

THE NEWSLETTER OF THE ROWAN UNIVERSITY MATHEMATICS DEPARTMENT

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Math Team

ADVENTURES

Rowan University's Math Team embarked on many adventures this spring semester—from origami, logic puzzles, and proofs on pavement to mathematics competitions and day trips off campus.

Hello Math Enthusiasts! Spring 2025 was a semester of growth and excitement for the Math Team! Over the semester, the club hosted four club meetings and organized various activities on and off campus including a trip to Washington, D.C. With increased advertising and more activities, the club also attracted students from diverse majors to attend their meetings. It is truly a great time to be a member of the Math Team!

The first club meeting on January 28th was an introductory meeting for the semester where the e-board introduced themselves and discussed activities for the semester. This meeting set up the momentum for the semester ahead!





For the second Math Team club meeting on February 18th, Professor Ira Fine discussed the mathematics behind origami. Professor Fine brought some of his collection of origami projects that students were able to admire. Participants created their own paper cranes as well. Some students donated their creation to be hung in the Math Learning Center in the Mathematics Department! This event attracted so many students and faculty that the room was almost at capacity!

The third club meeting on March 25th was a logic puzzle competition. Participants solved problems individually and in groups. The fourth and final club meeting of the semester on April 29th was an end of semester celebration of how far the Math Team has come over just one short semester! At each club meeting, students enjoyed pizza and socializing with fellow math-lovers!

In addition, the Math Team had a very successful Bake Sale on February 17th. Everything sold at the Bake Sale was home-made by members of the Math Team! The members of the Math Team also created a great display and presentation for their table which attracted numerous customers!

The Math Team hosted and participated in various events in Spring 2025. On March 29th, 12 members of the Math Team participated in the Garden State Undergraduate Mathematics Conference competition individually and as four teams of three. Congratulations to Anthony Segrest who placed 2nd overall and James Turbett who placed 5th overall in the individual



competition out of 70 participants! Also, congratulations to the team of Anthony Segrest, James Turbett, and Nicholas Gocke which placed 2nd overall out of the 24 teams!

On April 25th, the Math Team hosted Proofs on Pavement. Students wrote mathematical proofs on the sidewalks around Robinson Hall. Exciting chalk was also provided including strawberry scented chalk and glitter chalk! This was a fun activity where participants were able to socialize and share their passion for mathematics with the wider Rowan University community by decorating the sidewalks.

In addition to all the other activities the Math Team participated in over the Spring 2025 semester, the Math Team went to Washington, D.C. for the day on April 26th. There were 16 students and 2 faculty members who joined in on the fun of this trip! The Math Team saw some of the Smithsonian Museums and hung out for the day to celebrate a semester of hard work!

To end the semester, a few of the Math Team members and the Math Team advisor, Dr. Rade Musulin, organized and presented a skit at the Mathematics Department Thank You Picnic on May 1st. It was an amazing semester to be a member of the Math Team at Rowan University! We can't wait to see what the future holds for the Math Team!

If these activities interest you, the Math Team may be for you! If you are interested in joining the Math Team, email the faculty advisor Dr. Rade Musulin at musulin@rowan.edu. ■



Equations & Engines

Stacy Evans Shifts Gears Between Teaching and Dirt Biking

Stacy Evans is a dedicated adjunct faculty member for the Department of Mathematics. In 2024, she earned the AFT Adjunct Faculty Award for her outstanding commitment to student centered teaching. Outside of the classroom, she can be found racing her dirt bike. Learn more about Stacy Evans’s dynamic personality, passion for teaching, and adventurous spirit below.

I graduated from Rowan University with a BA in Mathematics and a BA in Education, and after completing my studies, I jumped into teaching high school mathematics at a career and technical school. After a few years, I decided to return to Rowan to pursue a Master of Arts in Mathematics, and since then, I’ve been teaching courses both at a high school and also here at Rowan University.

One of my favorite classes to teach is Quantitative Reasoning. It's always exciting to see students walk into the classroom with a bit of fear or hesitation about math, only to watch that change over the course of the semester. By the end, they often leave the class thinking, “Hey, math isn’t so bad after all!” It's such a rewarding experience to help students realize how math is connected to their everyday lives and seeing that shift in their confidence makes my job feel much more meaningful.

For me, teaching is all about embracing growth—not just for my students, but for myself too. I love learning new things and hope to pass that excitement on to my students, encouraging them to keep exploring and challenging themselves. I always want my students to know that it’s okay to struggle, because that's when real growth happens.



Stacy at graduation for her master’s degree in mathematics.

