Puget Sound Council of Teachers of Mathematics

December 16, 2022





Puget Soundings



We are excited to present, Rona Gurkewitz, as our February 6, 2023 speaker for our return to in person dinners! She will speak on: *My 50 Year Journey with Origami, Math and Polyhedra*

December 16, 2022

Happy Winter Break!

Editor: Joyce Frost (frostjoycee@gmail.com)

Save the dates!

PSCTM 2023 Dinner Presentations: February 6, 2023 May 15, 2023

Board Meetings: January 23, March 13, April 17, June 12, 2023

Join us for our in-person presentation, **February 6, 2023** featuring Rona Gurkewitz, who will share with us, "My 50 Year Journey with Origami, Math and Polyhedra." Be prepared to do some Modular Origami!

Season's Greetings PSCTM members!

It's that time of year when the temperature drops, the daylight hours decrease, and we countdown the hours to our winter break. At a staff meeting this week, we were asked to share one thing we were most looking forward to during our well-deserved time off. The top answers were connecting with family and friends and getting some rest.

In the new year, we look forward to hosting our first inperson dinner event in 3 years. Prior to spring, 2020, we had our three annual events at Bishop Blanchett HS. The PSCTM February dinner, will be a wonderful way for our members to meet in person and once again, make meaningful connections with other local math enthusiasts. More details soon in the flyer which will come out in early January!

We hope you'll carve out time to get cozy and read this Puget Soundings edition. Maybe you'll enjoy a favorite warm

drink and snuggle in your NWMC blanket! Perhaps you'll find something that sparks your curiosity to learn more about a topic, or an idea that will brighten your classroom. We wish you the very best as we wrap up 2022. See you soon in 2023!Cheers and best wishes, *Traci Cotton, PSCTM President*



Jane Bissonnette - Past President, Secretary, Joyce Frost – Program, Newsletter, Jane Hunter - Newsletter, Art Mabbott – Treasurer, NCTM Rep, Joe Frost - Web Page, Laura Beckett, Maryke Haynes - Equity, Angela Ensminger – Membership/Social Media,







"Christmas Wreath" by Bennett Arnstein made from 10 interlocking truncated octahedra, each made from 24 "one piece triangle modules" from Rona Gurkewitz and Arnstein's book, "3D Geometric Origami: Modular Polyhedra", Gurkewitz and Arnstein Dover 1996.

Rona Gurkewitz: February 6, 2023 PSCTM Dinner Speaker! You do not want to miss this in person event! Come do Origami with Rona!

Rona Gurkewitz became interested in origami after meeting origami pioneer <u>Lillian</u> <u>Oppenheimer</u> at a dinner party and becoming a regular visitor to Oppenheimer's origami get-togethers.^[2] She has written several books on origami, exhibited works at international origami shows,^[2] supplied a piece for the set design of the premiere of the <u>Rajiv</u> <u>Joseph</u> play *Animals Out of Paper*,^[4] and has made modular origami quilts as well as polyhedra.^[2]

With retired mechanical engineer Bennett Arnstein,^[2] Gurkewitz is the coauthor of:

- 3D Geometric Origami: Modular Origami Polyhedra (Dover, 1996)^[5]
- Multimodular Origami Polyhedra: Archimedeans, Buckyballs and Duality (Dover, 2002)^[6]
- Beginner's Book of Modular Origami Polyhedra: The Platonic Solids (Dover, 2008)

With Arnstein and Lewis Simon, she is a coauthor of the second edition of the book *Modular Origami Polyhedra* (Dover, 1999), extended from the first edition by Arnstein and Simon.^[7]

Mathematical Gift Ideas for Family Members and Colleagues! – Joyce Frost At this time of year, I try to give gifts that will have lasting appeal and will work with a variety of ages and experiences. Two of my all-time favorites are **Blokus** and the game **Set**. **Blokus** even has a travel edition for two players that is also quite fun. As we recently experienced while visiting our grandchildren in Switzerland, Blokus and Set both are big hits with elementary aged students as well as with adults of all ages. After playing **Blokus** with me, our granddaughter played it with her friends when they visited, explaining the rules carefully. She also spent time trying to arrange the pieces into a rectangle (much like Tetris). This reminded me of the Pentomino tiles and the various rectangular grids that can be formed – a nice class challenge! Joe spent a couple of hours playing **Blokus** with our grandson, "letting our grandson beat him".



I also brought magnetic pattern blocks, which were a huge hit. We found a magnetic cookie sheet which worked perfectly.



PSCTM Executive Board Elections

The Puget Sound Council Teachers of Mathematics has two elected positions on the executive board: President and Programs Chair.

