

Points & Angles

Newsletter of the Metropolitan Mathematics Club of Chicago
Volume XLIX No. 2 Oct. 2019

The Art of Logic in an Illogical World

November Speaker Eugenia Cheng



From I-90 & Southbound I-294: Exit at I-190 West to O'Hare; Exit onto North Mannheim Rd.; Take Mannheim Rd. North 2.25 miles.

From Northbound I-294: Exit at West Touhy Ave.; Take Touhy Ave. to Mannheim Rd.; Turn right on Mannheim Rd.

Public Transit: Take the CTA Blue Line to the Rosemont Bus Terminal; Take Pace Bus #223 to Touhy Ave. & Lee Rd.; Walk East on Touhy to Mannheim Rd.

Friday, November 1, 2019

Doors Open/Social Hour: 5:45 PM

Dinner & Talk: 7:00 PM

Fountain Blue Banquet & Convention Center

2300 Mannheim Rd., Des Plaines

847-298-3636

\$43 for Members, \$49 for Nonmembers

Reserve by noon, Monday, October 28

Online at mmcchicago.org

or by phone at 847-486-4291

For thousands of years, mathematicians have used the timeless art of logic to see the world more clearly. Today, truth is buried under soundbites and spin. Arguments are becoming more and more divisive, and seeing clearly is more important than ever. In this talk, Eugenia Cheng will show how mathematics can be used to understand what people are really telling us. Taking a careful scalpel to politics, privilege, sexism, and other real-world situations, Cheng will show how math can help us find clarity without losing nuance. These are surprising topics Cheng has addressed to convince math-phobes and skeptics that abstract math has a purpose and that broad applicability is one of the powerful consequences.

Dr. Eugenia Cheng is Scientist In Residence at the School of the Art Institute of Chicago. She won tenure in Pure Mathematics at the University of Sheffield, UK and is now Honorary Visiting Fellow at City, University of London. She has previously taught at the Universities of Cambridge, Chicago and Nice and holds a Ph.D. in pure mathematics from the University of Cambridge. Alongside her research in Category Theory and undergraduate teaching, her aim is to rid the world of “math phobia”. Her first popular math book, *How to Bake Pi*, was published by Basic Books in 2015 to widespread acclaim, including *The New York Times*, *National Geographic*, and *Scientific American*. She was interviewed around the world, including on the BBC, NPR, and The Late Show with Stephen Colbert. Eugenia was an early pioneer of math on YouTube and her videos have been viewed around 15 million times to date. Her next popular math book, *Beyond Infinity*, was published in 2017 and was shortlisted for the Royal Society Insight Investment Science Book Prize 2017. Her newest book, *The Art of Logic*, was published by Profile and Basic Books in July 2018. Eugenia is also math columnist for *The Wall Street Journal*, a concert pianist, and founder of the Liederstube.

Points from the Interior

by Matthew Moran

Greetings MMC Members,

The recent talk we hosted with NCTM President, Dr. Robert Berry, was a great way to start the school year. Dr. Berry was talking about Catalyzing Change in schools, and he was advocating for some radical changes in our schools. The two big ideas that stuck with me, and that I have been thinking about since, were detracking students and detracking teachers.

Detracking teachers is perhaps a less discussed and less controversial recommendation. The idea is to distribute the teaching load more evenly across a department to avoid new teachers being “stuck” with the lower-level, introductory courses. This is certainly an issue of access for students that are, for whatever reason, enrolled in these lower-level classes. If these lower-level or “regular”-level (vs. honors or accelerated or double honors or AP...) courses are usually taught by the least experienced teachers in the department, then the students in these courses move through the entire curriculum without ever benefitting from the improved teaching that only experience can produce. Surely there are fantastic teachers that are still early in their careers, but they will almost always be better teachers with a few more years of experience.

Are we comfortable with our newest teachers teaching the most advanced courses? Will the students in these advanced classes get as much from the course as when it is taught by an experienced teacher? Probably not, but is a higher-level course more important than a lower-level course? I hope you’d agree that we need high-quality teachers in ALL of our classes. Does moving teachers around really solve anything? I’d argue that it does in that all students will have access to experienced teachers at some point in their progression.

