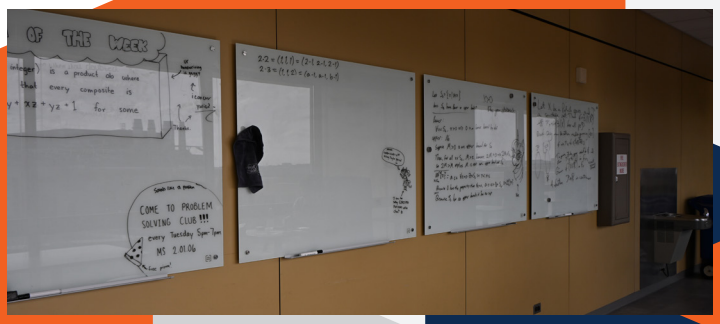
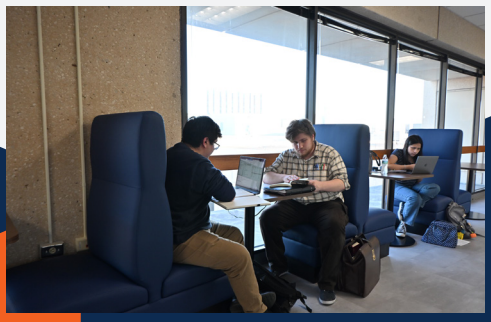
THE IRRATIONAL ROADRUNNER

AN APERIODIC NEWSLETTER OF THE DEPARTMENT OF MATHEMATICS AT UT SAN ANTONIO





Department of Mathematics
1 UTSA Circle
San Antonio, TX 78249

February 2026

On the cover: New math study space on 4th floor of Flawn. Creation of space catalyzed by Dr. Gutierrez when he was Chair. Cameo appearance by Rowdy.

Chair's Message

The ides of March and Spring Break are nearly upon us! I feel like a broken record, continually amazed by how quickly time slips away. With that in mind, it's important that you remember to plan ahead. Without planning and a strategy for achieving goals, it is hard to do so! We all need a break but, students, consider a break in a constructive direction: you need a study break and your choices are TikTok or thinking about what you want to do this summer; maybe you can aim for a 25%-75% balance (in that order)? Whether you choose to do nothing this summer and give yourself a mental break, go work 40+ hours/week to save up for next school year, find a professor or program where you can do research and work on math, or take some classes here, your choices or lack thereof start to shape your next few years. There is no wrong or right answer but instead a cautionary tale to seek advice from faculty and maybe advanced students or graduates and be proactive now instead of reactive later.

If you are still thinking about research (REUs) and haven't applied to any programs yet, there are a few deadlines that still have not passed. Doing a Google search can give some insight. From MathPrograms.org, I searched for "Undergraduate" and ordered by deadline and you can see those here: https://www.mathprograms.org/db?joblist-0-0---0-d-- If you need to get a job, keep in mind that REUs pay money! Don't put all your eggs in one basket and do apply for other jobs as well - but try to look for somewhat more technical jobs instead of ones that may be easier to get.

And it is only late February...which means there is a lot of semester ahead of us! Try to stay on top of things as much as possible. Seek out classmates to work on homework with, seek out help at the **Math Gym in Flawn 3.02.08**, go to Student hours with your professor, and use the new math study space on the 4th floor at the east corner of Flawn to gather and work (and maybe play cards occasionally)! And if the stress levels have you at your wit's end, we have resources on campus to help out: https://www.utsa.edu/students/wellbeing/services/counseling.html (QR code to the left). We want you here for the long haul!

Conference opportunity (1st of many)

There is a student research conference, MATH FOR ALL, which shares the similar purpose of offering a first-time conference experience for students that is mentioned later in this newsletter (see MAA conference info on next page). Additional information can be found at https://sites.google.com/view/mathforallnola. The closest site is in Austin, TX.

Integral Bee - in April!!

Remember the Derivative Bee from the fall semester? In April we will have our first Integral Bee! Look for flyers to be posted soon with the date likely being a Friday in early- to mid-April.

