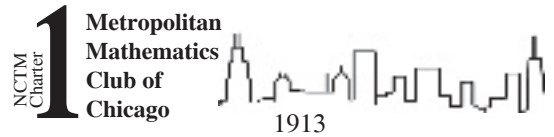


# POINTS AND ANGLES

Newsletter of the Metropolitan  
Mathematics Club of Chicago



Volume XLI

June 2007

No. 9

## NEW AND NETWORKED CALCULATORS-THE POTENTIAL TO TRANSFORM THE WAY WE TEACH

DR. ALLEN BELLMAN

By CONRAD WAYNE

MMC is very pleased to have Dr. Allan Bellman, Mathematics Education Professor, University of California-Davis, be our opening speaker for the 07-08 school year. Dr. Bellman will reflect on eight years of classroom work with networked calculators and a little over a year of work with the new TI-Nspire graphing calculator. He will discuss and demonstrate the potential effects of these technologies on the mathematics classroom. During the presentation, we will look at the past and dream about the future.

Allan Bellman has been actively involved in mathematics education for thirty-eight years. For thirty-one of those years, he was a classroom teacher, system-wide trainer, and curriculum developer for the Montgomery County, Maryland school system. For the past seven years, he has been a mathematics professor in the School of Education at the University of California-Davis. During his career in education, he has written numerous textbooks (most recently, he is the lead author of the new Pearson Prentice-Hall Algebra series). He has been a frequent speaker at national and regional conferences. He is a national  $T^3$  Instructor and has worked with Texas Instruments in the development of many products.

Give yourself a great jump-start into the new school year and get an introduction into the newest graphing calculator technology. Dr. Bellman has established a national reputation for enlightening and entertaining presentations.

Let's have a great opening turnout and give him a warm Chicago welcome!

**REMEMBER!!** You can earn CPDU credits for attending dinner meetings!

**Date:** Friday, September 7, 2007

**Time:** 5:30 p.m. Doors Open  
6:00 p.m. Social Hour  
7:00 p.m. Dinner and Talk

**Place:** Fountain Blue Banquets &  
Convention Center  
2300 Mannheim Rd.  
Des Plaines, IL  
(847) 298-3636

**Cost:** Members \$31  
Nonmembers \$37

### RESERVATION DEADLINE

Monday, September 3, by noon,  
please!

### TO RESERVE:

Call Glenbrook South Math  
Department at (847) 486-4690 or  
email: [reservations@mmcchicago.org](mailto:reservations@mmcchicago.org)  
Requests for special meals *must* be made  
in advance.



### From Southbound I-294 & Eastbound I-290:

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; Exit at  
Touhy Ave. & Lee Rd.; Walk East on Touhy  
to Mannheim Rd.

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## Scholarship Winners

Congratulations to our three scholarship winners this year and thanks to all who encouraged students to apply! I would also like to heartily thank those who spent hours reading through our many terrific applications. The committee included Phil Gartner (Chair), Virginia Highstone, Stephanie Levin, and Carol Nenne. Many thanks to the Filliman family for their continued support, as well!

Nell Elliott is this year's MMC Scholarship winner. She attends Evanston Township High School and was nominated by John Benson.

Meghan Danielson attends Hersey High School in Arlington Heights and is a Filliman Scholarship winner. Chris Rugg sponsored her.

Mary Johnston is from Evanston Township and is also a Filliman Scholarship winner. John Benson nominated her.

Best wishes to our winners as they graduate this spring and embark on their studies to be mathematics educators!

-Phil Gartner, MMC Scholarship Chair

MMC BOARD OF DIRECTORS		Term
Conrad Wayne President	Chicago State University, Chicago	2006-2009
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John McConnell Conference Treasurer	North Park University	2006-2007

## Board Report Meeting of 21 May 2007

The Board of Directors held its fourth meeting of the 2006-2007 academic year on 21 May 2007.

Mary Wiltjer reported a club membership of 520, of whom 24 are first year members, 45 are retired members, 64 are student members, and 2 are life members.