I think an appropriate response to this problem is to consider which teachers go where but also to provide more support and mentoring for newer teachers across the board. If a teacher has access to good curricular materials, access to a mentor with teaching expertise and experience, and frequent observations with feedback from more senior members of the department, then I’d be happy with them teaching any class. Teaching any course is demanding in some way. The extremes on the high and low end are probably the most demanding, but all teaching is demanding, and we need great teachers anywhere we can get them.

The recommendation to “detrack” students also addresses some of the problems with tracking teachers. If there is only one level of each course, there is one fewer dimension we need to distribute our teachers over.

I sensed some skepticism in the room about detracking during Dr. Berry’s talk. One of the common questions is “What about the extremes?” Will higher-performing students be bored and lower-performing students be overwhelmed? A fair question, and a great argument for differentiated instruction. This is something that is easier said than done but important in every classroom and possibly even more important in a detracked classroom. Designing curriculum that has different points of entry and exit is a great way to differentiate. This is easy to do with mathematics as there is always another generalization you can look at. How can you extend that problem? Can you generalize that? What about in 2, 3, 4, n dimensions? Are there interesting special cases? These are great questions for students and teachers alike.

One thing I would caution against in a differentiated classroom is having the top students “teach” other students rather than extend problems. While I think there can be value in this technique, it is not a substitute for engaging a student with a challenging problem.

I was really encouraged that the case studies Dr. Berry presented all had a component of teacher training to them. This is essential to any large-scale, systemic change. We cannot just dump large-scale changes on teachers and expect them to figure things out as they go. These kinds of changes require planning, buy in, and lots of work.

I’ll stop rambling here, but don’t forget to mark your calendar for Friday, November 1, as MMC will again be hosting Dr. Eugenia Cheng for a talk on The Art of Logic. This talk will surely give you things to think about that will help you grow as a teacher and learner of mathematics. While you have that calendar out, make sure to also clear April 1 - 4, 2020 for the NCTM Centennial Meeting at McCormick Place.

September Dinner Meeting Talk – Robert Berry

by Aimee Hart

“How are you doing? I am truly wonderful and getting better.” Dr. Berry opened his talk on September 13th at the Fountain Blue with this question and response. He then asked a couple audience members to talk about how they were truly wonderful and what they were doing to get better. One first year teacher responded she was truly wonderful because she got excited about teaching math and she was getting better at “everything I do, every day.” He explained how the response of “truly wonderful and getting better” emphasizes the importance of understanding students’ identity, how they are truly wonderful, and that students feel a sense of agency in the classroom about how they are getting better.

Dr. Berry then talked about the growth in learning in elementary, middle, and high school mathematics in the last 30 years. He mentioned that there is so much content in high school mathematics that teachers often find it difficult to teach at the desired level of rigor with that amount of content. He discussed the importance of identifying essential math concepts and examining equitable structures and equitable instruction. He focused on a key NCTM recommendation that schools should discontinue the practice of tracking students into qualitatively different courses and “dead-end math courses” as well as teacher tracking. He explained that teacher tracking is when teachers are assigned courses based on their experience or rating, so teachers with more experience are given the higher-level classes. As a result, groups of students are not given access to high-quality instruction.

He shared four case studies with us, in which schools have tried to put the recommendations into practice, and spent time discussing two of them in detail. In 2013, Escondido Union High School began to try to change their mathematics education and their results. Their practices had been heavily influenced by standardized testing, and they were underserving many students of color. The school focused on changes to the system and began by implementing a “teacher curriculum,” which offered professional development on instructional practices and allowed for more collaboration. After two years of behind the scenes work, they rolled out their new curriculum and in the 3rd year began detracking in the 9th grade. In Escondido, improvements in teaching practices led to students being more engaged and more positive about mathematics, as well as almost all students being in grade-level classes and more taking upper-level classes. Dr. Berry emphasized the importance of investing in teachers before schools move to detracking, and stated when they don’t do this and detracking doesn’t work out, it becomes the scapegoat.