At our meeting in February we will vote to fill these two positions.

Angela Ensminger has been nominated for President and Joyce Frost has been nominated for Programs Chair.

If you are a member of PSCTM, and have interest in serving on the board, we would like to hear from you.

There are a variety of ways to serve our council. Please email Traci Cotton, PSCTM President, at <u>tcotton@everettsd.org</u> if you're interested in a leadership position. Thank you! - - Traci Cotton, PSCTM President

"We admit it - we're math-lovers.

We love the wonder and beauty in math, how it helps us understand the world we live in and dream up ways to improve it. We exist to inspire kids to feel that way too. We love the beauty in an elegant proof, the mathematical relationship between notes in music, and finding a Fibonacci sequence in a head of cauliflower." - - SUMM



PSCTM Zoom Fall Dinner

Monday, October 24, 2022 on Zoom **About Seattle Universal Math Museum – How to Add Yourself to SUMM's Equation**

Tracy Drinkwater: President and Founder of Seattle Universal Math Museum

What a delight it was to hear SUMM Founder + President, Tracy Drinkwater, talk about this exciting new museum project and all that they have going on currently as well as plans for the future! My new Year's resolution is to get involved with this exciting new project. We look forward to lots of excitement to come!

Tracy is the current acting Executive Director of SUMM. She has been an educational consultant, as well as a part-time instructor in the College of Education at Seattle University. As a former Special Education and Math teacher and a former School Board Director, she specializes in the concepts of math identity and promoting math as an accessible and equitable subject for all learners.

Tracy earned a BA in Economics at the University of California at Santa Barbara, an International MBA from the Thunderbird School of Global Management, and a Master in Teaching from Seattle University



SUMM will build a dynamic museum to house engaging math exhibits, hands-on experiences, programs, and play areas, focused on 3rd to 8th grade.

Receive Clock Hours for PSCTM events!

For attending one or more PSCTM events: Fall 2022, Winter or Spring 2023, you can receive 1 ¹/₂ clock hours per presentation. Email art@mabbott.org after the event. **PSCTM's Clock Hour process:**

- Request clock hours for any one of the events
- Art will send you an evaluation form
- Complete evaluation form and email to Art
- Art will send you the clock hour form for the event
- Complete clock hour form and keep for your records. (Email Art if you have questions)

Follow PSCTM on social media! Share your lesson ideas, news with us, too! @PSCTM



Congratulations to these PSCTM members who presented at the 61st NWMC in Tacoma, October 13-15, 2022!

Jane Bissonnette: Fun and Games in Math Class **Traci Cotton:** Planting Seeds & Watching Them Grow: Cultivating a Coaching Cycle **Angela Ensminger:** Unified Robotics – A Special Olympics program **Joe Frost:** Overlooked Math Influencers **Joyce Frost:** Embrace the Mathematical Practices by creating 3-D Puzzles Jim King: How Rigid Motions Can Change a Geometry Course Maryke Haynes: Ignite coordinator: Launching for a Rewarding Career in Education: A Panel **Jane Hunter: Ignite Speaker!** Art Mabbott: Tetrahedron Kite Building **Diane White-Shaw:** Promoting Flexible Thinking: Working with Students with

Learning Disabilities in the HS Setting









Jim King







Joe Frost

Maryke Haynes



Diane White-Shaw Jane Bissonnette









Diane, Alex, Joyce

Jane & Joyce – Sponsored Dinner Dr. Seuss Math.

Dr. Berry – Opening Keynote Layla Nuir – Closing Keynote

It is better to solve one problem five different ways, than to solve five problems one way. George Pólya

No snowflakes are the same. These stunning close-up photos are proof ...

"Stellar dendrites, the snowflakes so often featured on holiday illustrations, form when water vapor combines with dust in clouds and freeze. Once an individual water droplet freezes, the tiny piece of ice acts like a sponge absorbing more water vapor from the air, causing the ice to grow. Other unfrozen water droplets in clouds evaporate and condense onto the ice.

"The liquid first evaporates and then the vapor deposits on the snowflakes," Libbrecht said. "It takes about 100,000 droplets to make a snowflake because the droplets are very small." It takes just over a half an hour before a crystal grows to a few millimeters in size. Once the crystals are heavy enough, they fall."

Snowflake photographer Jason Persoff's studio is his back deck. Using only a black wool sock, a camera, a table and some lights, he has been capturing snowflake pictures for 6 years. It takes nearly 40 high-focused images stacked on top of each other to create one snow photograph.



