

# Mathesis

Volume 45, Issue 2

November 2012

## ATMNE Honors Dick Evans with the Fr. Stanley Bezuszka Award in Hartford

### **Upcoming Deadlines:**

- December 1: Speaker Proposals for NHTM Conference due
- December 15: Prevost and Evans nominations due
- January 1: Nominations for Balomenos award due
- March 15: End of Early-bird registration for NCTM annual conference

By Greg Superchi

At the opening session on Wednesday night, October 24, at the NCTM Regional conference in Hartford, **Dr. Richard Evans** (retired professor, Plymouth State University) was awarded the **Rev. Stanley J. Bezuszka, S.J. Lifetime Service Award for Mathematics Teaching and Learning** given by the Association of Teachers of Mathematics in New England. Congratulations Dick!



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For more information about the award including how to nominate someone, please go to *Susan and Richard Evans at the NCTM Regional Meeting in Hartford Connecticut*

<http://bilbowdish.ipage.com/atmne/bezuszka.html>

I will also remind you to nominate someone for the awards that the **New Hampshire Teachers of Mathematics** gives including the award named in Dr. Evans' honor, Dr. Prevost's honor (a former winner of the Father B Award), and others. You can find out more information about these awards at <http://nhmathteachers.org/awards-and-scholarships>.

# *Art's Attic: Nicolai Lobachevsky*

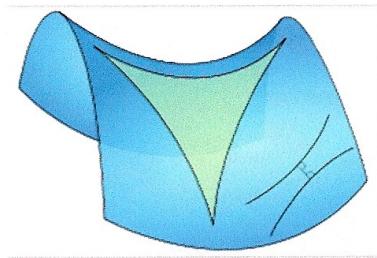
By Art Johnson

Russian mathematician Nicolai Lobachevsky (1792-1856) once wrote, "There is no branch of mathematics which may not be applied to the real world." You would think that such a statement meant that all his mathematics would be grounded in real-world applications. Nothing could be further from the truth.

Lobachevsky was the son of a Russian laborer who died when Lobachevsky was only three. His mother then moved with her three sons to Kazan, near Siberia. She taught the boys at home until they were ready for school. Lobachevsky was an adept student who excelled in all subjects. At age 13 he entered the University of Kazan. He earned a master's degree at age 18 and became a full professor ten years later. Lobachevsky was elected rector when he was 33. He was also the head librarian, headed the construction of new university buildings, and oversaw the observatory and the museum.

Despite all of this responsibility, Lobachevsky found the time to explore a new frontier in mathematics. On February 23, 1826 he delivered a paper, *A Brief Statement of the Elements of Geometry with a Rigorous Proof of the Theorem of Parallels*. It was based on a textbook he hoped to publish. (He never did publish that book because he used the metric system in it, and the Russians had had quite enough of anything French after Napoleon's invasion during the War of 1812.) His paper contained his discoveries about a new geometry that he termed 'imaginary'. Some three years later Nicolai Lobachevsky published his polished geometry article *On the Foundations of Geometry* in the *Kazan Messenger*. In the article Lobachevsky used proof by

contradiction to establish an entirely new geometry. Lobachevsky began with the statement that through a point not on a line there are at least two parallels to the line, which contradicts Euclid's Fifth Postulate that there is but a single parallel. As Lobachevsky developed his argument, he found no contradictions. He kept going, and eventually established a whole new geometry, based on what is called a hyperbolic surface.



Hyperbolic surface that represents Lobachevsky's geometry

Unfortunately for Lobachevsky, he wrote his article in Russian, not a common language among leading mathematicians of the day, and Kazan was on the edge of nowhere. This work and subsequent versions that followed were largely unknown beyond Kazan.

