate and graduate students to gain hands-on experience in mathematics education, as well as conduct research related to curriculum and pedagogy.
- Mathworks summer camps prepare all students to do higher-level math and science.
- We develop innovative and creative problem solvers who will be future leaders in STEM.

Guiding Principles



Guiding Principles Are Woven Into Every Program

The Mathworks Guiding Principles are intentionally woven into every aspect of the Mathworks Programs. Research has shown that students' learning success depends on an integrated approach that supports students in each point: Doing Mathematics, Persistence, Classroom Culture, Communication.

Doing Mathematics

Doing mathematics is about making sense of and thinking deeply about fundamental concepts.

Students should:

- "Think deeply of simple things," (Arnold Ross)
- Build on prior knowledge by making connections that follow the flow of ideas from what they previously understood to new ideas being studied
- Promote a deep understanding for why things work
- Focus on the math problems, not the answers
- Reflect on what they have learned to make sense of the mathematics

Persistence

Persistence is critical to success in problem-solving and doing mathematics. Students need to:

- Develop a "growth mindset;" and understand that ability can be developed with hard work
- Be willing to take risks and realize that mistakes present opportunities for learning
- Take ownership of their own learning
- Develop confidence to tackle new situations without giving up easily

Classroom Culture

Teachers need to establish a classroom culture that develops students' curiosity and imagination. The keys to establishing this culture are to:

- Make math interesting, fun and relevant with challenging, well-sequenced problems
- Support students' productive struggle by responding to student questions with appropriate guidance
- Allow sufficient time for learning ideas deeply
- Use techniques to engage all students
- Balance individual and group work; both can be appropriate depending on the task

Communication

Communication between students and teachers are critical for learning.

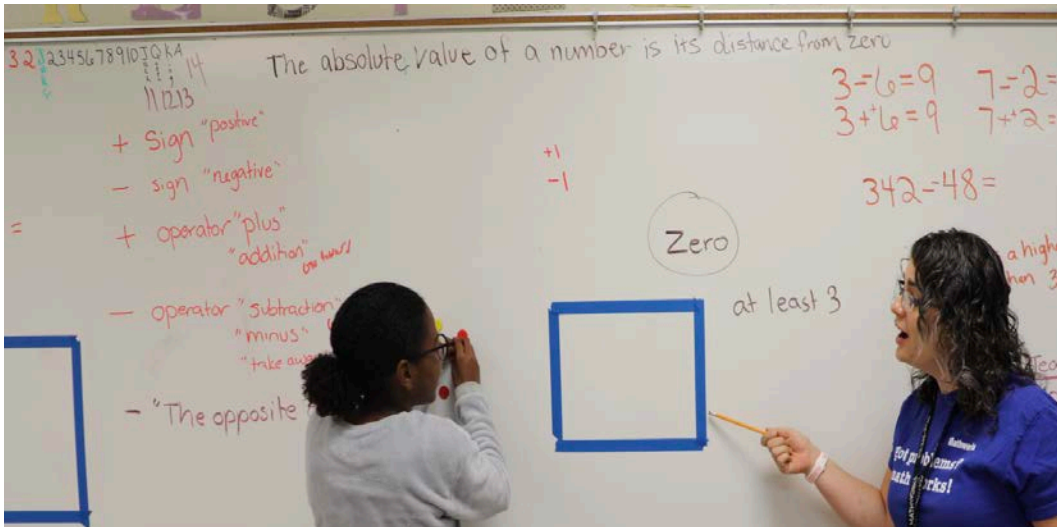
To facilitate better communication, teachers should:

- Ask probing questions to develop student understanding, and encourage students to question why things work
- Expect students to present their work and defend their reasoning using precise mathematical language
- Take student attempts seriously, and examine both right and wrong approaches
- Expect students to articulate and explain the key math concepts

Math That Stays With You - by Megan Freese

If you ask Molly Bending (master teacher in the JSMCH) what makes Mathworks matter, she won't talk about scores or statistics. She'll talk about voices. "Kids become more willing to talk in front of their peers and use vocabulary. They gain a positive interaction with math. That has a huge impact."

At Mathworks, students learn to think, to question, to try and try again. And those skills reach far beyond the summer. "Really pressing a deeper understanding of math into kids—understanding what math is—it can't not make you a better problem solver," she says, "Because you become more problem-centered than answer-centered."



Sponsors make it possible

For Bending, the power of Mathworks goes beyond the classroom. "Many of our students come to camp on scholarship. This gives opportunities to kids who wouldn't otherwise get to go. We're giving them STEM experiences and sending them home with supplies they wouldn't have had. We couldn't do that without our sponsors."

The support doesn't just make camp possible—it makes it powerful. Students leave with more than new vocabulary and math models; they leave with confidence, curiosity, and a new way of seeing themselves as learners.

The Power of the "Ah-Hah"

Ask any master teacher at Mathworks, and they'll tell you: the magic is in the moment. For Bending, one such moment happens almost every year when students begin subtracting on the number line. It's not just about moving pegs on paper—it's about expanding mental models and challenging assumptions.

"That's when they can't really lean on their innate understanding anymore. They have to add something new. It surprises them," she says. "You see the wheels turn. You watch them become thinkers."

A Spark that Grows - by Megan Freese

In a quiet classroom in San Marcos a third grader stares at a number line, her brow furrowed in concentration. She's not memorizing formulas. She's not being handed answers. Instead, she's exploring — moving numbers, testing ideas, building something that is truly her own: understanding. This is where it begins. This is Mathworks!

Founded by Dr. Max Warshauer at Texas State University, Mathworks is not just a camp. It's a transformational experience designed to build fearless problem solvers, critical thinkers and future leaders — one summer at a time. Inspired by Dr. Warshauer's experience in the Ross Program at Ohio State, Mathworks began in 1990 with a dream: to teach students how to think, not just what to think. What started with 12 high schoolers in a borrowed classroom has grown into a nationally recognized program serving students across all grade levels and backgrounds. Mathworks offers a tiered approach that nurtures students from their first math curiosity to advanced exploration:

- Junior Summer Math Camp (JSMCH) (Levels 1–5): For local elementary and middle school students, these half-day camps build a foundation in algebra, geometry, and advanced problem-solving. Each level builds on the last, starting with integers and equations, progressing through coordinate geometry and discrete mathematics. "Kids leave Level 1 knowing how to add and subtract integers using number lines and games, and they love it," longtime teacher Melissa Freese said. "They're learning sixth-grade concepts in third grade."

- Residential Camp (JSMCR): A two-week experience for middle schoolers from across the nation. Students live and learn at Texas State University, diving deep into advanced mathematics with world-class faculty. "We don't give them answers," Dr. Warshauer said. "We give them questions — and the space to wrestle with challenging problems."

- Honors Summer Math Camp (HSMC): The pinnacle of the program, HSMC selects about 76 top students from hundreds of applicants. They are engaged for 6 weeks working together with courses in number theory, abstract algebra, analysis and combinatoris. Returning students also work on original research guided by faculty mentors. Students from HSMC have gone on to MIT, Princeton, Google, Microsoft and beyond.

What truly sets Mathworks apart isn't just the curriculum, it's the community. "Mathworks made me love the subject," said Olivia Bley, now heading to Yale to study statistics. "But more than that, it made me feel like I belonged."

Bley and her peer Benjamin Keller, Princeton- bound valedictorian, began Mathworks as curious kids in the JSMCH and then JSMCR, before attending the HSMC. Over the years, they returned not just as students, but as counselors and mentors. "It's about growing together," Keller shared. "Mathworks taught me how to think. How to lead. How to care."

That transformation is echoed by Sofia White, who began in Level 1 and now returns as a college Mathworks Fellow in the JSMCH mentoring younger students.

"Mathworks taught me to be brave in my own learning," she said. "It's more than a camp, it's a launchpad."

And for the teachers — like Melissa Freese, Amanda Voigt and EJ Mungia — it's a source of renewal. "This is why I'm still in education," Melissa Freese said. "Every summer at Mathworks feels like a family reunion. It reminds me why I teach."

Teachers describe Mathworks as the best teaching environment they've experienced: more support, less pressure and a focus on real learning.

"It's not about getting through a textbook," Voigt added. "It's about getting students to think deeply, ask questions and explore."

Working in partnership with San Marcos CISD, where over half of the students are on free and reduced lunch, San Marcos CISD provides a free breakfast and lunch to all JSMCH half-day participants. Sponsors include the H-E-B Tournament of Champions, the Lions Club and generous alumni and friends who provide scholarships that ensure that all students can attend math camp no matter what their financial situation is. "It's not just about giving kids math," Dr. Warshauer said. "It's about giving every kid a chance to see they're capable of great things."

Students leave math camp feeling empowered that they can tackle any new problems they might encounter.

Every part of the program — students, teachers, counselors and researchers — is woven into the fabric of the university itself. It's not an add-on. It's a living laboratory, a teacher training ground, a model for how higher education can serve younger generations.

Over 36 years, Mathworks has become more than a program. It's a legacy. Students who once doubted themselves leave confident. Campers become counselors. Fellows become faculty. Mathworks alumni are now doctors, engineers, educators and entrepreneurs — leaders in every field.

