Department of Mathematics

April 28, 2025

UNDERGRADUATE MATH SEMINAR

Math folk at Union unite for the next math seminar!

DATE: THURSDAY, May 1

Time & 12:30 – Refreshments in Bailey 204

Location: 12:50 – 1:45 Seminar in Bailey 207

This seminar, **Professor Matt Lamoureux** from the **University of Connecticut's College of Engineering's School of Computing**, will present the following talk:



Professor Matt Lamoureux

Title: A Gentle Introduction to Text Mining

Abstract: Many of the tools we use to analyze information rely on structure, so we often see data provided neatly in rows and columns (think Excel spreadsheets). That said, lots of data is unstructured yet still valuable; specifically, there is no shortage of written text in our world—books in our libraries, message boards on Reddit, customer feedback on products. This presentation will provide a quick overview of common techniques used in processing unstructured text data.

Pieces from Thesis, by Livi Gwinnett

Livi wrote their senior thesis this past winter under the guidance of **Professor Ellen Gasparovic**.

This past Winter, I wrote my thesis under the guidance of Professor Gasparovic. The paper was inspired by the Max-Flow Min-Cut Theorem in graph theory, which states that the maximum flow of resources from a specified source to sink in a flow network is equal to the minimum number of edges that separate them. I focused on understanding the proof of this theorem, as well as an established algorithm to find the maximum flow. This theorem has many applications in optimizing transportation and communication networks. Additionally, it has applications within the mathematical world, such as Menger's Theorems and Konig's Theorem. Menger's Theorems characterize the connectivity of graphs, both through vertices and edges. Konig's Theorem focuses on bipartite graphs and has many applications in resource allocation.

With these new perspectives, I revisited research I had done a couple of summers ago, which I had called "The Safety Net Problem". This problem aimed to identify reinforcement paths on minimum spanning trees to ensure the connectivity of specific nodes in the case of failure. An example being a town, where the town itself is the graph, roads are edges, and buildings/landmarks act as nodes. Building roads costs money and space, so we want to minimize those resources. However, failure of an edge could look like a tree falling and blocking a road. Without additional routes, parts of the town can become separated. We want to ensure people can get where they need to go.

Finally, after thinking about both topics, Max-Flow Min-Cut and my previous research, I decided to look more broadly at optimization problems. When both problems are applied to the real world, the goal is to optimize resources, but for one problem, that means maximum, and for the other, it means minimum. So, how do we approach problems with opposing optimization goals? The answer is that there is no one best solution, but I was able to learn about different methods depending on the goals of those creating the algorithms.

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For students who are going to write a math thesis, my advice would be not to get stuck on one idea. Start with a topic that interests you, but as you learn more, do not be afraid to shift your focus, or get broader or more specific than you planned. Senior writing is a learning opportunity, and do not be afraid to use it as such.

Summer Research Opportunity in Statistical Mathematics

This summer, Marist College is hosting an NSF sponsored Research Experience for Undergraduates (REU) entitled Statistical Mathematics and Research Training (SMART). The description says, this "... provide[s] a unique opportunity for nine students to engage in original research in statistics, data science, and mathematics, guided by dedicated faculty members. The students will learn proper research ethics, including those related to collaboration, credit attribution, and source citation. Toward the end of the program, the students will prepare a final report based on their research findings, and as a culmination



Application Deadline May 11

of their efforts, they will be able to showcase their research at the SMART REU Conference. Additionally, they will publish their findings in peer-reviewed journals when appropriate.

"The program aims to recruit students with at least a year and a half remaining in their degree program post-REU, ensuring they can pursue subsequent REUs or engage in campus-based research for maximum impact and professional growth before graduation. Beyond developing research skills and mathematical/statistical knowledge, the participants will enhance their communication skills through regular presentations and project updates, receiving constructive feedback from faculty members. They will also be integrated into the social events of Marist's summer research program, offering them interactions with a broader peer group and a gateway to future collaborations." There are several different programs within SMART. CHECK THEM OUT!

News from the Clubs

- Association for Women in Mathematics (AWM). This spring term, the Union chapter of AWM will be holding its meetings on Mondays at Common Lunch in the Math Common Room, Bailey 204. All are welcome!
- Math Club. At last week's meeting of Math Club, elections were held for the leadership positions in the club. Congratulations to Henry Howe and Talha Khan, who were elected to be the Co-Presidents; Mukundan Thanigaivelan was elected Treasurer, and Izzy Petersen was elected Communication Chair.

Movie Night! This week, Math Club will be collaborating with the (Bio)Chemistry club (and Sorum and Messa Houses), and will be showing the movie "Big Hero 6" at **7:00pm on Friday, May 2**, in the Reamer auditorium. There will be popcorn, snacks, and drinks provided. Hope to see you there!

• The Math-Problem Solvers. Under the guidance of Professor Grant Moles, the math-problem solvers continue to sharpen their skills, working on Putnam Competition problems and similar questions every Thursday, 4:00-5:00pm in Bailey 102. No experience needed, just a desire to attempt to tackle interesting problems.

The results are in! This past March 21/22, **Nolan Blake, Dang Duy Hung, Talha Khan,** and **Hunter Gould** participated in the 9th Rochester Institute of Technology Math Competition. Nolan led the way, placing in the top 10 overall, earning an Honoroable Mention for his effort. Congratulations, team!