

Points & Angles

Newsletter of the Metropolitan Mathematics Club of Chicago
Volume XLVII No. 2 October 2017

Reading and Writing the World with Mathematics

October Speaker

Rico Gutstein



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, October 27, 2017

5:30 PM Doors Open, 6:00 PM Social Hour
7:00 PM Dinner & Talk

Fountain Blue Banquets & Convention Center

2300 Mannheim Rd., Des Plaines
(847) 298-3636
\$43 for Members, \$49 for Nonmembers

Reserve by Noon, Monday October 23, 2017

Online at www.mmccchicago.org
or by phone at (847) - 486 - 4291

Rico Gutstein is a mathematics education professor in the UIC College of Education. He writes and teaches about critical and Freirean pedagogies, and mathematics and urban education policy. Rico has taught middle and high school mathematics in Chicago public schools and is the author of *Reading and Writing the World with Mathematics: Toward a Pedagogy for Social Justice* (2006). He co-edited *Rethinking Mathematics: Teaching Social Justice by the Numbers* (2nd Ed) (2013). He is a founding member of Teachers for Social Justice (Chicago), a 19-year old group of educators that supports teachers to develop culturally relevant and critical classrooms, and that is active in the struggles to keep public education public—not private—locally, nationally, and internationally. Rico was a member of the design team that founded the Social Justice HS in the Lawndale community (Chicago's Westside), which opened in 2005 and is currently a quality neighborhood, open-enrollment, public school. He was also the co-facilitator of the design team working on the proposal to revitalize (and successfully re-open) Walter H. Dyett HS (a school closed by the district located on Chicago's Southside), representing both Teachers for Social Justice and the UIC College of Education.



In this talk, he will present a framework on “reading and writing the world with mathematics” (aka “critical mathematics” or “teaching math for social justice”). He has been learning to teach critical mathematics since 1997, working with, and learning from, students in CPS middle and high schools. I will share some of what he has learned, as well as what have been both possibilities and challenges in doing this work. I will also discuss what knowledge and dispositions I find useful in doing this work, and how teachers, and teacher educators, might learn how to teach critical mathematics, as well as to support others to do it as well.

Points From The Interior

BY MATTHEW MORAN

The school year is fully under way now, and so is the MMC Dinner calendar. I hope your year is off to a good start. Mine is, though not much changes in my calendar due to the school year since I left the teaching profession in 2016. Though I am keeping my teaching acumen by working with the Math Circles of Chicago (MC₂) and the Chicago Area All Star Math Team.

If you missed Po-Shen Loh's talk in September, you missed a great story of his discussions with the MAA before hiring him as the head coach of the USAMO team. He told them to expect the results of the team to suffer because he did not plan on doing much IMO specific preparation. He wanted the team to work collaboratively on interesting problems, rather than learn all of the usual tricks/techniques. Po was also asked by a member of the audience about the usefulness of math contests for students. He acknowledged that they have good side effects, but doing contest problems to get better at math contests was not the best use of time. This is coming from the head coach of one of the most prestigious competitive math teams in the world!

You don't have to look very far to find people that share Po's opinion, or far more extreme opinions ranging from how not-great to downright terrible math contests are for kids. Just try a search of, "mathematicians that don't like math contests," with your favorite search engine. You'll find things from Cathy O'Neil, Terence Tao, and Andrew Wiles, to name a few.

Now I don't want to just rant about how terrible math contests are. In fact I love math contests. I have been involved with them since I was in seventh grade! I owe a great deal of my love of mathematics, and learned volumes of interesting mathematics through contests, contest problems, and people involved with contests. I even helped found a new competitive math league in Chicago a few years back. The competitive math community is full of people well aware of the shortcomings of math contests, and eager to help kids move beyond just getting better at doing math contests. This is what is supposed to happen; a kid does math contests and gets hooked!

Sadly, some kids do not get hooked. Some kids that want to do and learn more math avoid competitions for any number of reasons. Others try contests and decide math isn't for them because they can't do well on them. Just to be clear, this does not mean they aren't good at math, that math is not for them, and the mathematics community doesn't need or want them.

Competitive math is not for everyone, and that, by itself, is not a problem. What is problematic, however, is when kids don't have access to math enrichment that is not competitive. Most of the pre-secondary schools that MMC members teach in have some kind of a math team that participates in contests. I would love to learn more about which schools have a separate "math club" kind of organization that does non-competitive math enrichment.