I recently found this Top 10 List I created for a Math Department presentation that we did at Lake Washington HS for a faculty meeting. We gave a short presentation on the math department, our classes, and philosophy. To keep it light, I added this Top 10 List. I hope that you find it amusing, too! - - Joyce Frost

Top Ten Reasons To Teach Mathematics (side note, our mascot is the kangaroo!)

10. Math is everywhere!

- 9. You get to say, "rhombi truncated icosidodecahedron".
- 8. Graphing calculators are so ... powerful.
- 7. Fractals, fractals, fractals!
- 6. Mathematics enables students to create the most gorgeous art projects.
- 5. You have an excuse to watch *Donald Duck in Mathemagic Land* every year.
- 4. You can confuse anyone, anywhere, anytime in five minutes or less.
- 3. You can sing weird songs to help you remember formulas.
- 2. Teaching probability involves cards, dice, marbles... useful skills in Vegas!
- 1. Lots and lots of math manipulatives are EDIBLE!



National Ugly Sweater Day – December 16, 2022!

The Ugly Holiday Sweater - - - Traci Cotton

Admit it. You likely have one. I have several. My new puppy is even joining the ugly sweater movement. It's challenging not to get swept into the fun of the Ugly Sweater tradition.

At our school we've recently begun holding an annual Ugly Sweater Contest for our staff. Last year, when many of our students and staff were wearing masks in the building, we even had people making ugly masks to go with their sweaters. The masks were simply hilarious with their pom poms, sequins, and puffy paint décor.

There are several awards given out for different categories. Staff members arrive to school, drop by the office to have their photo taken in their fashionable frock, photos are displayed in the staff lounge, and staff members are given tickets to vote for their favorites. The votes are tallied at the end of the day, and we gather near the office for the results to cheerfully celebrate the winners.

Prizes are typically quite silly like a rubber chicken, or some other gag gift. This year, December 16, 2022 is Ugly Sweater Day? It's celebrated the third Friday of December.

The first official ugly sweater day was in 2002 in Vancouver, BC. The origin story of this festive tradition was a themed party to raise money for a friend's cancer treatment.

The ugly sweater trend is growing every year. You'll find them for sale everywhere from the grocery store to the pharmacy to the hardware store! Tipsy Elves, which appeared on the tv show Shark Tank in 2013 sells about 6 million holiday sweaters each year. The ugly sweater became a trend in the 1980s after pop culture comedies such as National Lampoon's Christmas Vacation delighted audiences with Clark Griswold (Chevy Chase) sporting holiday fashions.

You don't have to spend much money to join the fun. Many people enjoy hunting through the racks at a local thrift shop. It's also quite popular to create your own. Grab a hot glue gun and some crafty decorations at the dollar store or craft store and let your imagination go wild. There are plenty of DIY videos on YouTube, and ideas on Pinterest too.

From 2012 to 2015 the Ugly Sweater Industry grew 200%.

Maybe you'll get creative and make a fun sweater this year with a *mathematical* twist. Warm wishes to you and all the best no matter what you wear this season!





Are you an NCTM member? The *Mathematics Teacher* includes great puzzles like this December puzzle a day!



The GCHQ Christmas Challenge 2022

The Challenge returns for a second year with a series of fiendish brainteasers and a final twist! Based on the seven disciplines featured in the recently published Puzzles for Spies book, the #GCHQChristmasChallenge tests the lateral thinking, ingenuity and perseverance needed by those working here at GCHQ across our missions to keep the country safe.

Download the Christmas Card puzzles here. You can download the answers here.



Young people who enjoy the Christmas Card puzzles and are interested in developing their cyber skills are encouraged to take part in the National Cyber Security Centre's <u>CyberFirst</u> <u>activities</u>, or find more brainteasers in the <u>puzzles</u> <u>section</u> of our website.

Spirograph pattern generator - - - Joe Frost

Sometime around fifth grade, I found a way to make art without having to be good at drawing. A spirograph set fascinated me and I set out to try all the wheels in all the combinations to see how the different wheels and pen holes affected the drawings. There are two basic ways to draw with the spirograph: holding a ring steady and running a wheel inside it or holding a wheel or ring steady and running a ring around the outside. I've since learned that the first is called a *hypotrochoid* and the second is called an *epitrochoid*.

In a hypotrochoid, the ratio of the diameter of the inner circle to the enclosing ring determines how many points or loops the drawing will have. You can change the size of the loops by changing how far the pen is from the center of the inner disk. For example, if the ratio of the inner disk to the outer ring is 1:2, then the drawing will have two points and can range from being a straight line when the pen is at the outer rim of the inner disk, through being an oval. The drawing ends at being a circle when the pen is in the exact center of the inner disk.