"If you invest in Mathworks," Keller said, "you're not just investing in students. You're investing in innovation."

And it all starts with that spark — that moment a young mind realizes, 'I can do this.' That's Mathworks!

Mathworks Math Contest

The Mathworks Math Contest (MMC) is an opportunity for middle school students in grades 6 - 8 to explore mathematics and be challenged by high-level problems. This test helps us identify students who love solving problems.

The MMC is a free, 15-question test that is proctored by math teachers, coaches, and parents at their respective schools, given each year at the end of October. Teachers download the test, administer it to students, and send students' responses to us. After all the tests have been graded; scores are released. Top scoring students are recognized and all participants are invited to apply to the upcoming Mathworks Junior Summer Math Camp Residential (JSMCR) or the Mathworks Junior Summer Math Camp Half-Day (JSMCH) .

About the Fall 2024 MMC

Free annual math contest
15 Questions
2-Hour time limit (no calculators)

Students

Student Participants: 814 (F: 266, M: 548)

Scores

Mean Score out of 15: 3.70
Perfect Score of 15: 4 students

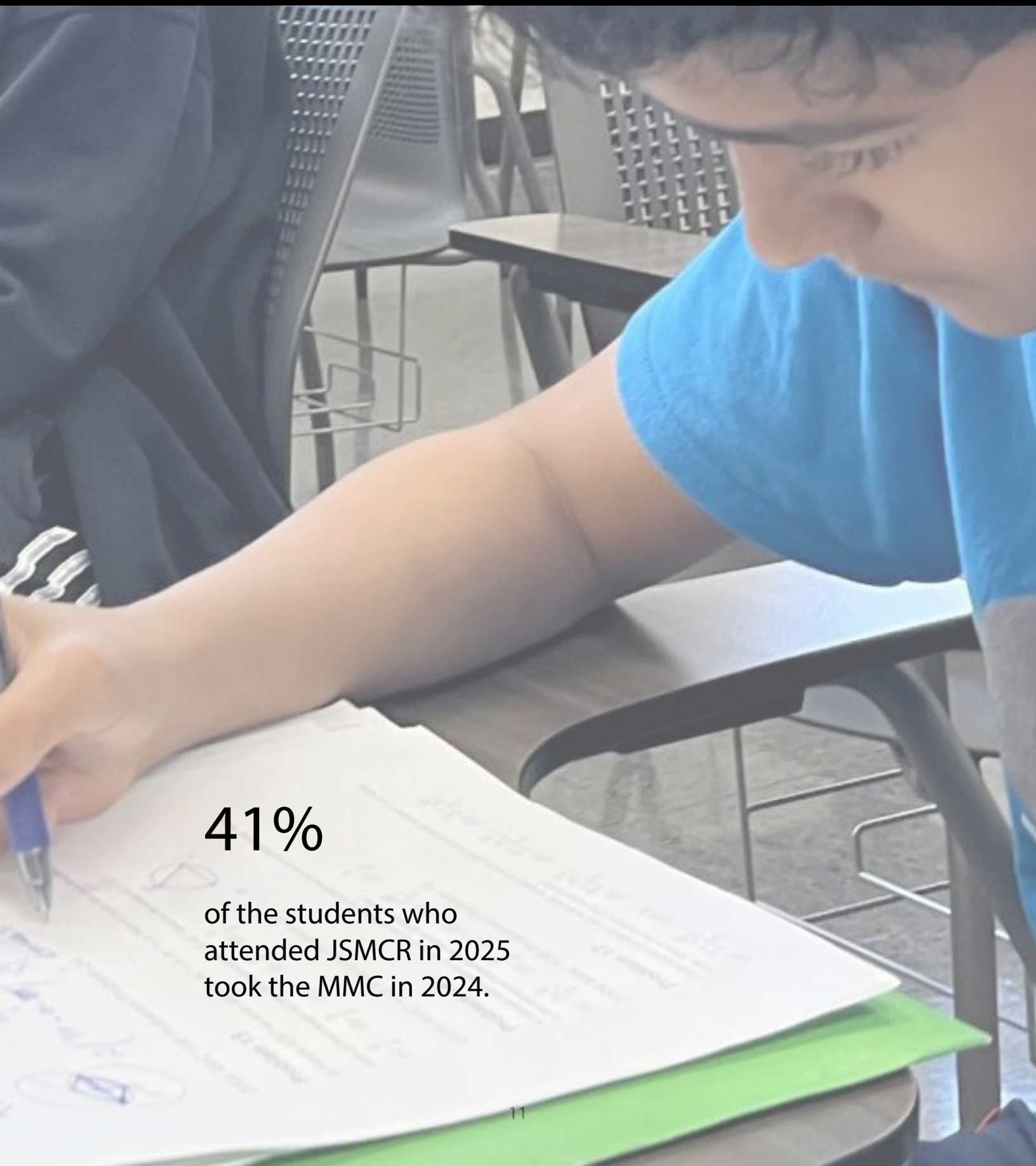
Curious how you would do on the test? Check out two sample problems from the 2024 MMC. Most students (603 or 74%) got the correct answer for Problem #2; while only (43 or 5.28%) of the students got Problem #12 correct.

2. Max fills in each of the empty boxes in the figure with a number. When he is done, every box except for the two leftmost boxes contains the sum of the number in the two boxes immediately to its left. What number does Max place in the box immediately to the right of the 3?

3			19		49

12. Consider a three-by-three square array in which two cells are already filled with the numbers 147 and 441 as shown. Suppose we fill each of the remaining cells with a positive integer so that the product of the three numbers on each row, on each column, and on each main diagonal is the same. If we do this so that the sum of the nine numbers in the array is as small as possible, what is the sum of the numbers in the two shaded cells on the right?

147		
	441	



41%

of the students who attended JSMCR in 2025 took the MMC in 2024.

Summer Math Programs

Doing mathematics is about making sense of and thinking deeply about fundamental concepts.

Students should:

- “Think deeply of simple things" (Arnold Ross)
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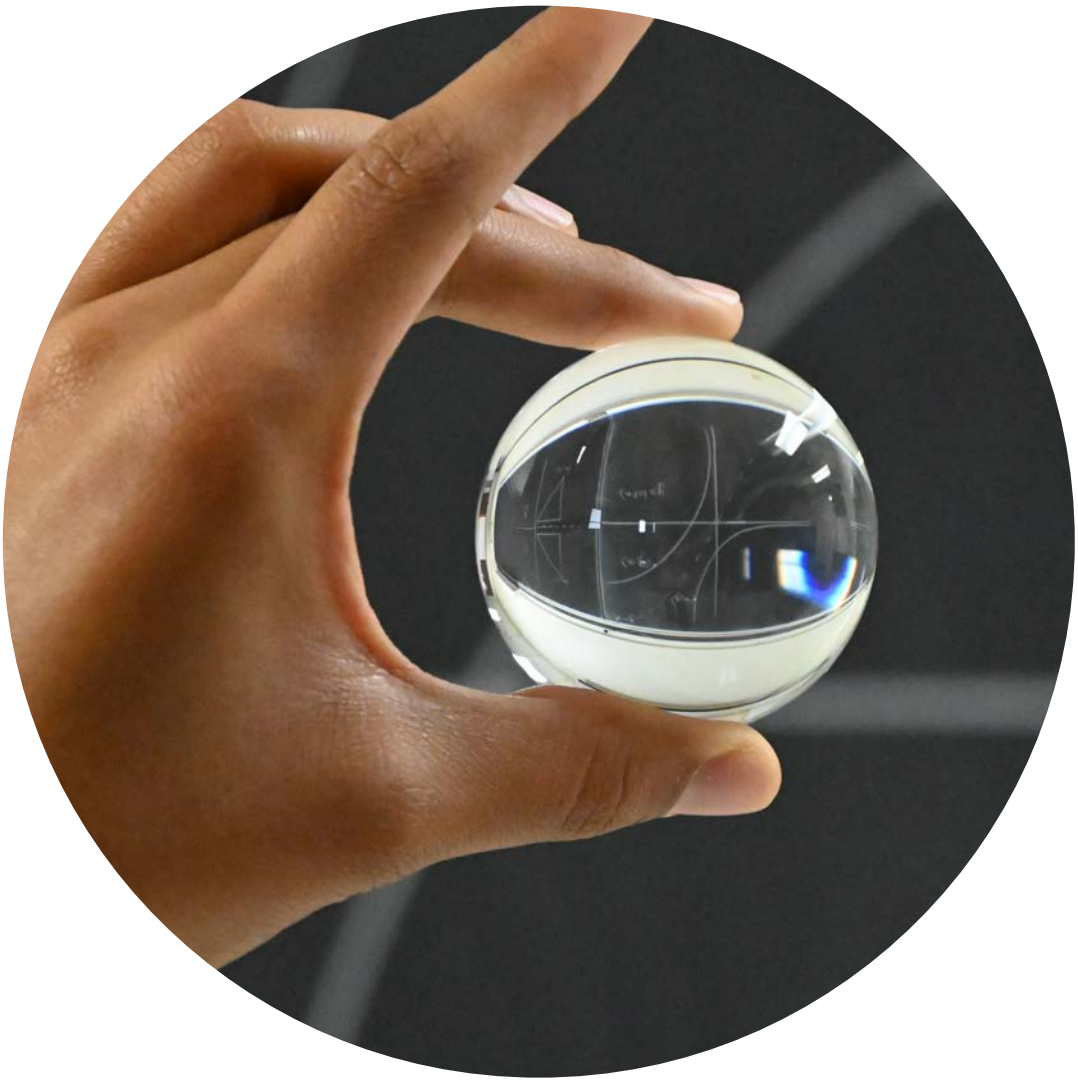


Summer math programs for students in elementary school, middle school, and high school

1

The two-week half-day Junior Summer Math Camp (JSMCH) provides a unique mathematical learning community for elementary and middle school students, pre-service teachers, in-service teachers, undergraduate students, graduate students, and university faculty. Young students have role models who provide a vision for why studying math is important and how students can use what they learn to pursue careers in Science, Technology, Engineering, and Mathematics (STEM) and many other fields.