So I'm offering up a challenge. If you think there should be more non-competitive math enrichment for students in your school, start a math club that is not associated with your math team. You might attract a lot of kids already on your school's math team, but you might tap into a completely different group of kids.

Points From The Interior Continued

Need something for your new math club to work on? Check out MC₂'s QED, which is a student math research symposium (think science fair with math projects and no competition for first place). You can find more information at mathcirclesofchicago.org/qed. There is no shortage of great math enrichment activities you can do with kids. The upcoming MMC dinner on October 27th is a great place to chat with your colleagues about ideas for math clubs and share your stories. Also, there will be food. Hope to see you there!

MMC Board Report

BY LYNN BOND

The MMC Board of Directors met on August 23rd at Glenbrook South High School, Glenview, IL.

The finance committee has audited the accounts and found no discrepancies.

Speakers for this year have been confirmed, and plans for next year are well underway. To encourage a good turnout for these exceptional speakers, if you bring someone new, you will receive a \$5 discount off your dinner cost, and your guest will receive a \$10 discount off theirs.

The MMC Conference of Workshops will be held on February 10, 2018 at Benet Academy in Lisle. Registration will open in November. and can then be found at: mmcchicago.org.

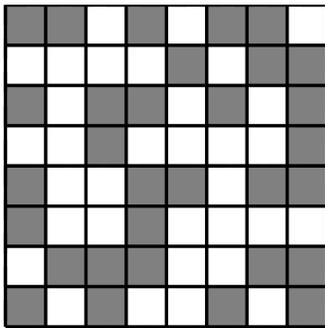
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The next MMC Board meeting will be held on Wednesday, November 15th, at 6:30 p.m. at Oak Park River Forest High School. MMC members are welcome to attend any board meeting. Please contact Carrie Fraher at cfraher@glenbrook225.org if you plan to attend.

September Meeting Summary

By SUE BROWN

Po-shen Loh, our opening speaker for 2017-18, is the national coach of the USA International Math Olympiad team, a professor at Carnegie Mellon University, and a self-proclaimed math evangelist. He strives to build interest among students and the public in mathematics, and his passion for the subject was clear. His talk felt like a conversation, and the MMC audience responded to his enthusiasm. He focused on a single puzzle-like problem, which he illustrated with a dynamic graphic of an 8x8 array with cells that could be colored red or white. (Keep in mind that $8 \times 8 = 64 = 2^6$.)



The problem Loh posed was this: Is it possible that he could be shown a random arrangement of red and white squares on the grid, have someone change the color of one square while his back is turned, and then identify which square was changed?

Evolutionary biology shows that our brains are designed to look for meaning and structure, not to memorize or to calculate. Loh claimed to have a poor memory himself. Yet he carried out this task. First, a volunteer from the audience indiscriminately colored the squares in the grid. Loh spent several minutes staring at diagram, while making strange tai chi-style motions and hopping around. Then, while his back was turned, the volunteer switched the color of one square. Again, Loh studied the diagram while going through a series of gestures and hops. Finally, he announced which square had been changed. How did he do this?!?

Loh's method relies on finding a way to distill the noise of the grid into just a few pieces of information that he could burn into his memory. His gyrations as he looked at the board, rather than being distractors like those a magician uses during a trick, were kinesthetic aids to his thinking. He analyzed the grid by breaking it down into regions in six different ways.

For each of the six dissections, he classified the regions by whether the number of red squares was even or odd. Then he shaded the odd regions, resulting in a picture. For the grid shown above, this characterization produces these six pictures:



Switching the color of one single square of the grid will result in switching the shading of one region of each of the six diagrams. To see how this works, try it out with for yourself. The end result is that Loh was able to identify the row and column that had changed – and these specified just one square.

September Meeting Summary Continued

A big surprise was the visual technique that Loh used to find whether a region was even or odd. He grouped red squares from the grid into clusters of four, looking for the familiar shapes of four squares from the game Tetris! As soon as he found a group of four, he could ignore it and focus on the remaining squares. His gestures helped him mentally rearrange the pieces. He was able to quickly identify the remainder modulo 2 for a region, and decide whether or not to shade it.

Loh devised this clever puzzle and his solution technique to fit his own ways of thinking. His method allows him to perform the act accurately in front of an audience. There are other ways to characterize the grid. He connected the puzzle to the idea of making slices through a hypercube in six dimensions, and to the fact that the cells in the 8x8 grid can be numbered using six digits in binary.