The treasurer's report indicated that the club is in good financial shape; the Board approved his report unanimously. The Board decided to raise the membership fee for retired members to \$12 per year.

In addition to dealing with normal procedural and organizational matters, the Board decided to send Bob Ruzich to the NCTM Affiliate Leaders Conference in Chicago in August. The Board also began planning for a workshop for new teachers to be held during the first semester of the 2007-2008 academic year.

The next meeting of the Board is scheduled for 26 August 2007. Members of the club are welcome to attend any Board meeting, but please contact Conrad Wayne at [cwayne4833@sbcglobal.net](mailto:cwayne4833@sbcglobal.net) to learn the location of this meeting before 19 August if you plan to attend. Because this is a dinner meeting, you would be expected to pay for your meal.

### POINTS AND ANGLES

Volume XLI, Number 9, June 2007

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The official club website: <http://www.mmccchicago.org/>

Correspondence may be directed to the editor:

Isaac Greenspan  
6930 N. Sheridan Rd., #2  
Chicago, IL 60626  
[ilg@trica.com](mailto:ilg@trica.com)

# EXPLORING MATHEMATICS THROUGH INTERACTIVE ANIMATION

By Audrey Weeks at the May 11, 2007, MMC Meeting.

BY GEORGE PRYJMA

Entering to the beautiful imaginary strains of the mathematical song of romance, “It was animation I know, when it began at the MMC show, just a passing glance, just a brief romance, and animation turned to math,” Audrey Weeks enchanted us with an exciting and very moving presentation on the use of animation in the teaching of mathematics. Thanks to Audrey’s generosity, several well-selected examples from her talk are available at our MMCCHICAGO.ORG website (Geometer’s Sketchpad is needed --- evaluation copy may be downloaded at [keypress.com](http://keypress.com)).

A native of Wisconsin, Audrey is now a resident of sunny California and President of her own software company. Interested readers may wish to visit her corporate website [CalculusInMotion.com](http://CalculusInMotion.com) for demos and further information. Audrey kindly sent me a WORD version of her handout, which I have gratefully adapted for this summary.

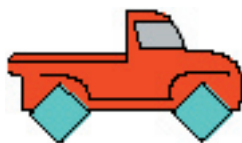
“What if...?” to “Let’s see.” – A Powerful Journey

Bracketing animated explorations by “What if...?” and “Let’s see” offers the students ownership of the solution and insight – whether they conjectured correctly or not. It is the “aaah, I see” moment that rises internally, giving students the confidence that comes with “I get that!”

1. “What if...?” (Pose a “What if...?” situation. Have students respond with their conjectures.)
2. Conjecture (Do not cut this step short! An animation may be opened here but without the key movement.)
3. “Let’s see.” (When appropriate - generally when conjectures are complete - the teacher needn’t comment on the correctness of the conjectures. Instead, he/she simply states, “Let’s see” and turns to the animation. The teacher or a student interacts with the animation to create the condition of the “What if...?” scenario, revealing the results.) Afterwards, discussion/reflection also may be appropriate.

Let’s try some...

- A. What if a farmer’s truck has square wheels. Sketch the roadbed that would provide a smooth ride.



- B. What if a wheel rolls along a horizontal path and picks up a stone...

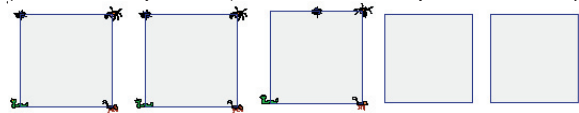


Cause/Effect - mix it up:

given initial alteration ..... conjecture effect  
 given desired effect..... conjecture cause

I find that students quickly begin to speak in “What if..?” language as well.

- C. What if 4 bugs begin at the corners of a square. At the snap of your fingers, each begins chasing the one clockwise next to it. If they run at an equal rate, what will be the paths of the bugs?



What if one bug begins at the square’s center?

What if the bugs’ paths are to be collinear; where do the bugs begin?

What if at least one path is to be part of a circle (or intersect itself); where would the bugs begin?