In 1840 Lobachevsky translated his latest geometry text, *Geometrical Investigation on the Theory of Parallels*, into French and German, hoping to reach a wider audience in the mathematics community. He sent a copy of his new book to the greatest mathematician in Europe, Carl Freiderich Gauss. Included in Gauss' otherwise supportive response to Lobachevsky was "You should know that for fifty-four years I have held the same convictions. I have found nothing that is new to me." Disappointed, but still hopeful, Lobachevsky pushed on, honing his ideas and publishing still another, updated version of his new geometry in 1855. Although he did re-

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# President's Message:

## *A Busy Season for NHTM*

By Greg Superchi

Hello mathematics educators! It certainly is a busy time of year for all of us (October, November, & December). It is no different for the NHTM! As you will read in the Secondary Representative's article, we continued to work with the NH Department of Education on the Secondary Task Force Report. I want to especially thank Christine Downing and Rich Andrusiak for their guidance and leadership on this issue. You can see on the front page of the newsletter, that Dick Evans earned a prestigious honor at the NCTM Regional Conference in Hartford, CT in October. Speaking of that event, our own Judy Curran Buck was the conference chair! What a great event where one was able to hear no less than four current/past NCTM presidents, other experts in mathematics education, get to shop in a huge vendor area, and network with colleagues from not only New England, but from all over the country.

Alongside this event was the annual fall Board meeting of the Association of Teachers of Mathematics in New England, the umbrella organization for the mathematics education associations in our region and an affiliate of NCTM. You are well represented on that Board with approximately one quarter being from NH including Christine Downing (Newsletter Editor), Beverly Ferrucci (Journal Editor), Karen Graham (Business Manager), Rob Lukasiak (NHTM's ATMNE Representative), and me. ATMNE's next fall conference is in Killington, VT. Pray for snow?

In our own slice of New England, your NHTM Regional representatives, led by Katrina Hall,

have been working hard to connect with you and offer experiences closer to your home. They send out emails to each of you letting you know about these opportunities and more. However, there are a couple of regions with no representative (more information in this newsletter). Here's your chance to get involved in NHTM. Let us know if you are willing and able!

Another great chance we had to get together was the Fall Dine & Discuss where the focus was the Common Core Mathematical Practices. What a great night! Christine Downing was the keynote speaker. She gave us many things to think about including how to implement the mathematical practices, questioning in the classroom, and a preview of the demands the new test may have on our students. We next had a delicious dinner during which our discussions carried on. This was followed by the grade level breakout sessions. Stephanie Wheeler led the K-4 session where, among other topics, she did a lot with iPads and the use of math apps in the classroom. Annie Wallace and Katrina Hall offered the 5-8 educators many activities that exemplify the Mathematical Practices. Everyone at this session walked out with a stack of ready to use activities! At the 9-16 session, Greta Mills also gave us some great activities to try and modeled them for us in her unique teaching style that lends itself so nicely to the theme of the night. Thanks to all those involved including Rich Andrusiak for chairing the event, the presenters, and Cecile Carlton for her work on registration (and all the work she does on membership daily).

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# *Post-Secondary Representative:*

## Time to Require More Mathematics at High School Part II

Editor's Note: The mathematical fonts in Rich Andrusiak's August 2012 column did not transfer accurately into the newsletter. The column is available on the *Mathesis* page of [www.nhmathteachers.org](http://www.nhmathteachers.org).

By Rich Andrusiak

Last May I wrote an article regarding recommendation #2 found in *The New Hampshire State Task Force on Mathematics Instruction – Report to the State Board of Education 2012*. Recall, that the report states that the task force was committed to two goals (NH Department of Education, 2012):

- Promoting K-12 mathematics curriculum and instruction that would **eliminate** the need for mathematics remediation at the post-secondary level; and
- Inspire educators to design and implement authentic mathematical activities, experiences, and assessments.

Furthermore, the recommendation as printed in the Task Force Report stated:

### **Recommendation #2**

Support the continuation of 3 credits in mathematics, but change the requirement from including algebra 1 concepts to demonstrating proficiency with algebra 1 competencies. Furthermore, the task force strongly recommends that all students take mathematics their senior year. A senior mathematics course should be designed to help students meet the mathematics placement requirements of NH colleges, or, if the student has already demonstrated college and career readiness, a course that more closely aligns to the student's aspirations.

In the May article, I cited the data and research that makes it clear that this recommendation is too weak to accomplish the goals in the report. Specifically, the recommendation is not

aligned with the mathematics expected to enter the workforce in careers that provide for advancement, nor with the mathematics required to successfully enter college (without needing any developmental mathematics).

You might also recall that Mike Shaughnessy, former (at the time current) president of the National Council of Teachers of Mathematics stated that the recommendation was "too soft" and that the top end of the recommendation was lower than what forty-five states have agreed to do, including NH. This comment was in reference to the Common Core states. He was very adamant that we need to specify what the mathematics looks like.