Outside of the classroom, I enjoy being active outdoors with my husband and two boys (skiing, biking, hiking, kayaking, etc.). One unique passion I've grown into is riding my dirt bike. I got into dirt biking in my mid-twenties, and now, after over a decade of riding a little more each year, I’m taking it to the next level and racing for the first time this year! Life truly is an adventure, and it keeps reminding me that there’s always something new to learn and try—whether that’s on a dirt bike or in a math classroom. ■



Stacy and a colleague at the National Council of Teachers of Mathematics convention in Washington, D.C.



Stacy showing off her AFT Adjunct Faculty Award.



Pi Mu Epsilon Inducts 36 Members



Rowan University's chapter of the national mathematics honor society, Pi Mu Epsilon, inducted 36 new members. The 14th Annual Pi Mu Epsilon (PME) Induction Ceremony was held in April, organized by Dr. Jennifer Hoxworth (PME Advisor) and Gina Magliocco (Mathematics Department Clerk Typist). Many students, friends, and family members were present for the ceremony. Dr. Marcus Wright, the first advisor of Rowan University's PME Chapter, attended the ceremony to congratulate the new PME members. Dr. Christopher Simons, Mathematics Department Chair, and Dr. Dex Whittinghill presented the inductees with their honors cords. Dr. Uma Thayasivam (Mathematics Department Head), Dr. Rade Musulin, and Dr. Chun Pang Lin also attended the ceremony to applaud the students.

The new inductees included: Aliyan Aamir, Nia F. Bellopede, Emma K.

Benkovic, Michael Brandon Busbee, Wilson Cheong, Michael Conrad, Mansi D. Dalwadi, Lucius J. Dinzeo, Madeline E. Dunsmore, Scott R. W. Eno, Austin David Felixbrod, Attanasia Garuso, Julie A. Gerber, Seamus Aloysius Johnson, Jamie Kahle, Max J. Karp, Nicolas Lunt, Andrew D. Malec, Miranda G. Marshall, AnnaMarie K. McMahon, Madison L. Meisner, Erin Miklencic, Jonathan D. Rivera, Julia A. Royall, Ashley T. Servis, Caeley N. Shorr, Mark Smeltzer, Jacob Stigum, Liam P. Taylor, Douglas A. Tranz, Kathy Trieu, Zachary J. Tucker, James Gabriel Turbett, Srivalli S. Valluri, Harrison T. VanDewater, and Glen P. Vosgerichian.

Pi Mu Epsilon is dedicated to promoting mathematics and recognizing students who successfully pursue mathematical understanding. If you are interested in learning more about Pi Mu Epsilon, please contact Dr. Jennifer Hoxworth at hoxworth@rowan.edu.



How Dr. Nasrine Bendjilali Uses Statistics to Decode the Secrets in Our Genes

Dr. Nasrine Bendjilali is a statistician and a data scientist whose research bridges the worlds of statistics and biology. Her specialty is developing new multiple testing procedures —statistical tools designed to carefully separate real biological signals from random noise when thousands or millions of comparisons are being made at once. She is applying these techniques to genetics data, where the challenge is not just collecting massive amounts of genetic information, but figuring out which patterns actually matter. That is where statistics play a critical role.

Imagine trying to figure out which genes are unusually active in cancer cells but not in healthy ones. This is the kind of question biologists tackle every day using a powerful tool called gene expression analysis. To uncover meaningful patterns in all that gene activity, scientists turn to statistics — particularly a method called hypothesis testing.

Let's look at a real-world example: researchers studying ovarian cancer collect tissue samples from patients. Some are from healthy tissue, others from tumors. They measure the activity levels of thousands of genes in each sample — this is what scientists call gene expression. Some genes are turned on, others are turned off, and some stay the same no matter what. Now the big question: *"Which genes are acting differently in cancer?"*

That is where hypothesis testing comes in. For every single gene, scientists ask the same basic question: *"Do we*



have evidence from the data to suggest that this gene is expressed differently in cancer samples compared to healthy ones?"

To answer this question, statisticians calculate a numerical value called a *p-value*. The *p-value* tells us how likely it is to observe a difference in gene expression this large (or larger), assuming there is actually no real difference between cancer and healthy samples. If the *p-value* is very small, scientists consider that gene "statistically significant" and worth investigating further. But there is a catch. Scientists are not testing one gene, they are testing 20,000 genes or more. And even if all those genes behave exactly the same in cancer and healthy tissue, some will still show up as "significant" just by random chance — just like flipping a coin 20,000 times and being surprised when a few long streaks

of heads pop up. This is where *correction for multiplicity* comes in. It is a way to adjust for the fact that when you do lots of tests, some false positives are bound to sneak through.