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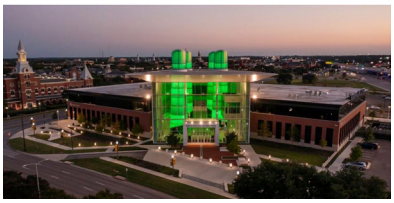
New SIAM Student Chapter!

- The **Society for Industrial and Applied Mathematics** (SIAM), the premier applied math society in the U.S., has a new **Student Chapter** at **UT San Antonio**. Thanks to the efforts of Dr. Zhuolin Qu and Dr. Jose Morales Escalante, the SIAM Student chapter has been approved. All students enrolled at UT San Antonio are now eligible to receive a **free student membership** with SIAM.
  - To receive free memberships, students must register online by clicking "Join Now" at Student Membership page: https://www.siam.org/membership/individual-membership/student-membership/
  - Students are also eligible for two free memberships with any SIAM Activity Groups (SIAGs) of their choice. A current list of SIAGs is provided on the website: https://www. siam.org/get-involved/connect-with-a-community/activity-groups/
  - Free student members can electronically access SIAM Review (SIAM's flagship journal)

siam® Society for Industrial and Applied Mathematics

MAA Conference at Baylor, March 27-28, 2026



Grads and undergrads!!! Conferences are a great opportunity to network with fellow students, meet faculty at other institutions, and get to see another university and/or city!

This Texas section of the MAA meeting/conference is a great opportunity to present a short talk or poster at a math conference. Presentations do not need to be about research - they can be on an interesting math problem (for example, from Problem-Solving Club!). https://math.artsandsciences.baylor.edu/105th-annual-maa-meeting

The UT San Antonio **Math Department will pay**/cover for (a) **student registration,** (b) mileage if you drive or carpooling if you don't, (c) **one night of hotel** (2-3 per room), (d) per diem for Saturday. **BUT you must contact Alejandra.Vicencio@utsa.edu by March 2** to start the process (filling out forms, etc.) and be responsive to emails from her. **Dr. Priya Prasad will be giving one of the keynote addresses!**

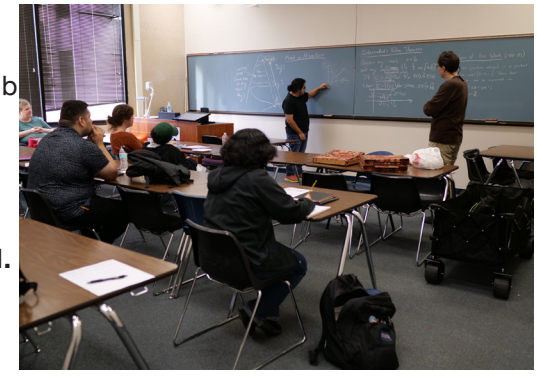
Math Study Space, FLN 4th floor

As you see on the front cover, we have a **new study space**!! Initiated by the previous chair, Dr. Gutiérrez, we finally have a study space in the **east corner of FLN**! Please **utilize the boards and the space** for studying and gathering. It is not only for math students but you were the catalyst for creating this. If things need to temporarily be moved that is acceptable but things must be put back in place when you are finished. If we cannot follow the **rule of putting the furniture back** where it came from, facilities may decide to bolt them to the ground!

Join the Problem Solving Club!

This is a great way to see math outside of the normal classroom setting. The Problem Solving Club is open to all UT San Antonio students (not just math majors). Bring a friend or come by yourself. Enjoy free pizza!

Meetings are **every Tuesday from 5:00PM-7:00PM. Meeting location: MS 2.01.06**. To be added to the Problem Solving Club contact group, scan the QR code and fill out your information!



From the Math GAR

This is the season of active recruiting for the master's program. The best recruiters are our current students, alumni, and faculty in the program. For YOU or for people you know who may be interested in pursuing an M.S. in Mathematics degree, we will be having a **graduate recruitment session** (ATTENTION UNDERGRADUATES!) on **Friday March 20, 5-7pm** in the **Loeffler Seminar Room, BSB 3.03.02**.