2

The two-week residential Junior Summer Math Camp (JSMCR) engages middle school students in working on challenging problems together. The goal of the program is to develop young students into creative problem-solvers and critical thinkers. We nurture students' interests and abilities to pursue higher-level math courses and careers in Science, Technology, Engineering, and Mathematics (STEM) and many other fields.

3

The six-week residential Honors Summer Math Camp (HSMC) is an intensive multi-summer program for high school students. The goal of the program is to develop talented students mathematical abilities through a rigorous in-depth mathematical experience in a unique learning environment. Students learn important skills for future degrees and careers in Science, Technology, Engineering, and Mathematics (STEM) and many other fields. Returning students study advanced math classes and work in teams on original research projects in a wide variety of areas with faculty mentors.

Two-Week Half-Day Camp

The half-day Junior Summer Math Camp (JSMCH) provides a unique mathematical learning community for elementary and middle school students, pre-service teachers, in-service teachers, undergraduate students, graduate students, and university faculty. Young students have role models who provide a vision for why studying math is important and how students can use what they learn to pursue careers in STEM.

About

JSMCH Dates:	June 2-12, 2025
Camp Levels:	5
Grades:	3 - 8
Curriculum:	Math Quest

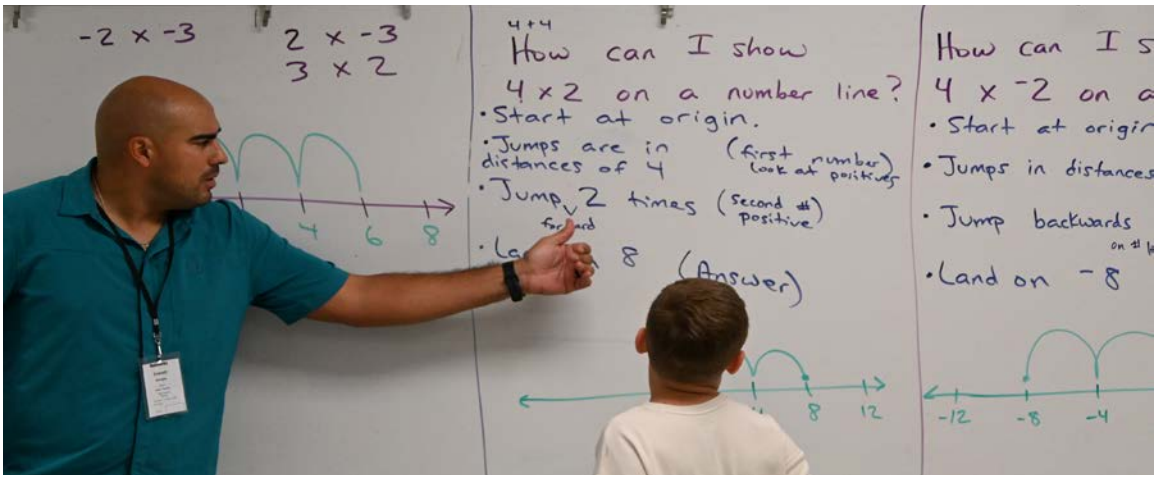
Students

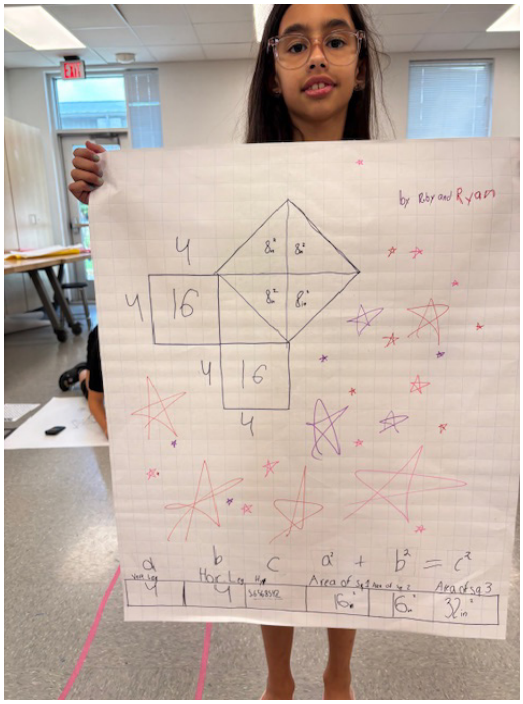
Student Participants:	166 (F: 71, M: 95)
Tuition Cost:	$400
Scholarships Awarded (90):	$34,500

Faculty and Staff

Texas State Faculty:	3
Texas State Undergrad Fellows:	24 (F:17, M: 7)
Texas State Graduate Teachers:	6
Master Teachers:	9
Professional Development:	9

"First time attending. My son just finished 3rd and is going into 4th grade next school year. My son made these comments to me: 'more fun compared to school. The way they taught... because it made me feel like I was having fun when it as just learning math. The teachers really listened to the kids, what they have to say... the teachers are amazing and supportive teachers.' He liked the challenge and was having fun and learned quite a bit. The scholarship made the opportunity possible. With large student loan debt and high payments, my family isn't able to do these kinds of camps. My son loved the camp. He had several friends from school attending. He also liked the interactions with college students. On the last day, he was so proud of himself, giving hugs and high fives to instructors and saying he can't wait to return next year. Thank you!"





"My favorite math activity was the Pythagorean Theorem because it was interesting. A square + B square = C square."

"I liked making posters because I can work together with my friends and I can express what I know about the stuff."

"My son enjoyed Math camp this year. This is a very good camp and hope that it continues in the future. I love that they teach my son different ways on how to solve math problems. I would not be able to have my son attend this camp without the scholarships. I hope that these awesome sponsors continue to help all kids and families in need."

"I liked playing the games, especially Prime Climb. It was super competitive and helped me learn a lot about prime numbers."

Texas State Students Participate in Programs

Texas State University Undergraduate Fellows

Texas State University students from a variety of academic backgrounds, gain valuable classroom experience while mentoring young students in mathematics during the JSMCH. This program creates small learning communities of students, teachers, and faculty while giving undergraduates the opportunity to gain classroom experience and work with students. Math and Math Education majors benefit from this classroom experience with many going on to the Masters and PhD programs at Texas State University.

Quotes

"I am getting better at asking instead of telling, and this has really helped me to gain confidence in asking and creating better questions." First-year Fellow

"I also valued how questions and statements in mathematics truly can positively and negatively influence peers, teachers, and students." Third-year Fellow

"Here (Math Camp), I have the wonderful opportunity to work with my students at their pace to learn how they think and interact with the material. This is extremely beneficial because I was able to put myself in their shoes to grow and learn with them." ... "I learned to incorporate more games throughout the day to build on student understanding and engagement." Fourth-year Fellow

"In the classroom, I was able to apply the things I've learned in my C&I classes so far to a real life setting for the first time, like asking good guiding questions to facilitate learning & discussion. I was also able to see good examples of lessons that are adapted to be interactive & give students more of a sense of autonomy in their learning." First-year Fellow

Texas State University Graduate Research

Six Texas State PhD students in mathematics education taught and conducted research during the JSMCH camp. Their investigations included exploring Fellows understanding of the use of questioning, developing identity as future teachers of mathematics, and awareness of instructional practices such as skills of noticing student thinking. Their collaboration as graduate student researchers is aimed at writing several manuscripts for mathematics education journals and sharing their work at a national mathematics education conference.

Quotes

"As a graduate student, it was nice to break down complex mathematics concepts and make it accessible to our students in an exploratory way. Camp was fun!!"

"In my second year as a Master Teacher for JSMCH, I've been enjoying my time to teach alongside incredible math educators and to research with an incredible team of math ed researchers. I feel like the camp gets more exciting every year!"

"Coming to Mathworks is always the best part of my summer! I learn so much as an educator and researcher every year, and I love seeing how much our students grow as they play with math."

Professional Development for Teachers

Master Teachers and teachers attending the Professional Development (PD) program earn a total of 45 hours of Professional Continuing Education hours, approved by the State Board for Educator Certification (SBEC).

Master Teachers

Master teachers (having already taken the PD program with Mathworks) return year after year to teach during camp as a way to stay focused on student learning and rekindle their love of teaching.