To correct for the multiplicity problem, one common method is called the False Discovery Rate (FDR). It tells you, *"Out of all the genes you think are different, how many are probably false leads?"* Using FDR correction, scientists can be more confident that the genes they find after correction for multiplicity are truly linked to cancer.

So, hypothesis testing helps scientists find signals in noisy biological data, and multiple testing correction makes sure those signals are reliable. Together, they help researchers zero in on the genes that might matter most, the ones that could explain how cancer grows, spread, or responds to treatment. ■

Exploring Fluid Flow

James Turbett's Experience with Mathematics Research

James Turbett is a dedicated mathematics student whose passion for the subject has led him to pursue both undergraduate and graduate studies at Rowan University. He finished his BS in Mathematics this spring and will return in the fall to complete his MA in Mathematics through the accelerated 4 + 1 program at Rowan University. Through the Mathematics Department, James already has experience in mathematics research and using mathematics for real-world issues. He has worked on multiple different research projects under Dr. Helga Huntley's guidance. He started by studying dispersion properties of the Mediterranean Sea, analyzing observational data and performing a comparison of different methodologies. Recently, James has been working on a research project titled "Stability Analysis and Analytic Solutions to the Lagrangian Kinematic Property Equations" under the mentorship of Dr. Helga Huntley. In simple terms, James is studying how fluid evolves in time. James presented his mathematics research at the Garden State Undergraduate Mathematics Conference in March and his earliest work on the topic is included in a paper that has just been accepted for publication in *Physics of Fluids*. *Vectors* had the opportunity to sit down with James and learn more about his experience with mathematics research.

Vectors: How was your research topic selected?

James: My research advisor gave me options and I chose this one.

Vectors: What is the goal of your research?

James: Predicting how certain properties with fluid evolve in time.

Vectors: What types or areas of mathematics are most relevant to your research?

James: Applied math. There's a lot of differential equations and multivariable calculus. And surprisingly, conic sections and geometry.

Vectors: What does a typical day of research look like?

James: It varies. Sometimes it's just coding and trying to identify a pattern. Or numerically solving a system of differential equations. And then when we find a pattern, we try to prove that pattern on paper. So, one research session might just be coding, and another one might be proving things on paper.

Vectors: Are there tools or software that you use for your research?

James: I'm using almost 100% MATLAB.

Vectors: Is collaboration a part of this research or are you the only student working on this research with the advisor?

James: I'm the only student working on this with Dr. Huntley.

Vectors: Do you work alone or with the research advisor?

James: I do most of my work alone, and then we meet every week and discuss what kind of progress I've made. And then my advisor will have an idea about which direction to go from there or how best to continue.

Vectors: How time-consuming is your research?

James: Some days I'll spend a couple hours working on it. And then there are days that I won't work on it. And the meetings with the advisor are usually about an hour or an hour and a half.

Vectors: How do you handle getting stuck when you are working on your research, if that happens?

James: It definitely happens. I will talk with my advisor about this when it happens. We either try a different approach to take, and if that doesn't work out, we might look at a different but related question.

Vectors: Have you been surprised by anything in your research?

James: I was most surprised by conic sections coming up. This development was pretty recent. The solutions to one case of our system of differential equations ended up just being an ellipse. So, when making those assumptions that it is an ellipse, we were eventually able to prove that it was an ellipse. And I didn't expect ellipses, as well as hyperbolas and parabolas to come up. In solving differential equations, it doesn't seem like they would come up. But they did.

Vectors: What kinds of practical

applications does the research have?

James: Practical applications would involve things like particles that spread out in the ocean. This could be an oil spill or other pollutants. We are looking at the fundamental properties of fluid flow, but from that you can definitely have applications involving anything that you want to track the spread of.

Vectors: Why is this research important?

James: We're trying to find an analytic solution to these systems of differential equations. And we're also trying to analyze the behavior of these solutions in case we can't find an analytic solution. The research is important for the oceanography community because the equations we are using is a model of fluid flow in two dimensions. Also, the findings would be important in interpreting experimental measurements

of the fluid properties we are studying from drifters deployed in the ocean.

Vectors: Has doing mathematics research changed how you see the world?