Advantages of Teaching through Animation

### UNFOLDS A PROCESS!

- Facilitates conjecturing - “What if...?”
- Teaches the phrase “For any...”
- Gives concrete form to ideas
- Allows variables to vary
- Greater understanding in less time and effort
- Reveals variations on central themes
- Captures attention, engages thought, enlivens explorations
- Shows motion/change
- Integrates topics; facilitates vertical teaming (whether curriculum is separate or integrated)

### Differences I’ve Noticed

- I left the front of the room; greater contact with students
- An animation running as students entered (a “hook”), immediately spawns mathematical discussions.
- Tangential explorations are deeper and more frequent
- I frequently learn something new from unexpected student insights – a great way to model learning

The evening ended all-too-quickly with raffle of Texas Instruments calculators and Audrey’s Algebra-in-Motion and Calculus-in-Motion software. Please thank our “procureur of corporate gifts” and MMC Board Member Ilene Hamilton for the calculators AND the appetizers.

## The Essence of Excellent Teaching (We are on a mission)

BY BOB RUZICH

On January 19, John Benson shared with a record audience of just under 200 people some of the wisdom, thoughts, and insights he has gained in his 39 years of teaching Mathematics. Of the many poignant things he shared, the one that describes the tone of the evening best is one that John shares at parent meetings: "I promise that I will try hard to make sure that something happens every day in class that can not be replicated anywhere else. If a student is not in class, that student will never be able to recapture that teachable moment, they will have missed something." This article will do its best to capture that evening, but if you weren't there, you really missed a special night.

In his presentation he stated:

I believe that part of my job is to frustrate students by asking interesting questions. It is then essential that I continually communicate to them that I believe that they can do these problems. Frustration is a necessary part of learning only when the student has a breakthrough and overcomes the frustration. The job if the teacher is to orchestrate these breakthroughs.

So, John began by posing several problems or by sharing problems that he and his students have posed over the years.

Sally's Patchwork Quilt Society decided to build a rectangular quilt to auction off as a fund raiser for a mathematical organization, of which Sally was a member. Each member of the society built a square patch, each of the squares were an integral number of inches along each side, and none of the squares were congruent. They had just the right number of members to make the smallest possible rectangular quilt. Sally was not the only member of the organization. How many members of the organization are there and what does the quilt look like?

This is one was posed by a student, Josh Carley, in his freshman geometry class: "A cube with side length  $S$  is rotated along its longest axis. What is the total volume of the shape created?"

It took some time, but when Josh appeared in his advanced Calculus class as a senior he developed the tools to solve this problem.

John then went on to share his "short" list on what an excellent teacher is charged with getting students to do:

Learn Concepts, Remember Facts, Communicate their thoughts verbally, Communicate their thoughts in writing, Work together, Work Independently, Complete Tasks in a Timely Manner, Meet Deadlines, Do their Best work, Act Responsibly, Plan Well, Use Technology when appropriate, Not use technology Compute accurately and appropriately, Reason Logically, Solve Problems, when appropriate, Become Independent Learners, Become Responsible Citizens, Appreciate the Utility of Mathematics, Appreciate the Beauty of Mathematics, Enjoy Mathematics, Take Notes, Apply Mathematics, Check for Reasonableness of Answers, Generalize, Make Connections, Draw Specific Conclusions, Dress Appropriately, Overcome Setbacks, Have Integrity, Take Pride in their work, Be Honest, Learn by Reading, Read for Understanding, Use proper Hygiene, Use proper language, Communicate with adults, Be in Class on time, Stay on task, Persist, Try Alternate Strategies . . .

As we gathered our breath and thought about this list, John then shared: How does one accomplish all of this . . . .meeting with 30 students at a time for 45 minutes a day for about 180 days, except for the inevitable field trips, trips to foreign countries, assemblies, pep rallies, illness, college visits, fire/tornado/code red, yellow, blue drills, and other interruptions? AND we also have to prepare them

for Mandated HIGH STAKES testing! Which means we must include "test prep" and use at least three days of instruction for state mandated testing. Three days!