For current students in the program, we have a **new qualifying exam track in Mathematical Physics**. See https://mathresearch.utsa.edu/wiki/index.php?title=Main_Page#Qualifying_Exam_Track:_Mathematical_Physics for courses that will satisfy the track, including Mathematical Physics I (MAT 4813/5863) that will be offered in Fall 2026. Scroll up to see other qualifying track courses and be sure that they agree with the flowchart. They should be in sync but sometimes there can be a delay in updating one or the other so let me or the Chair know! You can find the flowchart at https://sciences.utsa.edu/_documents/mathematics/grad-degree-flowchart-ay25-26.pdf.

For **undergraduates interested in Mathematical Physics**, we have a new minor! It will become official in the next catalog. For a minor (in general), you need to select a minimum of 6 semester credit hours of approved upper-division mathematics electives. We will offer undergraduate versions of the following courses

Mathematical Physics I (4813/5863)
Mathematical Physics II*
Quantum Information Science and Engineering*
Differential Geometry*

Of these, only Math Physics 1 appears in the current catalog, and it will be offered next fall. Math Physics I is theoretical, while Math Physics 2 will be computational.

UTeachSA

It's never too late to consider teaching at any level! Our UTeachSA program prepares UT San Antonio students to teach grades 7-12. UTeachSA is **currently recruiting NSF NOYCE scholarship applicants**. The application **deadline is February 27th**. Selected scholarship recipients can **earn up to $20,000** toward the last two years of their studies of becoming secondary STEM teachers. In addition, students will be invited to attend local workshops and conferences. Scan the QR code to apply or contact Dr. Uchenna Miles at uchenna.miles@utsa.edu for more information.

If you are a UTeachSA student available and interested in attending the **UTeach conference in Austin, May 19-21**, 2026, please contact Carey Walls carey.walls@utsa.edu.

Volunteer Opportunity and Paid Tutoring Possibilities

The **Texas Math and Science Coaches Association Academic State Competition** wants your help! All volunteers get free lunch, free T-shirt, recognition certificate, and networking opportunities!! No math background needed. Event dates: **Saturday, March 21, 8AM-3PM** and **Saturday, April 11, 8AM-3PM**. Please register by March 5th to guarantee a shirt!

Tutoring Possibilities. I routinely receive requests from parents asking if I can connect them with a tutor. I would like to compile a list of undergraduates math majors who may be interested in tutoring. If you are interested, please send me, stephen.wirkus@utsa.edu, your (1) name, (2) expected graduation date, (3) math topics/level you are willing to tutor, (4) tutoring experience, if any, (5) contact email address, (6) tutoring rate per hour (you may leave this blank if you don't know). When I'm contacted in the future, I will forward the list I've compiled.

Seminars and colloquia

We have colloquia in Spring 2026 on Mondays, 3-3:55pm. Please see the flyers on the math bulletin board for upcoming ones - they are often, but not every week. Cookies are served! We also hold various more specialized Seminars in addition to these. Please look for flyers on the bulletin board outside the department or check on the math webpage on the right tab under Seminars & Events. All students, undergrad or grad, as well as faculty or others are welcome to attend.

Some of Our Student Researchers

We have a number of student researchers, conducting research under one or more professor's guidance either individually or in groups, and as either undergraduates or graduate students. What is presented in the remainder of this newsletter is a brief glimpse of the work that they are doing. Some are at the start of their project while others are near or at the end! Behind each of these projects is the research of one of the UT San Antonio math professors. In Fall 2026, we will likely host student "lightning talks" to give students an opportunity to give a 10-15min presentation of their work. More details to come in early fall!

Graduate Students

Marissa Martinez (see spotlight at the end): Marissa Martinez is a second-year MS in Mathematics (Math Ed Concentration) student from San Antonio, TX. She fell in love with mathematics in middle-school and continued with this interest through high school. She pursued a bachelor's degree in mathematics with a minor in computer science at the University of the Incarnate Word.