A 1:3 ratio of the diameter of the disk to the ring yields a shape that has three points, a 1:4 ratio yields a shape with four points, and so on. Choosing the ratio of 3:9 yields the same shaped diagram as 1:3, but three times as large.

The diagrams start being actually pretty once you choose larger numbers that are relatively prime. For example, the diagram for 15:23 with the pen set 2/3s out from the center of the inner disk looks like the first diagram. If you choose several positions for the pen and change colors, you can make a diagram like the second. I created these using an online version of the spirograph at this link: <u>https://sciencedemos.org.uk/spirograph.php</u>



The online version is much faster than my trusty plastic toys, but it scales all the drawings to the same size, so a 1:3 ratio drawing is the same size on the screen as a 30:90.

A second interesting observation is that the number of points is determined by the second number in the ratio and the number of times the inner disk has to travel around the ring is determined by the first number in the ratio. You can see this by choosing "Animate construction" in the link above. The link shows how the pen retraces its path if the ratio can be reduced. For example, a 3:9 ratio causes the application to draw the same diagram as a 1:3 ratio three times. If you are interested in the mathematics behind this, <u>check out this link</u>.

Lurking Variables ... Correlation vs Causation – Jane Hunter

In today's news we are inundated with numbers, graphs and half-truths (if even that). We expect our students to be able to successfully navigate through it all with no problems. It's about this time of the year in Algebra 1 when we are finding the best fit line. A great review in Algebra 2 that I like to give my students is fun graphs with actual statistics. I then ask some interesting questions for them to ponder... For example, did you know that the more ice cream a person consumes, the more likely they are to drown? They will usually scoff at this. So, I show them the data and we plot it. I smile and ask, "so this isn't made up? What's really going on here?" Someone eventually says something like, "Oh Ms. Hunter - it's the summertime and people eat ice cream and probably swim more! So, more deaths by drowning."

So, ice cream doesn't **cause** downing, it is simply **associated** or **correlated**. The missing link was *summertime*. <u>Click here</u> for a great article with two videos to describe this idea. (Engaging Adults in Science and Energy (EASE) was a Penn State project supported by a National Science Foundation STEM grant that spanned five years from 2012 through 2016).

Here are links to the two videos. <u>How ice cream kills! Correlation vs Causation</u> <u>Correlation vs. Causality: Freakonomics Movie</u>





Statistical Correlation, Causation, and Lurki... www.thoughtco.com

Correlation and Causation in Statistics

Some other fun correlations are:

The more fire fighters there are at a fire, the more damage happens at that fire. The taller an elementary student is, the better reader they are.

The more computers there are per person in a country, the higher life expectancy there is. All of these have **Lurking Variables** that seem to link these events together. Eventually, I can remind students to be more thoughtful when information comes their way, to keep their minds open and to watch out for those Lurking Variables! "Correlation does not imply causation."



61st NW Mathematics Conference Reflection - Maryke Haynes

October 13-15th, math educators from all over the Northwest and beyond joined together in person for the first time in three years! While the attendance was lower than 2019 (just over 500), the energy and gratitude for being able to gather together was tangible. We were grateful to be back at our familiar Greater Tacoma Convention Center and Hotel Murano, coordinated by our Facilities and Tech Chair Dan Herforth. With two event spaces and sharing the spaces with other groups, the committee had to think flexibly and proactively for our committee and attendees. Beginning with the theme of "Math: You Are Invited", the committee worked through every element of the event with the lens of inclusion. Keynote events, arranged by our Program Chair Cheryl MacIntryre, included Dr. Robert Q Berry III, Allison Hintz and Laila Nuir, all of whom spoke of strategies for including all voices while attending our own needs as educators. The Ignite event featured classroom teachers, including PSCTM Board Member Jane Hunter, and proven champions of teachers who inspired us all to continue making a small difference in the lives of our students. Our exhibitors continued our invitation by sponsoring many events, coordinated by Exhibits Chair Molly Daley, that provided a fun atmosphere with delicious food and drink.

We committed to embracing early career and pre-service teachers with a special event featuring a panel conversation with PAEMST Finalist and honorees including a reception sponsored by the Office of the Superintendent of Public Instruction. Math Teacher Educators worked with their new college students to create a new event R-cubed (Recent Research Roundtable), formerly Math-O-Rama, to present recent learning in a friendly, conversational way. I hope both of these events are able to continue in future conferences.