John then shared with us a few strategies on how we can possibly accomplish all of this when as he stated " . . . we really can't afford to waste a minute of time". He started with a little inspiration with a clip from the Blues Brothers in which Jake and Elwood state that "We are on a mission"!

You must develop an efficient way to communicate solutions to homework, tests and quizzes that does not take up valuable instruction time.

There is a set of mailboxes in his classroom (one for each student). Test, quizzes, missed handouts, etc are all there. Classroom time is not spent distributing materials. Assignment sheets are here as well, all the student needs to do is look at the assignment number which is posted on the assignment board in the classroom. Solutions to problems are posted in the classroom.

Make the classroom friendly and inviting, filled with interesting MATH-EMATICS stuff. We were treated to pictures of John's classroom that had a large mobius strip and other intriguing geometric shapes hanging from the ceiling. Escher prints, posters of great mathematicians, the mathematical time line and pictures of his students on the walls. The color quilt that is the answer to the quilt question posed at the beginning of the talk and much, much more in the way of visual mental simulation. Establish a routine in your class so students will know what is expected of them each day. Try to be consistent, certainly about what happens the first five minutes of each class.

**The first five minutes is perhaps the most important part of the class.**

I meet my students at the door, every day, every time. **It is more important that I be at the door than anything else that I may think I have to attend to.** This initial contact, greeting the students by name and welcoming them into the classroom is critical to building any kind of relationship with them. When the tone sounds to start class, I check homework (He has not collected homework in 30 years) and collect information about what they had trouble with while they check their answers and work on the first opener.

We were then treated to another clip, this one from M.A.S.H. where Charles states to Hawkeye and BJ: " I do one thing, I do it very, very well, and then I move on."

I give them ONE PROBLEM  
I walk around and listen and watch  
I decide when the teachable moment has arrived  
When it arrives, I seize it with vigor  
I do NOT stop and tutor one student  
I rarely answer a question while walking around, and I certainly do not answer the question "Is this right?"  
I may pose another question, like  
"Are you sure that is right?"  
" Did you check your work?"  
"Can you think of another way to do it?"  
" Can you find the measure of any other angles in the picture?"  
"Did you get the same answer as Max?"

John then stated: I Believe Really good teaching is as much about what you don't tell them as it is about what you do tell them, (the teachable moment) Students, for the most part, don't KNOW they are suppose to learn something from doing a problem, they think they are supposed to DO the problem and then they are done. They want to "finish the sheet."



## NOTICES & REMINDERS

### MMC SPEAKER /MEETING DATES

2007-2008

September 7	Allen Bellman, Math Education Professor (U. of California-Davis)/ National Instructor/ Prentice Hall Algebra Series Author
October 12	Laurie Boswell, The Riverside School, Lyndonville, Vermont, McDougal-Littell author, past NCTM board member
November 2	Tom Oettinger, Reinhardt College (Georgia)
December 7	Jerry Cummins
January 11	P.J. Karafiol, Walter Payton College Prep High School
February 8	Michael Keyton, IMSA
March 14	David Thiel , Clark County School District, Las Vegas, Nevada
May 9	Zalman Usiskin , University of Chicago

**[HTTP://WWW.MMCCHICAGO.ORG/](http://www.mmcchicago.org/)**

Old issues of POINTS AND ANGLES, summaries of talks given at MMC meetings, the MMC Scholarship application, job openings and people looking for jobs, and more!

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### TI-Nspire Summer Institute

June 26, 27, 28  
9:00 A.M. – 4:00 P.M.

Glenbrook North High School  
Northbrook, Illinois

For More Information Contact:  
rlevine-wissing@glenbrook.k12.il.us or  
rklein9019@aol.com

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If you would like a notice or reminder to appear in **POINTS AND ANGLES**, please email the text you would like to appear to [ilg@trica.com](mailto:ilg@trica.com) no later than the date of the MMC meeting preceding the issue in which you would like it to appear. All notices are subject to editing.

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

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415 S. Ridgeland Ave. #2  
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