Marissa is currently writing her thesis on the experiences of undergraduate STEM majors who identify as Hispanic women in Calculus 1 courses. She is investigating the ways in which these students feel their identities and previous experiences shape their perceptions of themselves as mathematicians and Hispanic women. Results show that discrimination against these women is normalized and dismissed by them. They feel intense pressure to succeed and be role models such that they cannot make a single mistake and what helps them navigate these experiences and pressure is support structures built into the University, like faculty and student success centers, as well as reaching out to friends and family.

Gaby Boada (Physics PhD student)- She investigates Markovian and non-Markovian open quantum systems (theory and computation) in the group of Dr. Jose Morales.

Ariana Castoreno (MS in Mathematics, Math Ed Concentration) - She is investigating Students' Technology Use When Solving Systems of Linear Equations - with Dr. Ben Sencindiver.

Eddie Guajardo (MS in Mathematics, Math Ed Concentration) - He is investigating In-Service Teachers' Understandings of Students' Thinking about Graphs - with Dr. Ben Sencindiver.

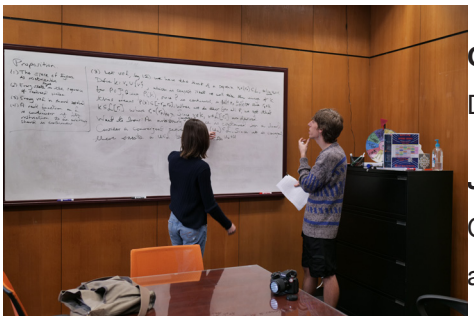
Brandon Lippe (Physics PhD student) - He is in the Morales group and works on Quantum analog of Stochastic Gradient Descent Algorithms (theory and computation).

Yaseen Syed (Masters student)- He is working on designing reinforcement learning systems to discover multistationary reaction networks with Dr. Alperen Ergür.

Taylor Woodard (Masters student) - He is investigating analytical output bounds for neural networks, with applications to differential equations - with Dr. Vu Hoang.

Undergraduate Students

Mariano Alcalde (Math and Physics Majors) and **Aaron Weymouth** (Physics Bachelor)- work in the Morales group on Physics-Informed Neural Networks (PINNs) for non-Markovian Open Quantum Systems.



Olivia Aubone is investigating Topological forcing under the mentorship of Dr. Dueñez and Dr. Iovino.

Jake Borawski, **McCrea Black** and **Taylor Woodard** are investigating Complexity of deep computations under the mentorship of Dr. Dueñez, Dr. Iovino, and Dr. Claire Walton.

Olivia Aubone, **Josh Hamilton**, **Ken Soto** are investigating Random-valued structures under the mentorship of Dr. Dueñez and Dr. Iovino.

David Cantu (Math major) and Taylor Woodard are investigating analytical output bounds for neural networks, with applications to differential equations with Dr. Vu Hoang.

Jonathan F. Derk (Math Major) is completing his coursework in differential equations and has begun working on population dynamics and mathematical modeling with Dr. Mostafa Fazly. He is interested in further developing his knowledge in these areas and in learning more advanced mathematical tools to deepen his analytical and computational understanding.

Melika Golestani (CS and Math majors) is working with Dr. Alperen Ergür: They have completed work and submitted to ICML 26. The work (code and paper) is accessible here: https://github.com/maliawalewski/umich-reu-2025

Caleb Mickelson (Math major) is investigating the relationship between open and closed quantum systems together with Dr. Vu Hoang.

Avery Tovar (Physics senior) and Brandon Lippe - They are in the Morales group and work on a Quantum analog of Stochastic Gradient Descent Algorithms (theory and computation).

Two final notes

- If you have missed any newsletter, you can always find them here: https://sciences.utsa.edu/mathematics/students/newsletters.html
- If you're at the point where you're wondering *why math?* I encourage you to check out *A Word from the Mathematics Chair*: https://sciences.utsa.edu/mathematics/word-from-chair.html

And a spotlight on some of our students and faculty!!!

We finish by highlighting one of our graduate students and one of our undergraduate students. In addition, we are highlighting two of our faculty as well. Each is featured in the last pages of the newsletter. Congratulations Marissa Martinez, Ken Soto, Dr. Eduardo Dueñez, and Professor Erin Lunsford! Keep up the great work!!!

