Points & Angles

Newsletter of the Metropolitan Mathematics Club of Chicago
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Magnificent Mathematics: Some of My Favorite Problems

December Speaker John Benson

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, Dec. 14, 2018
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 Dec. 10
Online at www.mmcchicago.org
or by phone at 847-486-4291
NOTE: Dinner will be beef; if preferred, you may request a chicken or vegetarian entree as a special meal with your reservation.

MMC has a few members who have encyclopedias of math problems in their heads. One of them is John Benson. He is a walking resource for many beautiful connections and surprising relationships in mathematics. We will be tapping this resource for our own benefit and delight on Friday, December 14, when John Benson returns to MMC for his fourth dinner meeting talk. In December, John will be presenting "Magnificent Mathematics: Some of My Favorite Problems." As he said of the talk, "There are some mathematical ideas as well as some problems that I think are very special. I would like to share some of my favorites. Many of these are classic, so you may be familiar with them. I think it will be fun to look at some wonderful mathematics together. Come and see a few of my favorites." This will be an exciting night of mathematics shared by one of our country's best presenters. He may be local, but he is a national treasure.

It is almost impossible to think of professional development in mathematics education in Chicagoland and not have John Benson come to mind. I'm not claiming he's the only person you may think of, but he's on your super short list. Well, he is on mine, and I know a lot of people in this game. John has had an impact on so many teachers and students that his reach is immeasurable. One of these moments for me was when I asked Sue Eddins, one of my heroes in mathematics education, how she got into the field. Her reply surprised me, since it was all about meeting John Benson at an MMC dinner meeting and how he had taken her under his wing. At that point, she hadn't taught in years, having been home with her young children, and she wasn't a famous educator and curricular leader like she is today. I remember saying, "John Benson? Really? But you never taught with him!" Fighting back tears, she explained that John made her feel welcome and worthwhile and championed her professional development. We are so lucky he did. Sue has done so much for so many in mathematics education.

Magnificent Mathematics (cont.)

I have had many moments where John's name came up where I least expected it. Quite simply, he has done it all. He taught for 42 years, with 41 of them at Evanston Township High School. He has won numerous awards and honors, including the Presidential Award in 1987. He co-authored four textbooks, he was an AP reader and table leader for calculus, and he has been an active member of NCTM, ICTM, and MMC for almost my whole life. A personal favorite for me is that he has presented at every single MMC Conference of Workshops (often more than once). He is the co-founder of NSML. He does not watch TV (although Netflix has altered this a bit), he is a jazz enthusiast (don't mention the blues), he is a big fan of theater, he's such a die-hard Cubs fan that the hackneyed term is wasted on him, he is loud, he is passionate, and he believes in all the best parts and ambitions of public education.

Don't miss this special night with John Benson and your MMC pals. We are back at Fountain Blue for this meeting. Since it is our "holiday meeting," we will have steak, but chicken and vegetarian meals are available on request with your timely reservation. Don't miss a single bite of this great night!

November Dinner Meeting Talk – Gail Burrill

by Carrie Fraher

On Friday, November 16, 2018, MMC hosted Gail Burrill to give a talk at a new venue. The room filled up for a family-style meal at the Des Plaines Elks Lodge. After a chance to mingle and dine with colleagues, President Mary Wiltjer welcomed the former NCTM president from Michigan State University.

Burrill recalled her days teaching Algebra I with some phrases and terms she often used: isolate the variable, first step, second step, and undo. Many of the participants were taught using that language and may currently be using it during instruction. Burrill challenged that this practice may not be equipping our students for mathematical thinking by introducing a problem to solve for x: $\left(x^2-5x+5\right)^{x^2-9x+20}=1$. Tables of people began discussing the problem and pointing toward their notes and examples. Participants shared several solutions, including setting the exponent to 0 while checking the base was not zero. Setting the base to 1 was another alternative, or the base could be -1 with an even exponent, generating many solutions. The example conveyed that students need reasoning tools more than a memorization of steps.