"It's always useful to document/reflect on the thinking that went on during class. My favorite part about teaching is observing students thinking.... helps me to create more thought-provoking activities."

"We loved our Fellows and their willingness to engage our students. When the students saw us having fun and enjoying ourselves (playing SET during free time, actively engaging in games and problems, creating new activities), they wanted to be part of it even more! That made this year so fun!"

Read about Molly Bending's experience as a Master Teacher since 2009, page 7.

Professional Development For In-Service Teachers

Teachers from San Marcos CISD, Hays CISD, Seguin ISD, and Regents School of Austin participated in the PD program.

In the morning, participants join the classroom experience of JSMCH camp where they learn the Mathworks guiding principles and ways to incorporate what they learned into their school classrooms. In the afternoon, teachers participate in a seminar covering research-based mathematics pedagogy and engaging math activities.

"I loved the integer highway and plan to use this strategy to teaching adding and subtracting on the number line. I enjoyed the collaboration between so many different people and the access to so much knowledge! I valued the deepening of my own math skills and would love to participate again." Hays CISD Teacher

"Teaching in this setting jarred me to slow down and give students more think time. This extra think time allowed them to discover strategies on their own and the result was a deeper understanding of the content". Hays CISD Teacher

"(This program teaches) confidence to give students more ownership of their own learning, allow more time for productive struggle, and create a safe place for error, trials, and student collaboration." Hays CISD Teacher

"Using hands on activities, number lines, anchor charts, and the frog model really did reach all students." San Marcos CISD Teacher

Two-Week Residential Camp

The residential Junior Summer Math Camp (JSMCR) is an immersive summer program for middle school students who are excited about doing mathematics. The goal of the program is to develop talented young students into creative and critical thinkers. We nurture students' interests and abilities to pursue higher-level math courses and degrees and careers in math, science, engineering, and many other fields.

About

JSMCR Dates:	June 1-13, 2025
Grades:	Middle School

Students

Students Applied:	232 (F:86, M: 146)
Students Attended:	76 (F:39, M:37)
Tuition Cost:	$2,200
Scholarships (14):	$24,700

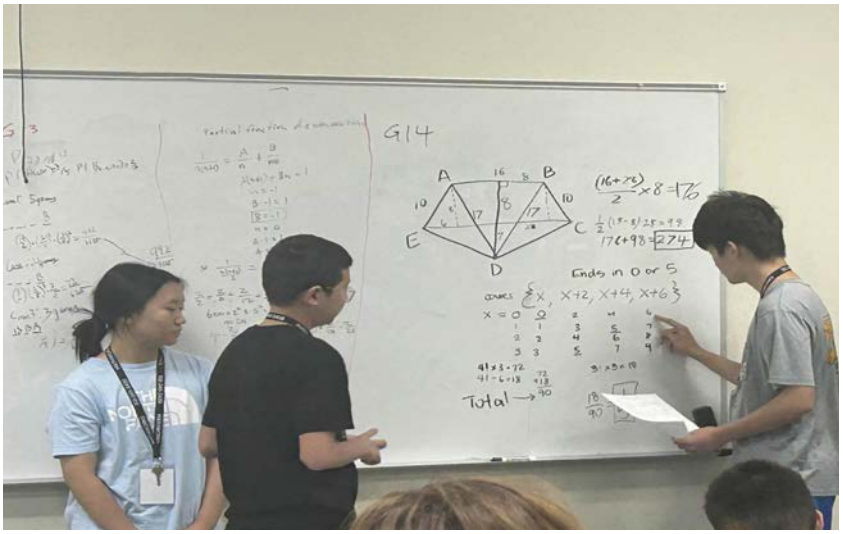
Faculty and Staff

Texas State Faculty:	4
Counselors:	19

"This was Apollo's first residential summer camp. He made many friends who also love math, learned to take care of himself, and enjoyed studying college-level math. It was a unique experience, different from anything he could learn at school and the best summer camp he has ever attended."

"My son gets up at 6 a.m. every day at camp, but he cannot get up at 8 a.m. during school. I asked him why, and he said, "That's school. It is boring. This is camp. It is fun."

"At camp we had more freedom and time to explore the problems in the classroom, and during problem session and study group. The camp let me struggle with the problems without pressure, and able to talk to other kids or the professor when I was stuck. The topics, although quite advanced, were very interesting and the way they were taught made it easier to understand them. My confidence level increased a lot, I am more comfortable speaking up when I have a question or need help, and have learned new techniques to solve problems. I also made lots of new friends, and even now that the camp is over, I still communicate with them. "



"Emma had a wonderful experience at JSMCR and enjoyed every day she spent there. It was her first opportunity to work closely with many students who share her passion for math. She especially liked the study group format, where she enjoyed collaborating as a team to solve challenging problems. This experience not only deepened her interest in mathematics but also helped her build valuable friendships with peers who inspire and motivate each other."

"Academically, the camp was unlike anything she has experienced at school. She especially loved the 3-hour daily study group sessions, where she worked closely with three other students to solve challenging math problems. That collaborative, immersive environment was both motivating and intellectually stimulating for her. The daily lectures by Dr. Shen were another highlight—Olivia was fascinated by the topics that are rarely, if ever, covered in school, such as geometric tricks and methods for taking square roots by hand. She even taught us how to do it during one of our video calls when she was at camp. These lectures opened her eyes to the beauty and depth of math in ways that traditional school curriculum typically don't."

Honors Summer Math Camp

Six-Week Residential Camp

The Mathworks Honors Summer Math Camp (HSMC) is an intensive multi-summer program for gifted and talented high school students. The goal of the program is to develop students mathematical abilities through a rigorous in-depth mathematical experience in a unique learning environment. Students learn important skills for future degrees and careers in math, science, engineering, and many other fields.

About

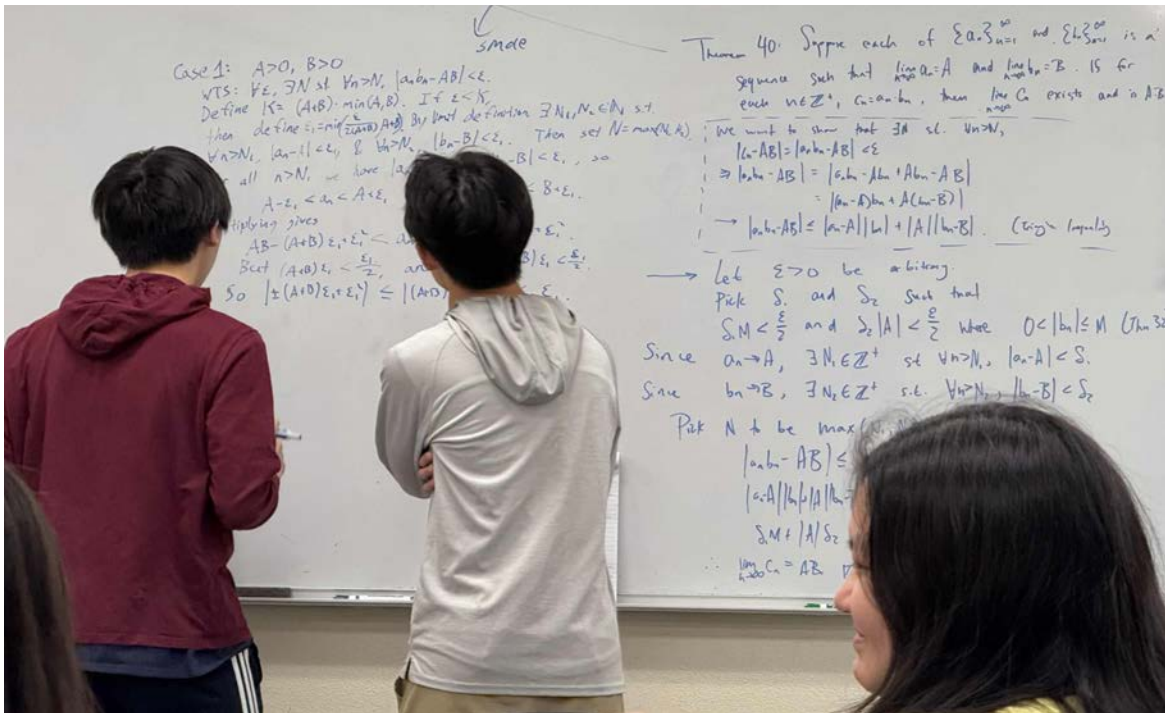
HSMC Dates:	June 15-July 26, 2025
Grades:	High School

Students

Students Applied:	716 (F:243, M: 473)
Students Attended:	76 (F:45, M: 31)
Tuition Cost:	$6,600
Scholarships (14):	$76,100

Faculty and Staff

Texas State Faculty:	4
Counselors:	19
Research Mentors:	9



"HSMC was truly transformative for me, both as a student of mathematics and as a person. Having never attended other math programs before, I arrived with no concrete expectations. What I discovered here was something rare—a perfect balance of rigor, community, and creativity that pushed me beyond my comfort zone while making me feel supported every step of the way."

"Prior to this camp, math has been mainly an individual pursuit, since I did not have many peers who were interested in the subject. During this camp, the study group sessions allowed me to practice sharing my thoughts and building onto others ideas, and have made me more confident working in groups and communicating mathematically. This experience has led me to see the remarkable difference in working on something with others compared to working alone."