Student Spotlight

Ken Soto

Major: Physics & Mathematics
Hometown: El Centro, California
Favorite color: Teal
Favorite artist: Sublime
Favorite movie: Howl's Moving Castle
Fun fact about you: I used to operate and supervise the operation of the nuclear reactors on the USS Nimitz

What has been your favorite class so far (and why)?
My research classes! From learning pure abstract math to synthesizing and characterizing quantum dots, everything has been so insightful and fun!

What are your career goals?
To become a research professor for mathematics and physics

If you could have one superpower, what would it be?
Body Supremacy

What advice would you give the incoming freshman?
Interact with fellow students and learn from each other. Its much better than learning alone!

Student Spotlight

Marissa Martinez

Major: Mathematics Education
Hometown: San Antonio
Favorite color: Green
Favorite artist: Olivia Dean
Favorite movie: The Phantom of the Opera
Fun fact about you: I think wearing matching socks is bad luck, so my socks never match and always have fun patterns on them

What has been your favorite class so far (and why)?
MAT 5963: Introduction to Math Ed Research because it gave me the first look at what would become my passion. I learned how to analyze research papers, and I got a taste of a little bit of everything when it comes to Mathematics Education Research. (There's so much more to it than you think!)

What are your career goals?
I want to continue teaching and doing research in mathematics education- working on making math classrooms more equitable and welcoming for all students. I also want to be the first woman in my family to get a PhD.

If you could have one superpower, what would it be?
To learn different languages or instruments instantly

What advice would you give the incoming freshman?
Do your best to make time to explore your interests and DO RESEARCH (if you can) at this level! It is so rewarding and you learn so much from faculty mentors! Also, take care of your mental health; there will always be more work to do, and you can't do it if you're burnt out.

Faculty Spotlight

Eduardo Duenez

Undergrad Major: BS in Mathematics
Graduate Degree: PhD in Mathematics
Current research interests: Real-valued logic and the theory of computation (classical, neural and quantum)
Favorite food: Mexican! Pueblan and Oaxacan mole.

Favorite non-academic activity:
Karaoke in multiple languages.

What has been your favorite class so far (and why) Favorite city that you've lived in or visited:
Turin (Torino) in northern Italy

Languages spoked:
Spanish, English, French, some Italian and German.

What advice would you give a student thinking about a career that uses math?
Be passionate and true to yourself, but also flexible: expand your areas of interest and expertise over time. The discipline of thought acquired by doing mathematics (solving problems, being inquisitive, learning to communicate well) is what matters —especially in this A.I. era— whether you are a student, professional, or day-to-day person.

Faculty Spotlight

Erin Lunsford

Undergrad Major: BS in Interdisciplinary Studies with a focus on Mathematics

Graduate Degree: MEd in Mathematics, minor in Adult and Developmental Education

What research and/or teaching interest(s) drive you: My primary interest is math education for college freshmen. Beyond teaching teaching content, I focus on mentoring students as they adjust to college-level learning, especially in math. Many students struggle not because of ability, but because they are still learning how to study math independently. Helping students build confidence, effective study habits, and a sense of belonging in math motivates my teaching.

Favorite Food: Fresh salads with herbs, avocado, and a protein like steak or chicken — preferably with jalapeño ranch. And always milk chocolate.

Favorite non-academic activity: Yoga. I've practiced on and off in San Antonio for nearly 20 years, and the combination of community and stress relief helps keep me grounded.

Favorite city you've lived in or visited: Denton, Texas. I earned my undergraduate degree at UNT and have many meaningful memories from that time, which continue to influence my passion for supporting college freshmen during major life transitions.

Languages Spoken: Fluent in English; currently learning Spanish. I understand more than I speak and continue working toward greater confidence.

What advice would you give a student thinking about a career that uses math: Don't let fear or past struggles convince you that math isn't for you. Many careers use math in nontraditional ways. Focus on problem-solving, persistence, and asking good questions. Struggling often means you're learning something new—with the right support and mindset, math can become a powerful tool.