

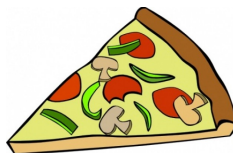
## UNDERGRADUATE MATH SEMINAR

The next math seminar of the term will be

**DATE:** **THURSDAY, January 19**

**Time &** **12:30 – Pizza in Bailey 204**

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



Audrey Benson, '25



Livi Gwinnett, '25

In this seminar, there will be **two speakers**, **Audrey Benson** and **Livi Gwinnett**, both of whom are current **Union undergraduates in the class of 2025!** of the Union College Department of Mathematics will present the following talk. Both Audrey and Livi participated in a Research Experience for Undergraduates (REU – more on these on page 2 of this newsletter!) and they will each discuss the research they worked on.

### Audrey's Talk. Why Knot: Detecting Local Changes in Knots

**Abstract:** When you first hear the word knot, you might think of a tangled pair of headphones or tying your shoes. Your initial thought may not be the definition of a mathematical knot, a closed loop in 3-dimensional space. The study of these knots and their properties is the branch of mathematics known as knot theory.

### Livi's Talk. The Safety Net Problem

**Abstract:** The Safety Net Problem is a variation on the Minimum Spanning Tree algorithm. Given an arbitrarily weighted grid graph,  $G$ , and an arbitrarily selected set of vertices,  $R$ , what is the lowest-cost path that connects every vertex and ensures that if an edge is removed every vertex in  $R$  would still be connected to every other vertex in  $R$ ? We analyze two different approaches to this problem. The "MST-First" algorithm and the "Path-First" algorithm.

### Winter Game Night this Wednesday!

The Union College chapter of the Association for Women in Mathematics (AWM) and the Math Club will be hosting a **game night this Wednesday, January 18 from 5:30-6:30 pm in Bailey 204**, the math department common room. Come and enjoy math games, puzzles, hot cocoa, cookies, and some good camaraderie!

ALL are welcome and encouraged to attend.

### Union Math Alum Delivered Prestigious AMS von Neumann Lecture

In [last week's newsletter](#), we reported about the Union faculty who spoke at the recent Joint Mathematics Meeting (JMM). In addition, we would like to mention that University of California, Berkeley math professor and **Union alum, Professor Nikhil Srivastava '05**, PhD in Computer Science, Yale '10, Polya Prize winner in 2014 delivered the AMS von Neumann Lecture. His talk was entitled, "Four ways to diagonalize a matrix." Congratulations, Nikhil!

**Winter**  
*Game Night*

**18 January, 2023**  
Math Games | Puzzles | Hot Cocoa |  
Cookies | Etc.

**5:30 -6:30 PM**  
Math Common Room (Bailey 204)  
Hosted by AWM and Math Club  
Professors are welcome!

## Summer Research Experiences for Undergraduates (REUs) in Math

Are you interested in learning new mathematics and trying your hand at mathematical research, and getting paid for it? Then consider applying for one of the many National Science Foundation sponsored Research Experiences for Undergraduates (REUs). These are small summer programs that last 6-8 weeks, hosted by several universities and colleges around the United States. This summer, some will be held remotely, and others might be held at the host university. The range of research fields covered by different REUs is wide, including algebra, computational mathematics, differential geometry, data science, discrete math, knot theory, mathematical biology, and many more. There is definitely something for everyone!

**Who should apply?** Math majors, typically in their junior or sophomore year, though some programs accept applications from current seniors. Most applicants to REUs are considering going to graduate school in math and would like to see what math research is about. Most REUs require participants to be US citizens or permanent residents. In terms of coursework, most programs require participants to have at least had multivariable calculus through Math 117, a course similar to Math 199, and/or a course beyond Math 199 that requires proof-writing.

**What are the options and how does one apply?** The primary site listing REUs, their descriptions, the application requirements, etc., is hosted by the American Mathematical Society (AMS). The Mathematical Association of America (MAA) lists several other summer programs in mathematics to consider. The links to these resources are

<http://www.ams.org/programs/students/emp-reu>

<https://www.maa.org/member-communities/students/semester-and-summer-programs>

**Act soon!** Most of the application deadlines to REUs are in February or early March.

**What now?** Go to the AMS website, filter for REUs, browse through the different programs, and get excited by the opportunities. Also, feel free to contact **Professor Jeff Hatley** ([hatleyj@union.edu](mailto:hatleyj@union.edu)), the math department's REU contact, to discuss the different programs and your options.

## Math Modeling Contests ... a Chance to Win Glory and \$\$\$

The 2023 Mathematical Contest in Modeling (MCM) and Interdisciplinary Contest in Modeling (ICM) will take place **February 16-20, 2023**. These are international contests designed to provide students with the opportunity to work as a team to engage in modeling and problem solving, open to students of all disciplines. You will form a team of up to three students, choose one of six contest problems (continuous, discrete, data insights, operations research/network science, environmental science, and policy), and work over 96 hours to develop a solution to a real-world problem.

For contest and scholarship details and past years' problems, go to:

<https://www.comap.com/contests/mcm-icm>.

Training sessions will be provided. Contact **Professor Jue Wang** ([wangj@union.edu](mailto:wangj@union.edu)) if you are interested in participating.



**COMAP's 2023  
MCM®/ICM®  
CONTEST**  
February 16-20

Is your team registered yet?  
The registration deadline is  
February 16, 2023 at 3:00 pm ET

Register today:  
[www.mcmcontest.com](http://www.mcmcontest.com)

COMAP's Mathematical Contest in Modeling (MCM)® / Interdisciplinary Contest in Modeling (ICM)® is an international math modeling contest for undergraduate students. It is designed to provide students with an opportunity to work as a team to engage in and improve their modeling, problem solving, and writing skills.

Questions? Email: [mcm@comap.com](mailto:mcm@comap.com)

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