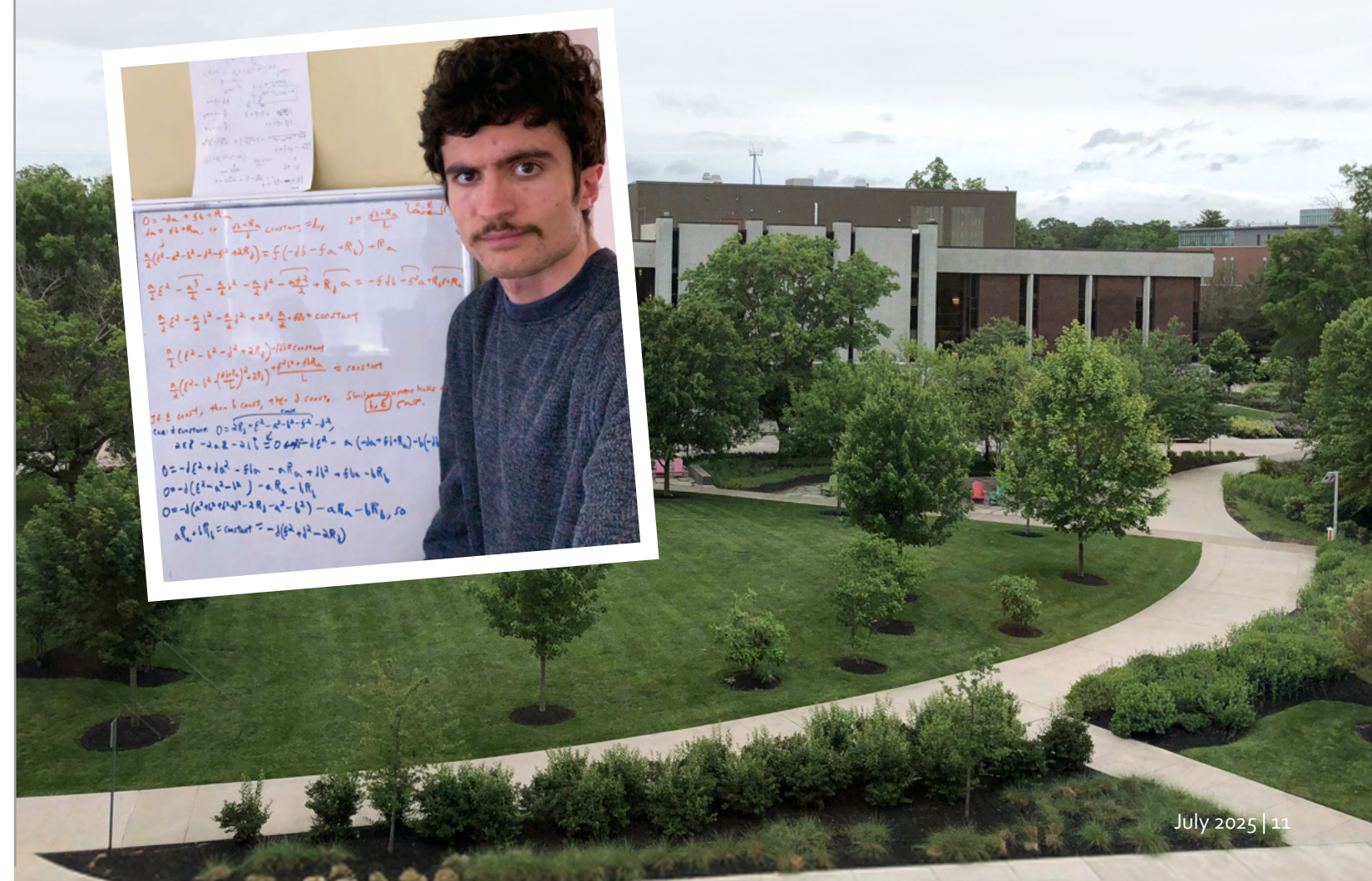
James: I would say so. It's interesting to see the applications of mathematics and seeing math applied to complex problems. I would say it's changed how I see math more than how I see the world.

Vectors: Do you have any advice for other students interested in doing mathematics research?

James: To practice coding. And have a strong foundation in calculus and linear algebra. And to apply to the summer undergraduate research program at Rowan University. I suggest cultivating an attitude of curiosity for all the math courses you take, because you never know what type of mathematics will end up being useful to you in research.