In 1988, NCTM published a list of common mistakes in algebra. When Burrill showed the slide listing these mistakes, it caused a roomful of teachers and math professionals to groan as they realized how frequently those mistakes still occur today. Burrill noted that math educators have been working on these errors for 30 years and should have been able to eliminate some of the underlying misunderstandings.

Burrill encouraged the audience to read an NCTM publication, *Catalyzing Change in High School Mathematics*. Themes in the publication include:

- Broadening the purposes for teaching high school mathematics beyond a focus on college and career readiness
- Dismantling structural obstacles that stand in the way of mathematics working for each and every student
- Implementing equitable instructional practices
- Identifying essential concepts that all high school students should learn and understand at a deep level
- Organizing the high school curriculum around these essential concepts to support students' future personal and professional goals
- Providing key recommendations and next steps for key audiences

Burrill promoted thought-provoking tasks focused on giving students opportunities to reflect, observe, and wonder. She engaged the group with a mathematical take on "Two Truths and a Lie." After sharing her own sets of three mathematical statements and giving participants a chance to discuss and defend their answers, she shared the idea of having students write the statements as a way to review material or pursue interests. The purpose is to get students talking, reasoning, and wondering.

To reinforce the magic of mathematical wonder, Burrill embarked on a series of tasks that beautifully connected triangular numbers to geometry, probability, and counting. She also showed that even in different statistical distributions, she could form a normal distribution from sampling the means over time. She asked participants to question if we are too focused on doing mathematics to notice some of these awesome things.

November Dinner Meeting Talk Summary (cont.)

Harnessing her extensive background in statistics, Burrill moved to the importance of giving students experiences that enable them to critique information. She revealed a story about the Flint water crisis. Two water samples were classified as outliers and eliminated from the data. If they had been left in, alarms would have been set off much earlier about the dangerous levels in the drinking water.

Burrill encouraged teachers to find persuasive graphs and statistics and allow students to critique and formulate decisions about them. She offered some statistics on levels of opioid deaths. Texas seemed to have shockingly fewer opioid deaths than New Hampshire. Further research revealed that a possible cause was the lack of medical examiners in Texas. She also urged the use of data that allows students to explore crucial issues that could affect their lives. Students can build graphs and displays to tell a story from data. Burrill posed a question about whether salaries for women are catching up with salaries for men. She gave students salary data over time and let them produce graphs, critique each other, and make predictions. Real data grab the attention of students and allow them to experience an open-ended problem.

Burrill encouraged reflection through writing and drawing assignments. These activities give students an opportunity to express themselves and share their talents. With these tasks, teachers can gain more knowledge about their students and their students' feelings about mathematics.

In closing, Burrill asked for teachers to showcase that exciting math is currently being done by a diverse group of people. She called for all students to witness people who look like them being successful and earning awards for discoveries. She summarized that students need to reflect, observe patterns, notice and wonder, critique information, and ask questions. Math educators need to initiate critical conversations and collect data to drive decision making. Burrill closed by saying that she has faith that teachers are the force that will improve math education moving forward.

Points from the Interior

by Mary Wiltjer

You know what I want for the holidays? Everything. Here's a very abbreviated version of my list as it pertains to mathematics education:

I want to have enough time to get everything done and still have some personal time.
I want to stop regretting that it is Sunday night because how unprepared I am is looming large.
I want every school everywhere to be safe enough to never have a lockdown or even a lockdown drill again.
I want textbooks to stop taking the lead on determining curriculum.
I want mathematics textbooks to be about half their current length.
I want paper to be the new screen.
I want screens to no longer be addictive.
I want every school to have the same plentiful resources as the most fortunate schools.
I want teenagers to get enough sleep.
I want no kid to be hungry.
I want parents' problems not to become kids' problems or even their worries.
I want kids to be courageous in their learning.
I want the SAT, the ACT, and the PARCC to vanish.
I want play and productive struggle to be the norm.
I want no one to worry about with whom they will sit at lunch.
I want kids to be able to apply to only their perfect-fit college and to always get in.
I want teachers to feel respected for their work all the time.
I want dogs to be allowed at school.
I want all the ills from which society suffers, big and small, to stop finding their way into schools.
I want time to stop negatively impacting students.
I want math anxiety to go the way of the dodo.
I want kids to love learning math as much as I do.
I want all of us to have a wonderful holiday season!