"I fell in love with the approach of starting with simple axioms and ending with a brand new idea, especially the logical, step by step nature of this. It made me far more confident math was what I was looking for in my future, as well as what I loved about math. That is, the puzzle solving nature of it."

11 Research Projects

High school students returning to the program as Second-Year and Third-Year students work with Texas State University faculty research mentors on original STEM research projects and helping to discover new knowledge. This summer, the students worked on these eleven projects.

The Geometry of Quantum Computing
Jessie Wang, Angela Yu, Mentor: Geonhee Cho

ZX Algebra and Spider Fusion
Jason Cheng, Evelyn Li, Mentor: Geonhee Cho

Prime Graphs of Finite Groups
Bryan Alvarez, Micah Dorton, Lawrence Liu, Evan Zhang, Mentor: Thomas Keller

Chip-Firing on Hypergraphs
Jack Holden, Rafael Longoria, Keeran Patel, Jerry Zhang,Mentor: Anton Dochtermann

Attempting Simon's Conjecture for the 3D Case
Benjamin Keller, Rhea Ghosal, Melody Han, Scarlett Kerr, Justin Liu, Ryan Tang, Chloe Weng, Mentor: Suho Oh

Prime Factors and Dynamical Orbits
Aristaa Bhardwaj, Adrian Boyer-Paulet, Emma Qiu, Alexander Sun, Mentor: Wade Hindes

Development of a Fast Training Algorithm for Logistic Regression and Support Vector Machine
Gloria Chi, Savanna Rocha, Kaylee Xu, Kelly Zhou, Mentor: Young Ju Lee

Accelerating Flash Calculations with the Orthogonal Greedy Algorithm
Amanda Li, Nathan Negera, Cady Wang, Elena Xiao, Mentor: Young Ju Lee

Enviromental Impact of Hyperinflation [Drawing the Connection Between Hyperinflation and Environmental Damage]
Abigail Castaneda, Akash Gusani, Allysson Juarez, Thalia Kahozi, Anlan Xu, Emma Wu, Cody Zhou
Mentor: Christopher Philip Guzelian, Pratheesh Omana Sudhakaran, Michael Stutz

Enhancing Image Segmentation with Normalized Cuts and Inverse Filters
Ryan Fitzgerald, Andy Lee, Kalia Wang, Jocelyn Wang, Mentor: Ivan Ojeda-Ruiz

Creating a More Flexible Test for the Population Mean - Extensions to Bivariate and Longitudinal data
Tomas Falleti-Moore, Emily Liu, Carolyn Wang, Mentor: Steve Hoberman

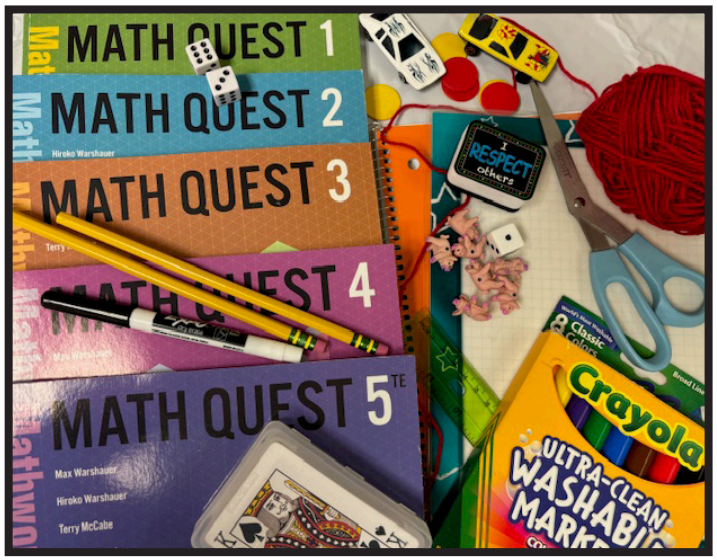
Curriculum

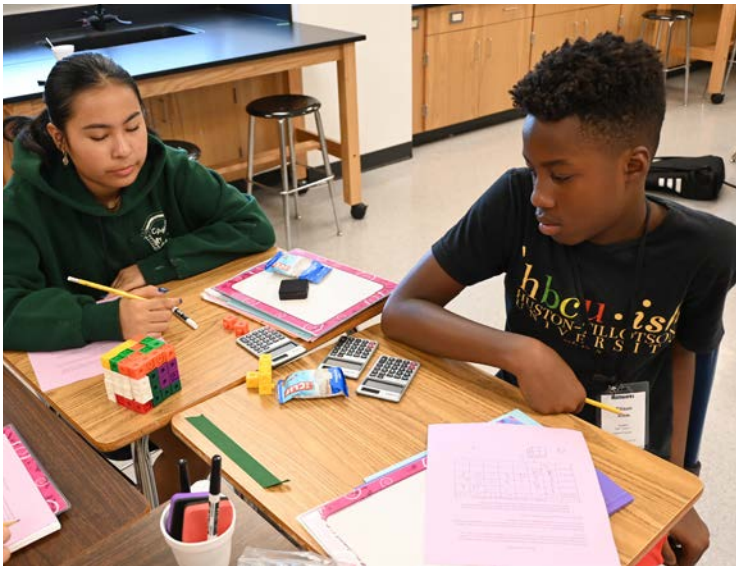
Math Camp Curriculum

Math Quest Curriculum

- Used during JSMCH camp
- Five Levels
- Aligns to 3rd – 8th grade math
- Includes student and teacher editions

From a first-year program that introduces students to beginning concepts in algebra through play-acting and drama (dramathics), to a more advanced program in problem solving and discrete math, students enjoy exploring problems together and share in the excitement of mathematical exploration and discovery.

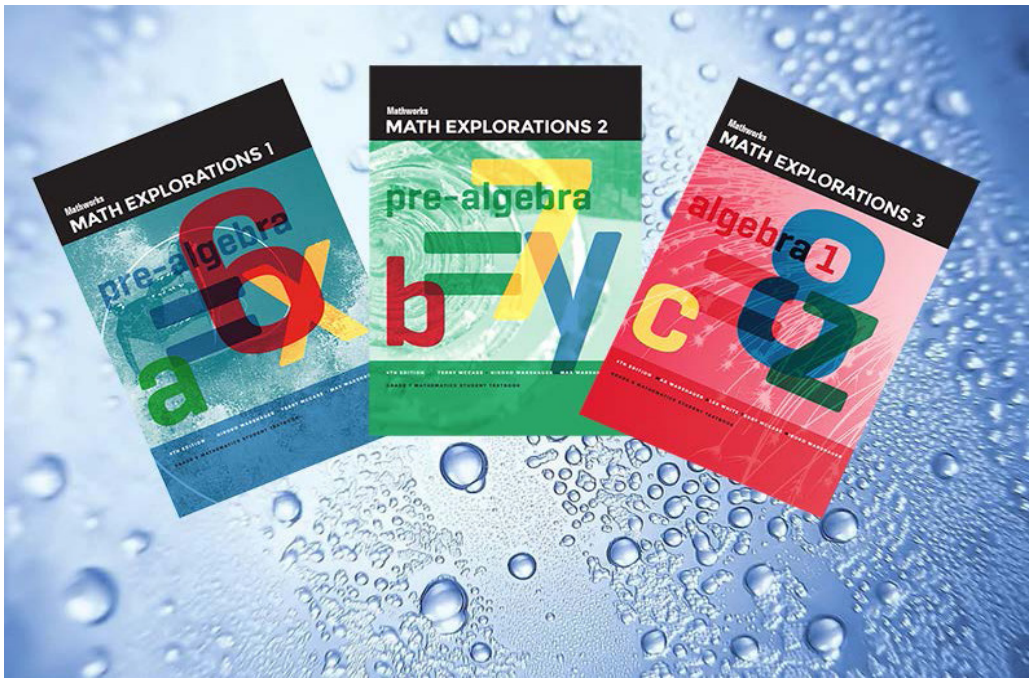




Camp in a Box

- Books and supplies for each Level
- *Math Quest* Curriculum
- For use in mini-math camps and after-school enrichment programs

Are you excited about math and want to hold your own math camp?
Join schools like Brown Middle School in McAllen, Texas by hosting your own camp. We have everything you need to host your own camp. Just let us know how many students want to participate in your fun math activity and we will gather all the supplies together and mail them to you at an affordable price. Everything you need for camp is in the box!