James suggests
"cultivating an
attitude of
curiosity for all
math courses"

James Turbett plans to continue working on mathematics research after college and is considering a PhD in Mathematics. If you are interested in mathematics research opportunities like the ones James has been involved in, please visit the Mathematics Department's website. ■



Association of Women in Mathematics



Spring semester has just flown by and left us with memories of some great activities for Rowan’s student chapter of the Association for Women in Math! Our students planned and held monthly meetings from January through April. They started the semester with a January meeting that allowed the students to reconnect, highlight some women in STEM fields, and to create individual BINGO cards featuring their own accomplishments. A few weeks later, they held a collaborative BINGO night with ACM-W. This has been a favorite event for our students over multiple semesters. At the February meeting, the club met together once again and had something to eat, featured women in STEM, and made some Valentine’s Day cards for donations to share with others.

Before we knew it, March had arrived. Our students hosted Dr. Andra Garner, a faculty member from Rowan’s Department of Environmental Science. Dr. Garner holds a BS in Mathematics and a PhD in Meteorology. She gave a talk entitled, “Variations in Tropical Cyclone Peak Intensification Rates in a Warmer World.” Following her presentation, Dr. Garner allowed time for questions and was able to share her background in mathematics and how that impacted her academic pursuits and her field of study.

Just a few days later, March 31 turned into a beautiful day for the students to have a bake sale. They set up a table outside of the student center to sell cookies, cupcakes and brownies as well as offering a chance to spin a wheel for prizes. It was a successful fund raiser allowing the students to increase their available money to plan for the end of the year. Thanks to all who stopped by to chat and support the club!



As we headed into the final weeks of the semester, the eBoard hosted a second speaker, Hannah Cioffi. Hannah is an alumnus of Rowan, having studied mathematics and statistics as an undergraduate prior to completing an MS in Engineering Management. Hannah is also an adjunct for the Mathematics Department. During her time with the club, she shared her experience as a student, her pursuit of internships, and her current work with InvoiceCloud, Inc.

Finally, the last club meeting of the year arrived at the end of April. Everyone completed an activity focused on identity and belonging. They were then able to discuss aspects of their own statements, personal goals and reflections with each other. Of course, there was also food and one last spotlight on women in mathematics. The evening concluded with an opportunity to vote on the eBoard for the upcoming 2025/2026 academic year.

Two members of the eBoard were graduating this semester. Bella Stefanowicz, the Chapter President, and Jackie Regensburger, the Chapter Vice President and Social Media Chair. Both students have been part of AWM since the beginning of our work to have a student chapter here at Rowan. They were instrumental in making this happen, and we wish them all the best in their future endeavors! ■

Questions? Email advisor
Shannon Miller at
millersh@rowan.edu

Mathematics Department’s Annual Thank You Picnic

The Mathematics Department Thank You Picnic was held at Washington Lake Park to recognize many outstanding students. The annual picnic was attended by current students and faculty members, alumni, retirees, and relatives.

Students who contributed to the Mathematics Department by completing research, participating on the Math Team, contributing to the Association of Women in Mathematics, or volunteering as a mathematics tutor earned certificates of achievement. This year’s students included: Rio Baliga, Luca Barone, Ryan Cahill, Tyler Casas, Cameron Connelly, Michael Conrad, Ryan Correll, Colin Dempsey, Hiep Duong, Zoe Eldridge, Ryan Falcone, Gillian Finn, Nicolas Gocke, Michael Grehlinger, Duwon Ham, Buddhi Hewa Kirindage Don, Jamie Kahle, Aayush Kapri, Mosharaf Khan, Merlie Kirschenbaum, Ryan Kleynowski, Sara Ladik, Mary Lisicki, Richard Musselman, Sam Patel, Carter Profico, Christina Quinn, Jacqueline Regensburger, Jessica Rippman, Anthony Segrest, Brooke Seibel, Eliana Spanola, Arabella Stefanowicz, Jacob Stigum, Luke Tonon, Martin Tuohy, James Turbett, Sean Twomey, Srivalli Valluri, Gianna Watson, Chase Witherspoon, and Abhijit Yadav.



Who to Contact in the Mathematics Department

Department Head:

Dr. Umashanger Thayasivam, thayasivam@rowan.edu

Department Chair:

Dr. Christopher Simons, simons@rowan.edu

Student Affairs Coordinator:

Dr. Abdulkadir Hassen, hassen@rowan.edu

Graduate Program Coordinator:

Dr. Thanh Nguyen, nguyent@rowan.edu

Placement & Program Evaluator, and Data Science Coordinator:

Dr. Ik Jae Lee, leei@rowan.edu

Assessment Coordinator:

Dr. Charalampos Papachristou (Babis), papachristou@rowan.edu

Undergraduate Math Advisor:

Cristine Mason, masonc@rowan.edu



Vectors Editor

Dr. Jennifer Hoxworth

hoxworth@rowan.edu

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