MMC Scholarship for High School Seniors

The Metropolitan Mathematics Club of Chicago is offering a $2,000 scholarship for a high school senior who will pursue a career in the teaching of mathematics. In addition, up to two Filliman Scholarships may be awarded for the same amount (funded by a gift from the Filliman estate). The selected students, their parents, and their sponsoring teachers will be invited to MMC's May 10 dinner meeting, at which time the scholarship recipients will be honored.

A selection committee of MMC members, appointed by the board of directors, will determine the scholarship awards. To be eligible, an applicant must be sponsored by a member of MMC, submit the application, have an official transcript sent, request a letter of recommendation from a mathematics teacher, and respond to the prompts in point E below, such that all of the materials are received by March 8, 2019. The committee will evaluate applications and will make a recommendation to the board of directors as to the awarding of the scholarship.

The guidelines used for selection shall be:

A. Demonstration of overall academic scholarship with an inclusion of at least eight semesters of college preparatory mathematics. (A minimum cumulative grade point average of 3.0, where A = 4.)

B. A statement of the intention to pursue a career in mathematics teaching.

C. Indication of participation in extra-curricular activities, especially those that may have a positive influence on a teaching career.

D. A letter of recommendation from a math teacher who is familiar with the applicant's academic performance and his or her potential as a mathematics teacher. The teacher must be an MMC member.

E. A short response from the candidate (1-2 paragraphs) to each of the following prompts:

   a. What qualities do you possess that will help you in a teaching career?

   b. Describe a teacher who has had an impact on your education.

   c. Was there a time when you struggled with a concept in a math (or other) class? What did you do?

   d. What was your favorite math class? Why?

   e. Describe your favorite math problem. What makes it so great?

   f. What excites you about mathematics?

   g. Why do you want to teach mathematics? *This response may be longer than the others, if necessary.*

In addition to the application form, applicants must also send:

1. A letter of recommendation from a mathematics teacher, p*referably not sent through the applicant.**
2. A current transcript for seven semesters of high school.*
3. Responses to the prompts in point E above.

**Letters of recommendation and transcripts may be sent by separate mail.*

MMC Dinner Meeting Incentive Program

"Bring a Friend" Nights

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

January 18 (Matthew Moran)

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

Please be sure to register both yourself and your guest, using the reservations link on the website, and mention the incentive when you check in at the meeting.

USACAS 2019

MEECAS and Highland Park High School will co-host the 11th USACAS Conference. While still emphasizing CAS, this expanded **technology** conference will broaden our view of Computer Algebra Systems to include various technologies in mathematics, STEM, and science education. Our motto for the conference will be "find the right tool to solve the problem." This event will be held at Highland Park High School, located in Highland Park, Illinois, on Saturday, June 15, and Sunday, June 16, 2019. There will be an opening dinner on Friday, June 14, 2019, hosted by the Metropolitan Mathematics Club of Chicago (MMC).

Speaker proposals are now being accepted at usacas.org.

Registration: **$85 for USACAS 11 (before May 9, 2019; $100 on or after May 9, 2019)**
$95 for USACAS 11 AND the MMC Friday night dinner
(before May 9, 2019; $110 on or after May 9, 2019)
$55 for MMC Friday night dinner (before May 9, 2019; $65 on or after May 9, 2019)
(Fee includes continental breakfast, box lunch, and snacks.)

