girls TALK math

PROMOTING GIRLS IN MATHEMATICS

UMD GTM SPRING EVENT 2021

MAY 22, 2021

VIRTUAL PLATFORM: ZOOM

SCHEDULE

1:00 – 1:15	Welcome
1:15 – 1:35	Icebreaker
1:35 – 2:35	Speaker: Dr. Melinda Lanius
2:35 – 2:50	Break
2:50 – 3:50	Speaker: Noemi Glaeser
3:50 – 4:00	Closing

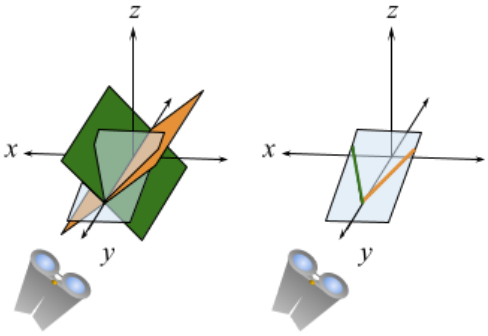
THINGS YOU'LL NEED:

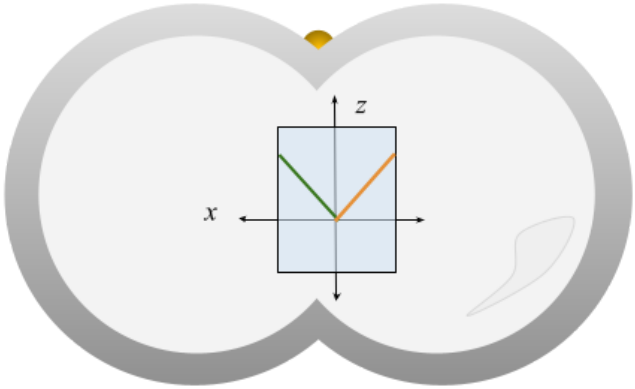
- Pencil and paper
- Google account
- Access to Zoom and a computer

THROUGH THE LOOKING-GLASS:

TO AT LAST SEE ALGEBRAIC SUBSTITUTION

Speaker: Melinda Lanius, PhD





Abstract: In 8th grade I learned how to solve a system of linear equations by a process called substitution. For example, to solve the system x + y = 2 and x - y = 0, I could solve for x in the first equation:

$$x = 2 - y$$

and substitute this expression for x into the second equation:

$$2 - y - y = 0.$$

So $2 - 2y = 0$, $2 = 2y$, and $y = 1$.

We plug y = 1 back into the first equation and find that x = 1.

But why did I solve for x in the first equation? Couldn't I have solved it for y? Or could I have solved for x in the equation x - y = 0 instead? My teacher told me that it didn't matter which I chose, that it's all the same and will get you to the same final answer. Just do what is easiest.

How could these substitutions be the same? They're different symbols and equations; surely it means something!?

Celebrating My PhD graduation - note my cool hat - with fellow Wellesley Alum Ran (pictured on the right)

Abstract, continued: I found no satisfactory explanation, and eventually let my confusion and incredulity slip out of mind. I passed 8th grade algebra and went to high school. I passed algebra II and went to Wellesley college. There I passed linear algebra, abstract algebra, and algebraic number theory.
At the University of Illinois, I took graduate level math courses in algebraic topology I - III and wrote a dissertation where I used algebra!

And still.... I did not know:

What is substitution? Like, really?

This year, after 15 years of study, I at last have an answer to my 8th grade question. It is visual and concrete and beautiful! I am excited to share my new found insight with you and to hear about what questions have been bothering you? What answers aren't satisfying? Come peer through the looking glass with me.

MATHEMATICALLY SHARING SECRETS

Speaker: Noemi Glaeser

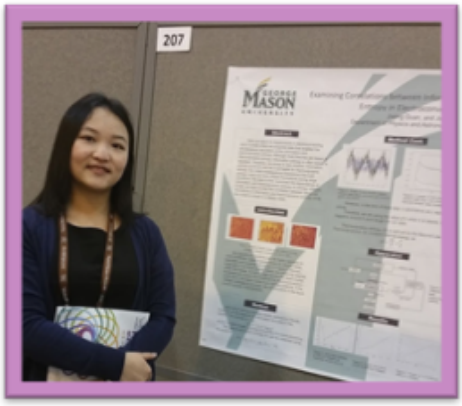
Abstract: Splitting secret information into pieces, known as "secret sharing", is a useful technique for hiding information while still allowing it to be recovered under certain conditions. It is also a building block for secure multi-party computation, which is used to construct privacy-preserving systems such as secure contact tracing. Best of all, secret sharing can be built out of nothing more than random numbers and basic polynomials! In this talk, we'll learn about how secret sharing works before sharing our own secret messages.

Noemi Glaeser is a second-year Ph.D. student in computer science at the University of Maryland and the Max Planck Institute for Security & Privacy in Bochum, Germany. She studies cryptography, specifically multi-party computation. Noemi earned Bachelor's degrees in math and computer science from the University of South Carolina in 2019. In her free time, she likes to practice flute, read, hike, and play Dungeons & Dragons.

ORGANIZERS

Sarah Burnett attended the University of North Carolina at Chapel Hill and received a Bachelor of Science in Applied Mathematics with honors, a Bachelor of Arts in Physics, and a minor in Hispanic Studies there. She then worked as a computational physicist at Los Alamos National Laboratory as part of their post-baccalaureate program. Now she is a PhD candidate and National Science Foundation Graduate Fellow working on the 3-meter spherical Couette experiment as well as using computational mathematics to simulate it. In the winter, she will become a Hedrick Assistant Adjunct Professor in the UCLA Department of Mathematics with a specialization for Program in Computing.

Jiajing Guan (JJ) is a second year PhD candidate in the AMSC program. She graduated from George Mason University in 2019. As a researcher, she is interested in numerical methods for PDEs. As a female mathematician, she wants to encourage young generations of girls to engage in STEM fields without societal prejudice. She recently joined Girls Talk Math after talking to her classmate Victoria. She is excited for the future events to come.



Angela Robinson is a mathematician in the Computer Security Division of the National Institute of Standards and Technology (NIST). She completed her Bachelor of Science degree in Mathematics at Baylor University. At Florida Atlantic University she completed her Master of Science and PhD in Mathematics, and the FAU Cyber Security Graduate Certificate. Her research focuses on mechanisms to solve real-world challenges pertaining to information privacy (the data your phone collects, etc.) and quantum-resistant cryptography.

Victoria Whitley is a second year graduate student in the Applied Mathematics, Statistics, and Scientific Computing (AMSC) program at the University of Maryland. She completed her Bachelor of Science in Applied Mathematics, with a minor in Women Studies at the University of North Carolina. Her research involves applying computational fluid dynamics to study the ocean. Looking forward, Victoria hopes to continue mentoring other women in math, as so many have mentored her thus far.