In San Francisco’s Unified School District, all 8th graders were taking Algebra 1, but only 22% were passing with proficiency. The school moved to eliminate Algebra 1 in 8th grade, due to the new Common Core Standards for 8th grade, and invested in professional development, implemented collaboration days, and added math coaches. They created a common pathway for all students to take Algebra 1, Geometry, and Algebra 2 and allowed for students to take some courses concurrently or a compressed course in 11th grade. Students still had access to multiple 4th year options, including AP courses. They encouraged all students to take four years of high school math. They have seen a decrease in Algebra 1 repeat rates, greater participation in higher-level math courses, and a decrease in achievement disparities. Dr. Berry again emphasized the importance of the support and training teachers were given to implement this new program. He talked about the importance of creating classroom structures that allow all students to be participatory and see themselves as doers of mathematics.

Though we did not have time to discuss the last two cases in depth (Dr. Berry had a flight to catch to Hawaii later that evening), he left us with a lot to think about. I think we all left that night feeling inspired to continue to “get better” and ensure that all students “experience the joy, wonder, and beauty of mathematics.”

Please visit the NCTM website for more information on these case studies as well as Dr. Berry’s President’s Message on “Truly wonderful and getting better.”



NCTM Centennial Annual Meeting & Exposition 100 Years—Looking Back and Moving Forward

NCTM turns 100 in 2020! Join your peers in Chicago as we celebrate our 100th anniversary at NCTM's Centennial Annual Meeting & Exposition. In addition to compelling sessions, networking opportunities, and enriching content, they're planning some special events and surprises to mark the occasion. Join thousands of math education professionals in Chicago as NCTM embarks on its second century.

Topics:

- Implement effective teaching practices
- Experience the depth and excitement of mathematics
- Look Back and Move Forward: A Centennial View
- Create positive change
- Build student agency, foster student identity, and promote social change

When:

April 1 – 4, 2020

Where:

McCormick Place, Chicago

Registration is open at www.nctm.org/100.

Early bird registration rates are currently available! Group rates are also available!

Follow MMC on Social Media!



Board Notes

By Beth Ann Ball

The MMC Board of Directors met on Wednesday, August 21, 2019, at 6:30 p.m., at Glenbrook South High School in Glenview.

Three new directors were appointed by the MMC Board of Directors to fill positions vacated through resignations. Joyce Gajda (Oak Park and River Forest High School), Janice Krouse (Illinois Mathematics and Science Academy), and Maryjoy Heinemen (Evanston Township High School) were welcomed after they were voted in. The board discussed moving the MMC Conference of Workshops program booklet to an electronic-only version, and a committee was formed to make that decision. Discussion was held about the 2020 MMC Conference of Workshops at Stevenson High School, as well as the NCTM Annual Meeting in Chicago.

The next scheduled MMC Board meeting will be on Tuesday, November 12, at 6:30 p.m., at Oak Park and River Forest High School in Oak Park. MMC members are welcome to attend any board meeting. Anyone interested in attending the next board meeting, please contact Matt Moran at matthew.j.moran@gmail.com.

Interested in joining the MMC Board of Directors?

If you have been a member in good standing for at least two years,
MMC wants you to run for the board.
Contact Mary at mwiltjer@glenbrook225.org for more information.

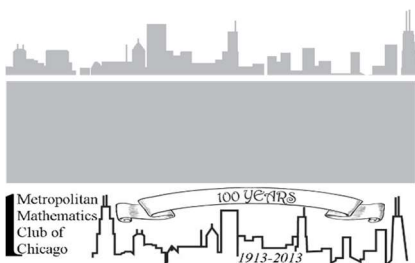
Answers to A Puzzle to Start the School Year: Mathematical Word Permutations

By Zalman Usiskin

- | | |
|-----------------------|--------------------------------|
| 1. dad, add | 11. recount, counter |
| 2. ten, net | 12. contour, crouton |
| 3. rate, tare | 13. eighths, highest |
| 4. shear, share | 14. inverse, versine |
| 5. seven, evens | 15. treatise, iterates |
| 6. stere, retes | 16. ordinate, rationed |
| 7. eighth, height | 17. triangle, integral |
| 8. general, enlarge | 18. sixty-nine, ninety-six |
| 9. latitude, altitude | 19. algorithm, logarithm |
| 10. couplet, octuple | 20. six-sevenths, seven-sixths |



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 Mary Wiltjer, Past President
 Sheila Hardin, Board Chair
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Metropolitan Mathematics Club of Chicago

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Save the date for the annual

MMC CONFERENCE OF WORKSHOPS

A conference in workshop format,
 given by teachers for teachers

Saturday, February 1, 2020

8:30 a.m. – 12:45 p.m.