000	000	000	000	000	0 ⁰
000	001	010	011	100	
001	001	001	001	0 ¹	
000	001	010	011		
010	010	010			
000	001	0 ¹			

His talk gave evidence for his statement that math is a way to avoid memorization. While the title was “Math and Creativity,” he did not overtly discuss creativity much at all. Instead, his talk allowed us to experience it along with him!

COMING SOON: The MMC Conference of Workshops!

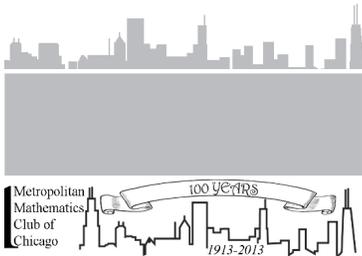
Save the date: Saturday, February 10, 2018
at Benet Academy in Lisle, Illinois.

Information and registration will be on the MMC website soon.

Remember that registration for workshops is done on a first-come, first-served basis, so register early!

You don't want to miss this event. Be sure to mark the date and return to mmcchicago.org for more details

Hope to see you there!!



NCTM Affiliate Report

By PATRICIA TRAFTON

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Patricia Trafton (2015-2018)
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Mary Wiltjer (2016-2019)
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Chicago Regional NCTM Conference:

Chicago is the site for one of the regional NCTM conferences this Fall. The conference will take place at the Hyatt Regency Hotel on Wacker Dr. on Nov. 29 thru Dec. 1. The opening session on Wednesday evening features a panel of six speakers who will discuss Equity and Access in Mathematics Education. Special features of the conference include a series of three consecutive one-hour workshops about Lesson Study conducted by Akihiko Takahashi and colleagues as well as a ministrand about Instructional Routines. Many MMC members will also be presenting at the conference! Early-bird registration deadline is Nov. 3, 2017, so don't delay, register today!

Volunteers are still needed to help with the conference. Contact Sendhil Revuluri at sendhil@gmail.com or sign up on the NCTM website <http://www.nctm.org/chicago/> to register, to sign up as a volunteer, and for more information.

NCTM Separating Ties with The Math Forum

In 2015 the NCTM Board of Directors decided to acquire The Math Forum after it was approached by Math Forum staff and informed that its relationship with Drexel University would be severed. The Board recognized the potential of The Math Forum and hoped that bringing the two together would translate into increased NCTM membership and an expansion of a vibrant community. Unfortunately, NCTM membership has continued to decline, and now in the third year after the merger, we can no longer justify two locations and an expense that far exceeds the revenue it generates.

As stated in the recent President's Message, NCTM has had an annual average operating loss of approximately \$1.5 million for the past 10 years. Last year's fiscal loss was more than twice that annual average.... The NCTM Board of Directors and its Executive Director have had to make a number of very difficult decisions to reverse the practice of deficit spending.... At its July meeting, the NCTM Board of Directors decided that effective January 1, 2018, in order to create synergies on staff and among volunteers and reduce expenses, that all full-time NCTM employees would be located in the Reston, Virginia office. The decision to consolidate all NCTM staff in Reston was not purely a financial one, but was made for other business reasons as well, including the potential positive energy The Math Forum staff could have brought to the focused work of the departments at NCTM headquarters in Reston. Math Forum staff elected not to continue their employment with NCTM.

For more information and to read the rest of the article, see <http://www.nctm.org/News-and-Calendar/Messages-from-the-President/Archive/Matt-Larson/NCTM-and-The-Math-Forum/>

MMC's Bring a friend night



Bring someone who has never attended an MMC dinner meeting and introduce them to MMC! You will receive \$5 off your dinner cost, and your guest will receive \$10 off their dinner cost. This incentive is only good for the October 27 (Rico Gutstein) Dinner Meeting. Please be sure to register both you and your guest using the reservations link at: <http://mmcchicago.org/mmc-online-dinner-reservations/> Mention this offer in the comment/instruction box on your reservation.



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MMC Membership and Change of Address Form

Upcoming Events

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- 6 Upcoming Events

Fri., Oct. 27	Rico Gutstein	Reading and Writing the World with Mathematics
Fri., Dec. 15	Eugenia Cheng	How to Bake Pi: Making Abstract Mathematics Palatable
Fri., Jan. 19	Paul J. Karafiol	Let Us Teach Wondering
Sat., Feb 10	MMC Conference Of Workshops -	Benet Academy Lisle, IL
Fri., Mar. 16	Esther Song	Math and Identity: How Our History Shapes Us
Fri., May 11	Zalman Usiskin	Mathematics and Diamonds: The Many Facets of Mathematics

Send upcoming event items to jharding@d120.org 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.

MAILING LABEL

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