Middle School Curriculum

Math Explorations (ME) Curriculum

- 6th, 7th, 8th Grade Math Curriculum
- Integrates learning from more than 25 years of summer math programs
- Texas Education Agency (TEA) Approved
- Aligns with the Texas Essential Knowledge and Skills (TEKS) for grades 6, 7, and 8
- Engages students in using algebraic ideas
- Research-based, classroom-tested, and developed by nationally renowned mathematics educators
- Prepares students for the STAAR Math Exam and the Algebra 1 End of Course Exam

Research

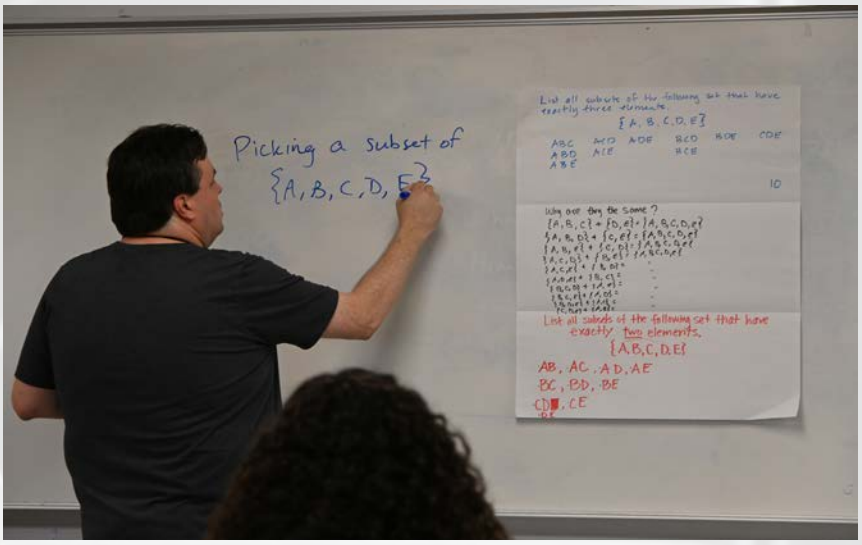
Focus on Research

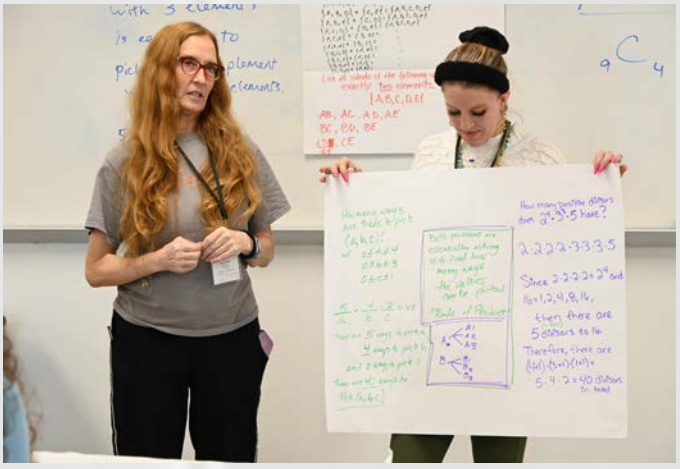
In 2025, Mathworks continued to establish itself as a leader in research on mathematics enrichment for K–12 students and on mathematics teacher education. Mathworks' ongoing research efforts include:

- studying the **collaborative** practices of teaching teams in the Junior Summer Math Camp (JSMC) as they engage in daily reflections and discussions
- **investigating** the experiences of Texas State undergraduate students who serve as Mathworks Fellows in the JSMC
- **designing** and piloting innovative mathematics tasks in Levels 4 and 5 of the JSMC and sharing these tasks with a wider K–12 teacher audience
- **studying** the community that forms among students in the Honors Summer Math Camp (HSMC) and examining the impact of this community on campers' academic and social identities and professional aspirations

Studying teacher collaboration
After a two-year revision process, the article "Examining professional development grounded in collaborative teaching: Resources that inservice and preservice teachers contribute to practice" has been accepted with minor revisions to the Journal of Mathematics Teacher Education (JMTE), one of the world's most influential research journals in mathematics teacher education. This article was developed by a team of current and former Mathworks faculty (Cody Patterson, Christina Koehne, Hiroko Warshauer, Xiaowen Cui, Sonalee Bhattacharyya, and Max Warshauer) based on a study of the collaboration of teaching teams during the 2016 JSMC. The article will inform the teacher education community about how both novice and experienced teachers' capacity for noticing student thinking can enrich teacher collaboration. Specifically, this article analyzes what novice teachers notice and how this can catalyze the sharing of multiple participants' knowledge and values about teaching. This may facilitate teachers' adoption of more effective teaching practices.

Dr. Patterson has constituted a new research team (Patterson, H. Warshauer, Callie Angel, Candice Hamilton, Cindy Cattey, and Bea Ellis) to continue this research. This new team plans to investigate how social dynamics between novice and experienced teachers on a teaching team can widen or narrow teachers' opportunities to learn from collaboration.





Investigating novice teachers' experiences

A team consisting of three graduate student researchers in the 2025 JSMC (Cindy Cattey, Stephanie Tarigan, and Levina Owusu) has launched a study of how Mathworks Fellows learn about teaching from their experiences in the JSMC, including their work with children in the camp's morning classes, collaboration with experienced teachers, and their participation in a Mathworks Fellows Seminar led by Dr. Hiroko Warshauer. This study will inform the mathematics teacher education community about how field experiences and courses can help novice teachers develop skills such as noticing and building on student thinking, questioning, and developing a classroom culture that supports students' productive struggle.

Research

Designing innovative math tasks

For more than a decade, graduate student researchers in JSMC each summer have piloted new activities for Levels 4 and 5 that develop students' thinking about graphing, combinatorics, and number theory. In the 2025 JSMC, Texas State doctoral students Carlos Acevedo, Brittney Fahnestock, Lianna Oviedo, and Levina Owusu piloted original tasks in their camp classes; they analyzed student work from these activities and submitted reports to the popular journal Mathematics Teacher: Learning and Teaching PK–12, a journal for mathematics teachers published by the National Council of Teachers of Mathematics.

Studying community and identity in intensive summer math camps

In the 2025 HSMC, Grace Morrell, a Texas State doctoral student, conducted a preliminary study for her dissertation, which will focus on how community forms among campers and how this community shapes the ways in which students think of themselves as mathematics learners and future STEM professionals. Her preliminary report on this study, "The nature of a community of practice: Social expectations at an informal summer mathematics program" (coauthored with Dr. Patterson), was recently accepted for presentation at the 2026 Conference on Research in Undergraduate Mathematics Education. Ms. Morrell has since applied for the highly competitive NAEd/Spencer Dissertation Fellowship to secure additional funding for this ambitious project.

45 High School students attending the 2025 Honors Summer Math Camp conducted original research projects mentored by TXST Faculty.. Read about the projects on page 23.

"The HSMC students always impress me with their ability to juggle a full schedule of classes, while also finding time to devote to the research questions that I provide for them. My particular students worked well as a team, always ready to share ideas and also supportive of each other. It was a pleasure to get to know them this past summer."

2025 HSMC Research Mentor and TXST Faculty Member, Anton Dochtermann

Alumni Impact

"My kids always felt okay about math, but participating in MathWorks is what really kicked that into high gear. Math became my two oldest kids' favorite subject. My oldest now wants to be an engineer. I credit a great deal of that interest to Mathworks, which modeled for them that math didn't have to be boring, didn't have to be formulaic. That you could be creative in math, that **math is a language** in which they can become fluent."

"My child attended several years of Math Camp as an elementary school student. **He just graduated from Texas State University with a degree in Electrical Engineering with a Concentration in Computer Engineering** and has a job as an Electrical Engineer right out of college."

"I am attending Stanford for electrical engineering. **JSMCR and HSMC have helped develop my mathematical thought process, helping me think in terms of rigorous proofs.** I have had quite some success in proof-based competition with 1st place team in ARML, HMMT, and pumac with the lehigh valley (LV) team in the past few years. A rigorous math background will serve as an important language in my future work in engineering."

"Our son is going to attend Stanford this fall. He plans to major in Computer Science and Math. The **Mathworks program certainly provided him with a solid foundation** in competitive math, and he subsequently qualified for AIME for three consecutive years, which also deepened his love for math."

"I am currently a freshman at Princeton University, and I plan on studying mathematics. Mathworks and its programs have strongly impacted both my education and my career. I've always been a fan of mathematics, and I always felt myself drawn towards it, and the Mathworks camps that I attended only added fuel to the fire. Even in the Half-Day programs, I was exploring negative numbers, inequalities, set theory, logic, and fun puzzles while in elementary school. The JSMC-R and HSMC camps only built on this, and it is definitely my experiences at HSMC that have led me to pursue mathematics in college. Additionally, **Mathworks helped me learn how to collaborate in a team.** This is because the difficulty of the problem sets alongside working in a study group essentially forces you to collaborate (which is a positive thing). Overall, Mathworks has definitely strongly inspired my high school and college careers so far, and I am grateful that I was able to attend all programs that Mathworks has to offer."

"Carolina and Isabella both completed Junior residential camp. They had an amazing time there. They were pushed to their limits. I was so happy to see them with some of the most passionate students who showed my kids how top students operate. Overall math camp will be a **defining event in their lives**. Isabella wants to pursue surgery, and Carolina wants to do biomedical engineering and then on to dental school."

"...I think **Mathworks helped him become even more comfortable with math** and helped him stay ahead of the typical course sequence so he could do multiple AP math classes and succeed. He is applying to competitive liberal arts universities to start as a freshman in fall 2026, and having a 5 on Calculus BC is certainly helpful in applications!"