OPTIONAL FREE AFTER-LUNCH SESSION

1:45 p.m. – 3:00 p.m.

**Stevenson High School
 Lincolnshire, Illinois**

FOR TEACHERS OF ALL GRADES K-16

2019-2020 MMC Dinner Meeting Incentive Programs

“Bring a Friend” Nights: Bring someone who has never attended an MMC dinner meeting, and introduce them to MMC! Both you and your guest(s) will receive \$5 off your dinner costs. There is a limit of 2 guests per meeting for the reduced cost, but you can still invite more people to come with you! This incentive is good for the following meetings:

November 1 (Eugenia Cheng)

December 6 (Bridget Tenner)

January 24 (Douglas O’Roark)

“New(er) Teacher” Program: Are you a teacher in your first 5 years of teaching? If so, you can take advantage of this incentive! Pick up a new(er) teacher card at registration and bring it back to be verified each time you attend a dinner meeting. Attend 3 meetings this year, and get your 4th meeting at half price!

Thank you to our generous members who are sponsoring this program.

**Please be sure to register all attendees using the reservations link on the website.
Mention the incentive when you check in at the meeting to take advantage of these programs.**

**Is your membership current? Check your mailing label to see when your membership expires.
You can renew by mail with the form below or renew in person at the next dinner meeting.**

NAME		PREFERRED CONTACT Check one: <input type="checkbox"/> Home <input type="checkbox"/> Work	
HOME ADDRESS			
CITY	STATE	ZIP	
HOME PHONE	HOME E-MAIL		
EMPLOYER			
WORK ADDR			
CITY	STATE	ZIP	
WORK PHONE	WORK E-MAIL		
ELECTRONIC-ONLY MEMBERSHIP Check the box below for electronic-only membership. You will receive an email with a direct link to each issue of <i>Points & Angles</i> when it is posted on the web site, often before paper copies are mailed. You will no longer receive <i>Points & Angles</i> by mail. <input type="checkbox"/> Electronic-Only Membership		MEMBERSHIP TYPE Check one: <input type="checkbox"/> 1 year (\$35) <input type="checkbox"/> student*, 1 yr (\$22) <input type="checkbox"/> 2 years (\$65) <input type="checkbox"/> 1 st yr teacher*, 1 yr (\$22) <input type="checkbox"/> 3 years (\$90) <input type="checkbox"/> retired, 1 yr (\$28)	
FORM USE Check one: <input type="checkbox"/> New Membership <input type="checkbox"/> Renewal <input type="checkbox"/> Former Member <input type="checkbox"/> Change of Address		MEMBERSHIP COST \$	
* The student and 1 st -year teacher memberships are only available as electronic-only.		DONATIONS	
		SCHOLARSHIP FUND \$	
		SPEAKER FUND \$	
		TOTAL AMOUNT OF CHECK \$	

Make check payable to **MMC**

MMC Membership and Change of Address Form
Mail completed form and check to:
MMC
7339 W. Ibsen St.
Chicago, IL

Upcoming Events

Fri.-Sat., Oct. 18-19		ICTM Conference, Peoria
Fri., Nov. 1	Eugenia Cheng	The Art of Logic in an Illogical World
Fri., Dec. 6	Bridget Tenner	Bijections: Sometimes It Counts Not to Count
Fri., Jan. 24	Douglas O’Roark	The Future of Math Enrichment
Sat., Feb. 1		MMC Conference of Workshops, Lincolnshire
Fri., Mar. 6	Eli Luberoﬀ	Creating Interesting Ways for Students to be Right and Wrong
Sat., Mar. 7	Eli Luberoﬀ	Desmos Workshops
Wed.-Sat., April 1-4, 2020		NCTM Centennial Annual Meeting: Celebrate 100 Years— Looking Back and Moving Forward, Chicago
Fri., May 15	Zalman Usiskin	Some Great Middle and High School Mathematics Lessons Few People Teach

Send upcoming event items to sburnett_308@yahoo.com no later than the date of the MMC dinner meeting preceding the issue in which the item should appear. All items are subject to editing.

Your membership renewal date appears in the upper right corner of the label