PSCTM Board members really shined, not only as presenters but also as committee members! Joe and Joyce Frost were incredible resources throughout all phases of the event with invaluable experience in many areas. Jane Hunter provided support to publicity throughout the planning process. Angela Ensminger was fantastic at maintaining social media for communications and events before and during the conference. Traci Cotton also supported social media as well as coordinating the free gift, a cozy blanket, and lovely t-shirts for committee members and volunteers.

I am particularly proud of the work our committee did in the last few days to address concerns that arose after the NCTM conference in California. We quickly pivoted to ensure the safety and comfort of all our participants, including Social Distance Stickers to indicate comfort levels, supporting presenters who preferred full masking, and locating and advertising genderless bathrooms. Post-Conference feedback shows that some still would have liked further COVID protocols in place, but our lower attendance helped minimize packed rooms and allow attendees to create space as needed. Our mindset allowed us to address feedback quickly and remain open to possible improvements.

Enjoy some of these Ignite photos! Special thanks to all the great Ignite speakers!



Unified Robotics – Angela Ensminger

Unified Robotics is a program that brings together students with intellectual disabilities with partners to compete in robotics competitions. Using LEGO robots, students build and program robots to fulfill a goal. This year, they worked to find and clear a field of obstacles faster than other teams.

On December 4, 2022, the Washington State Championships were held at Liberty High School in Renton. 27 teams competed in preliminary and elimination matches. Middle school students from St. Madeleine Sophie in Bellevue won the gold medals as the 2022 champions. Students also won recognition for technological accomplishments and team dynamics. Every student goes home with an award for their efforts.

Middle and high school programs can compete, and support is given through Special Olympics Washington for all teams. Training is given for coaches. Computers and kits are available to borrow.

For more information on how to start the program at your school, contact Special Olympics Washington (<u>https://specialolympicswashington.org/</u>) or Unified Robots (<u>http://unifiedrobotics.org/</u>) or you can talk to Angela Ensminger (<u>aensminger@stmadsophie.org</u>)



Liked by tinibot10 and 48 others smschoolbellevue Our Champion Robotics team got to demo all their winning robots at lunch today!!! #robotdemo











Three Boxes in One!

Math Magic in packaging! I can't wait to do some analysis and create one of these myself. I may have to have my grandson send me the template...

Math fun – Jane Bissonnette

Have you heard of the *Kruskal Count*? I just recently came across this fun probability-based math trick. Martin Kruskal was a mathematician and physicist. David Copperfield, renowned magician, used this concept to perform a "magic trick" on television where he would predict the numbers the viewers had chosen. The Kruskal Count is based on the output of a Markov chain. (I'll let you look that up your own.)

Here's how to play in your classroom. Set up a drawing that looks like an analog clock (remember those?) with the numbers, one through twelve, twelve being on the top. Students silently chose any number on the clock. Starting at the 12, they spell out the number they have chosen, moving around the clock for each letter. For example, if they had chosen one as their number, they would point at 12 for "o", 1 for "n" and 2 for "e". Now this particular student is on two on the clock. For the next round they would spell two going around the clock again beginning at the two. At this point there is a little showmanship as you tell the students that based on your magical powers you can tell that they are not on the 2, 4, 8 or 12 and you erase or remove those numbers from your clock. You then do one more round of counting with those numbers removed and then reveal that all the students are on the number 6!

The following website walks through an example game and provides the mathematics behind the Kruskal count: <u>https://youtu.be/j94VUp6NZEg</u>.

The picture below shows the possible moves for each round.





Check out this 7-piece Soma Cube puzzles available at Target! At the 61st NWMC, Tracy Drinkwater had a set at the SUMM booth. They are \$189.99 at Target, but would be a wonderful thing for a classroom!

ECR4Kids Foam 7 Piece Soma Cube Puzzle

Origami Santa Stars



https://www.youtube.com/watch? v=HvTQDV200es&t=6s



Step 1: Cut out your pentagon



Step 2: Folding in half - 5 times Unfold between each fold. Make sure your creases are sharp!

Put the printed side down. Fold at each corner in half.



Step 3: Fold the bottom up so that the corners touch the folds in the top

Unfold and do it 4 more times for each side.



Step 4: Fold the left side while also pushing up from the bottom fold. Crease.

Unfold and do it 4 more times for each side.



It should look like this now. The highlighted folds are the ones we just did.



Step 5: Start with the unfolded pentagon. Squeeze all the corners at the same time and squish to the center. They should slip under each other.



It should look like this now:



Step 6: Flip over. Fold the right side to the center. Rotate clockwise and repeat for all sides.



All done!