Building a Community

"Olivia was very involved in Mathworks and took 2 classes at Texas State University her senior year of High School for dual credit. Olivia is now at Yale and what I am most impressed with is that the alumni students are still meeting! Olivia informed me that **she ran into a Mathworks student at Yale and he noted to her that he needed her contact information because the Mathworks students meet monthly for dinner.** She is now on the group-chat and has attended her first dinner with them. I find it very special that they are continuing their relationships that they have as Mathworks alumni by continuing to be with and network with each other now in college. Great job Mathworks, you have indeed built a community of learners!"

"I am a math teacher and joined the camp as well, as a result of my learning my student's performance skyrocketing but not only that we had so much fun with numbers that I will be forever thankful for the opportunity you give me and the benefit on the Texans as a society."

"I'm so **grateful for Mathworks, I not only built amazing friendships and connections, but also discovered an even deeper passion for math.** Being surrounded by such a supportive, inspiring community made the whole experience unforgettable, and I truly loved every moment of it! This experience has expanded my dreams and inspired me to set even bigger goals for the future."

"Benjamin just started in Princeton majoring in math. But maybe best of all, and something that even the best parents cannot easily provide, is that **through the math camps Benjamin got in touch with peers equally interested in and enthusiastic about mathematics,** and he saw them go off to great universities year after year. I think this served as a huge inspiration and made him realize that one day, he could do that, too, and he did. In summary, for my son there could not have been a better way to spend his summers than at the Mathworks summer camps!"

"My daughter, Rhea, has attended JSMC and HSMC for the past four years. **Over this time, she has built such close bonds with her like-minded friends and the faculty that they feel like an extended family to her.** Each year, she eagerly counts down the days until summer so she can return to camp.

What I value most is how the programs immerse students in college-level, proof-based mathematics and research. The students engage with genuine enthusiasm and passion, yet the learning environment is designed so they never feel overwhelmed. Instead, they truly enjoy the challenge—**continuing to discuss mathematics long after camp ends,** often through their friendly Discord community.

I especially appreciate the balance between intellectual rigor and social connection. The two weeks at JSMC and the six weeks at HSMC provide not only **deep academic growth but also lasting friendships and joyful experiences that extend far beyond the camp itself."**

Best of the Best!

At Mathworks, faculty selection follows an exceptionally rigorous process to ensure that only the most outstanding educators join the team—those who can inspire and develop students into tomorrow's leaders. The guiding question is straightforward but uncompromising: Are they truly the best?

Ms. Ellen Couvillion teaches Honors Seminar and Python during the HSMC and teaches Level 5 during the JSMCH. Enthusiastic, friendly, and able to beat you at a round of pool any day of the week. She really knows her geometry and much, much more.

Dr. Tim Chase teaches Analysis and Topology during the HSMC and Problem Solving during the JSMCR. Tim also manages the residential camps. If not teaching, you might find him running, cleaning the kitchen, or playing a game with his kids. When not teaching, you might find him running, cleaning the kitchen or playing a game with his kids or campers.

Dr. Eugene Curtin teaches Abstract Algebra and Combinatorics during the HSMC and Problem Solving during the JSMCR. In his spare time, he likes writing problems for the Mathworks Math Contest. Enjoy Chess? Ask Eugene to play a game with you and he might play several other people at the same time (it's called a simul in the chess world, short for simultaneous).

Dr. Cody Patterson attended the HSMC in high school and has been a part of the HSMC since that time. He teachers the Professional Development classes during the JSMCH and often teaches Number Theory during the HSMC. Ask Cody about Truman his dog!

Dr. Jian Shen teaches during Problem Solving during the JSMCR and coaches the Mathworks USA team when participating in the Primary Math World Contest. He enjoys sharing his delicious dumplings (authentic family recipe) with family and friends.

Dr. Hiroko Warshauer supervises the Texas State University undergraduate Fellows and the Texas State University graduate Fellows during the JSMCH. She leads the Math Education Seminar for the Mathworks Fellows after the JSMCH morning classes. Ask Hiroko, the First-Lady of Mathworks about her favorite topic, her kids and grandkids.

Dr. Max Warshauer teaches Number Theory during the HSMC and manages the half-day programs and residential programs. He is the founder of Mathworks and continues to create learning opportunities for all ages. He loves to tell jokes and play pickleball.

126 Years

of collective experience!

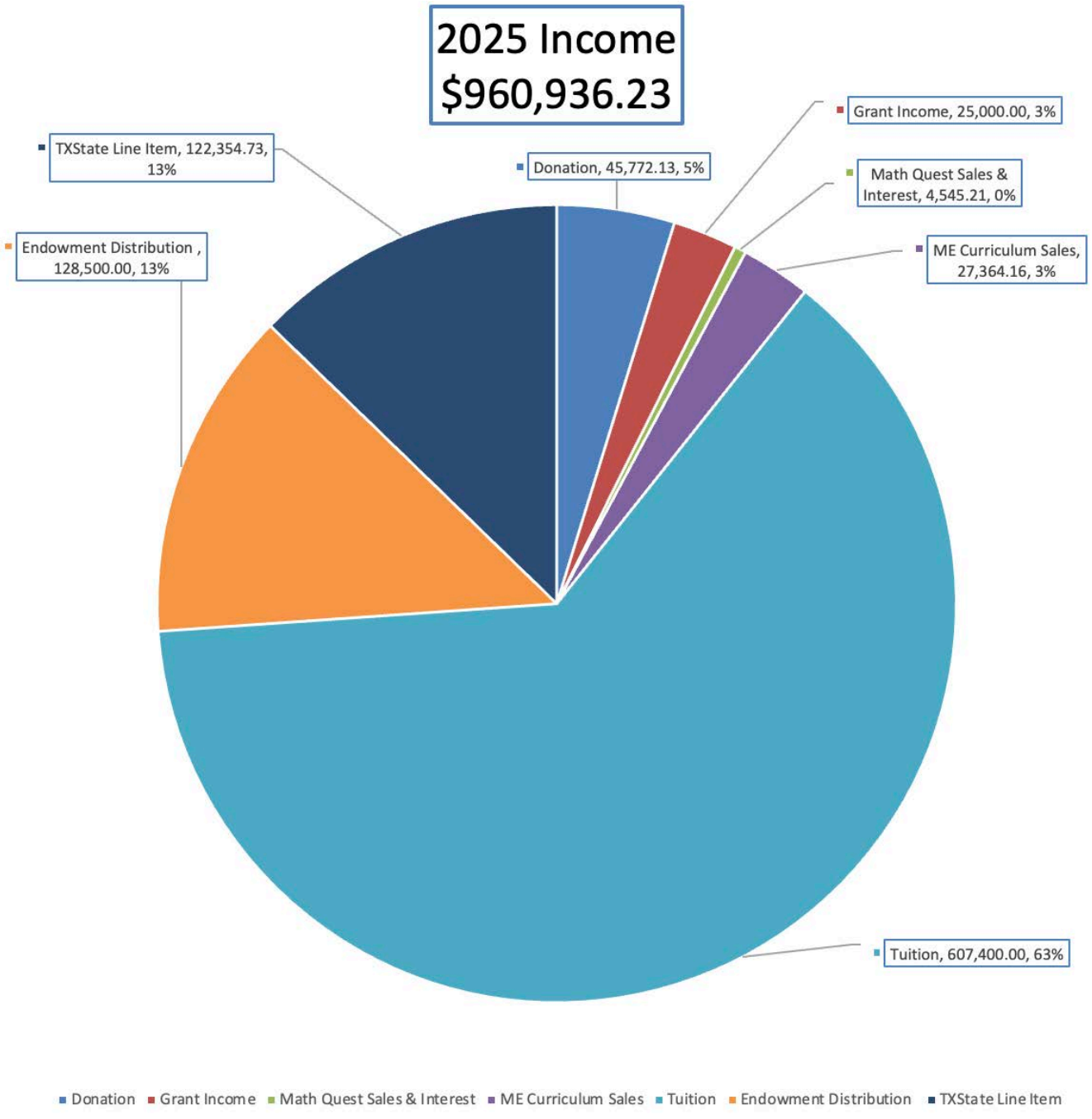
Four (of our six) faculty members presenting certificates to HSMC students during the last day of camp. (Left to Right) Ellen Couvillion, Tim Chase, Minerva Cao, Tasneem Ahmed, Grace Cao, Eugeue Curtin, Max Warshauer