NEW! Graduate credit will be available through Central Michigan University.

Any questions can be directed to Ilene Hamilton at ihamilton2341@gmail.com.

Are you doing your holiday shopping on Amazon?
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Metropolitan Mathematics Club of Chicago

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invites you to attend the annual

MMC CONFERENCE OF WORKSHOPS

A conference in workshop format,
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Saturday, January 26, 2019
8:30 am – 12:45 pm
OPTIONAL FREE AFTER-LUNCH SESSION
1:45 pm – 3:00 pm

University of Chicago Laboratory Schools
Chicago, Illinois

FOR TEACHERS OF ALL GRADES K-16

Low Cost: $32 members; $38 non-members; $20 students

Professional Development Hours/ CPDU Credit Available

For program booklet and registration information, see the MMC website:
www.mmcchicago.org

Call for Candidates!

by Matthew Moran

The MMC is seeking members to run for open positions on the board of directors and for the office of president. As a member on the board, you will have opportunities to serve on various committees to continue MMC's tradition as an outstanding professional organization. The high-quality, low-cost professional development that the Chicago area has come to depend on from MMC every year does not happen without a lot of hard work from our board. We need energetic MMC members like you to step up to do some of this work!

Having served on the board and as president, I can attest that it is truly rewarding work. Through serving on the MMC board, I have established relationships with great professionals in the field of mathematics education, and I have learned a great deal about how a professional organization and board of directors function.

If you are interested in running for an open seat on the board, please contact me (matthew.j.moran@gmail.com). I am happy to answer any questions you have about the open positions. If you aren't ready to serve on the board but know someone you think would be a good fit, please encourage them to contact me, or just send me a note and I can reach out.

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.

MMC Membership and Change of Address Form

Mail completed form and check to:

MMC
7339 W. Ibsen St.
Chicago, IL

NAME

PREFERRED CONTACT
Check one: ☐Home ☐Work

HOME ADDRESS

CITY | STATE | ZIP

HOME PHONE | HOME E-MAIL

EMPLOYER

WORK ADDR

CITY | STATE | ZIP

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ELECTRONIC-ONLY MEMBERSHIP
Check the box below for electronic-only membership. You will receive an email with a direct link to each issue of Points & Angles when it is posted on the web site, often before paper copies are mailed. You will no longer receive Points & Angles by mail.

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FORM USE
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* The student and 1st-year teacher memberships are only available as electronic-only.

MEMBERSHIP TYPE
Check one:
☐1 year ($35) ☐student*, 1 yr ($22)
☐2 years ($65) ☐1st yr teacher*, 1 yr ($22)
☐3 years ($90) ☐retired, 1 yr ($28)

MEMBERSHIP COST $

DONATIONS

SCHOLARSHIP FUND $

SPEAKER FUND $

Make check payable to *MMC*

TOTAL AMOUNT OF CHECK $

Upcoming Events

Fri., Dec. 14	John Benson	**Magnificent Mathematics: Some of My Favorite Problems**
Fri., Jan. 18	Matthew Moran	**The Robots are Coming for Your Teaching Job: Educational Ramifications in the Machine Learning Age**
Sat., Jan. 26		**MMC Conference of Workshops, UC Lab Schools, Chicago**
Fri., Mar. 1	Eli Luberoff	**Technology that Thinks WITH Students, Not FOR Students**
Sat., Mar. 2	Eli Luberoff	**Workshop**
Fri., May 10	Annie Fetter	**Sense-Making, Ideas, Curiosity, and Learning**
Sat., May 11	Annie Fetter	**Workshop**
Fri., June 14	Tom Dick	**Cubics, Conics, CAS, and a Curious Connection Called "The Most Marvelous Theorem in Mathematics!"**
Sat.-Sun., June 15-16		**USACAS Conference, Highland Park**

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

MMC
7339 W. Ibsen St.
Chicago, IL 60631