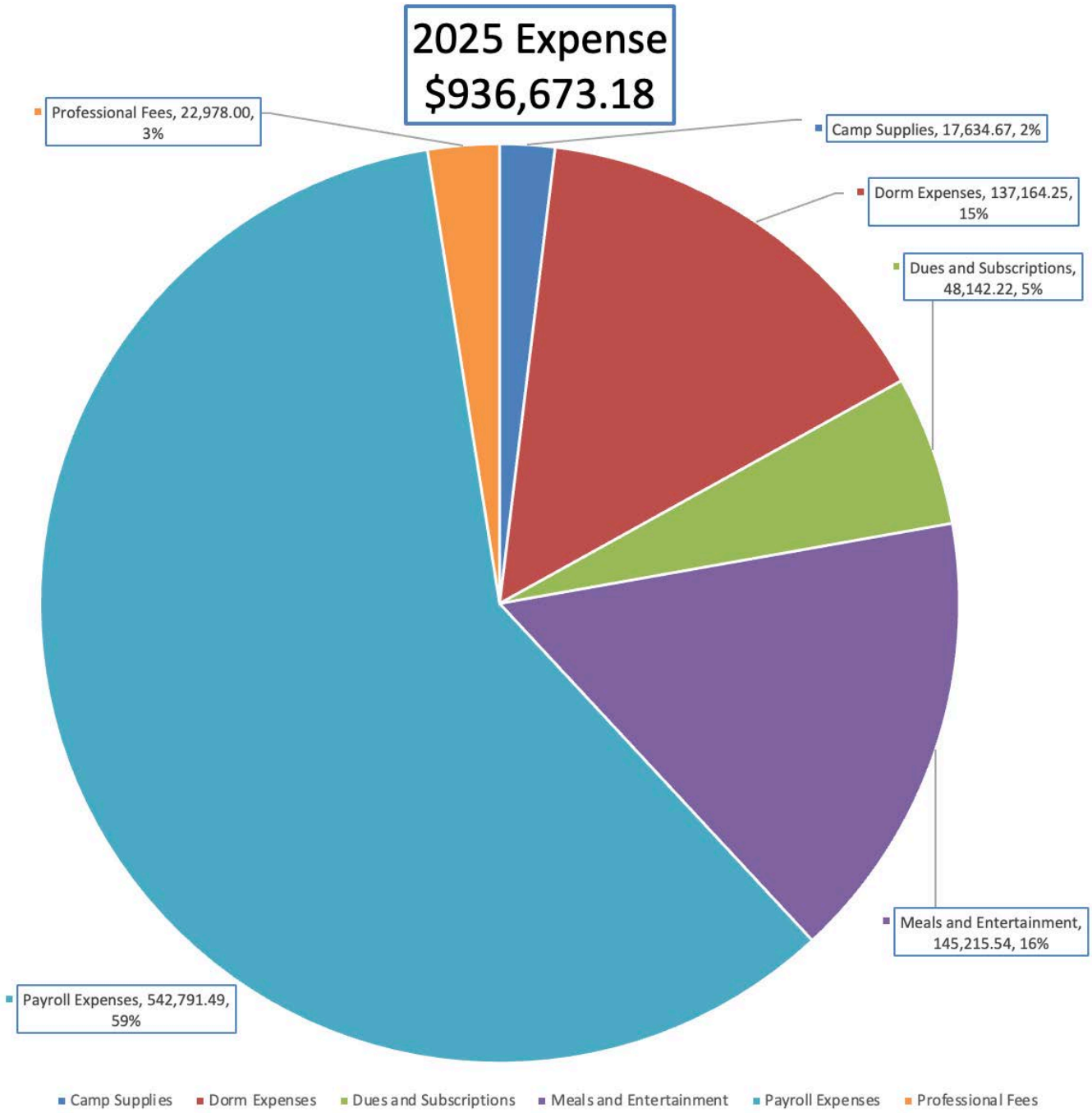
Thumbs up for an early morning run with Tim Chase.

For the past seven years, Tim has been an integral part of our summer math camps, sharing his passion and expertise with countless students. We send him off with our warmest wishes as he begins his new role at Alfred State College, State University of New York. We give him a big thumbs-up and hope he'll return to MathWorks each summer to continue inspiring future mathematicians.

Financial Report

Through the generous support of dedicated donors, the growth of endowment funds, sustained university backing, and prudent financial planning, Mathworks continues to deliver exceptional programs at a reasonable cost. Despite rising expenses, Mathworks remains well-positioned to build upon the strong foundation established over the years. We are pleased to report that the endowment has experienced substantial growth and now serves as one of the principal sources of support for participants, ensuring the continued excellence and sustainability of our programs. Financial data for fiscal year September 2024 - August 2025.




2025 Expense
$936,673.18
Professional Fees, 22,978.00, 3%
Camp Supplies, 17,634.67, 2%
Dorm Expenses, 137,164.25, 15%
Dues and Subscriptions, 48,142.22, 5%
Meals and Entertainment, 145,215.54, 16%
Payroll Expenses, 542,791.49, 59%
Camp Supplies
Dorm Expenses
Dues and Subscriptions
Meals and Entertainment
Payroll Expenses
Professional Fees

Donations

Thank you for your commitment to Mathworks and to mathematics education.

Donate Now!

The generosity of individuals and corporations makes it possible for Mathworks to change lives—empowering students to discover their potential and shape a brighter future through mathematics.

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Ms. Li Wang
Drs. Max and Hiroko Warshauer
Ms. Amy Y. Warshauer
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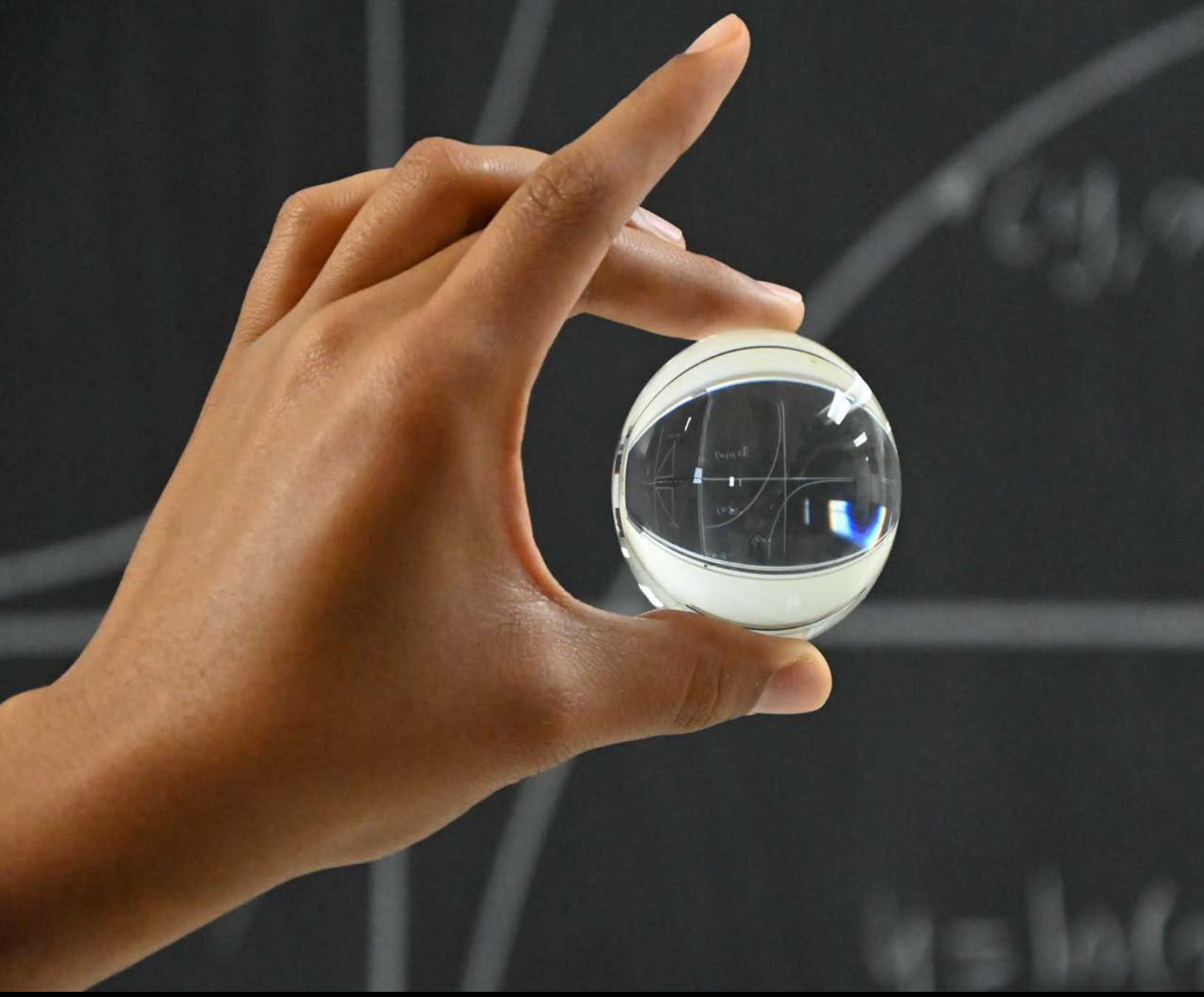
Dr. Allison Woodruff

Leading the Way Among Summer Math Programs

Mathworks at Texas State is a member of the Summer Mathematics Programs Consortium, an organization that connects the nation's most prestigious intensive summer mathematics programs. The Consortium has recently secured multiple grants totaling over $500,000 to launch the organization as an independent 501(c)(3) nonprofit and advance the public's recognition of the significant benefits that summer mathematics programs provide for the mathematics profession and for society at large. Dr. Cody Patterson, Mathworks' Assistant Director for Teacher Education, has been invited to serve on the Consortium's Steering Committee and has been a member since April 2025. This six-member committee will lead the way in setting the vision for the Consortium's work over the next few years, promoting collaboration among summer mathematics programs and identifying additional fund-raising opportunities.



Mathworks

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