Rather than spending this article on why we need to have higher expectations, why students can achieve these standards, and why this is important for our society, I would urge you to read both the Task Force Report and the research from the Making the Transition from High School to College Grant. I will focus here on the latest developments.

This past summer, the NHTM Executive Board rewrote recommendation #2, voted unanimously to support the revision, and delivered the revised recommendation to the NH Department of Education together with a letter of support from Mike Shaughnessy. The New Hampshire Department of Education reconvened the Task Force to discuss the proposed revision. After much discussion, the NHTM board was asked to clarify a few points in the revised recommendation and create an addendum outlining steps that the NH Department of Education will need to take to support the recommendation. We were then asked to deliver both the addendum and revised recommendation to the State Board of Education for approval. On October 17, 2012 the State Board of Education voted to approve the following revision to recommendation #2:

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# *Secondary Representative* **Mathematical Modeling – Making Students Think!**

By Greta Mills

As I write this article, I am sitting in a computer lab with 27 math students who are participating in an international math modeling competition. The room is full of lively discussions, moments of frustration, minor mental breakdowns, some group singing, and a lot of food! The students are participating in the High School Mathematical Contest in Modeling (HiMCM), sponsored by the Consortium for Mathematics and its Applications (CoMAP). This 36-hour contest gives students the opportunity to use their current math skills to delve into a real-world problem, and to submit a solution abstract as well as a technical paper detailing their solution. The mathematics necessary for participating often extends no further than Algebra 2 / Trigonometry; in general, no particular mathematics content is specified. Hanover High School has participated in this contest every year since 2004, and most students cite it as a highlight of their high school mathematical experience.

While it is too late to register to participate in this year's contest, I thought it might be helpful to write about how to prepare a team; additionally, there are resources and other competitions that might be helpful.

## **Preparing a team:**

At Hanover, we offer a course in Mathematical Modeling, which is a natural fit for this competition; this year, we invited one team of students from Advanced Mathematics (our pre-calculus course). Although a great deal of class time has been spent creating a modeling disposition in each class, I believe that a modeling disposition can be developed in *any* class. There are a number of modeling activities and projects at a variety of levels that are interesting, non-trivial, and extraordinarily open-ended. As students gain experience in resolving open-ended problems, they will be more likely to engage in the kind of deep mathematical thinking that promotes perseverance in problem-solving.

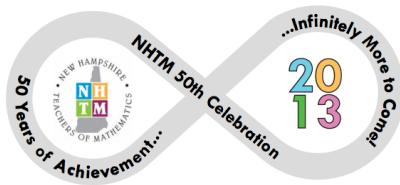
The **Common Core** encourages students to “model with mathematics” as one of the **Standards for Mathematical Practice**. The remaining standards serve to create a classroom environment that promotes robust mathematical thinking.

As part of Hanover’s Math Modeling and Advanced Mathematics curriculum, we have established **Classroom Goals**. These goals align well with the **8 Mathematical Practices** in that they also set

<b><u>Common Core: 8 Mathematical Practices</u></b>	<b><u>Classroom Goals</u></b> (based on <i>Mathematical Modeling</i> by Joshua Paul Abrams):	
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	1. Enjoy math! 2. Embrace challenge. 3. Simplify and generalize. 4. Create models that help you understand your world. 5. Make connections. 6. Question your results, and reexamine your premises. 7. Articulate your thought process. 8. Work cooperatively. 9. Work independently. 10. Use technology.	the tone for the work that we do in the class, and serve as a foundation for approaching modeling problems in general.

*(Continued on page 14)*

## Call for Proposals



New Hampshire Teachers of Mathematics 50<sup>th</sup> Celebration

2013 Annual Spring Conference

**50 Years of Achievement and Infinitely More to Come!**

April 5, 2013

Radisson Hotel, Manchester, NH

NHTM is seeking presentation proposals for the 2013 NHTM Annual Conference, which will honor NHTM's 50<sup>th</sup> year of service to mathematics educators across New Hampshire and the New England region. It will take place in Manchester, New Hampshire, at the Radisson Hotel on April 5, 2013. A celebration dinner will be held during the evening on April 4, 2013, to honor NHTM's 50<sup>th</sup> year as a leading mathematics professional organization in New Hampshire.

The theme for the conference is "50 Years of Achievement and Infinitely More to Come!" NHTM is hoping for presentations that emphasize the future of mathematics education including such topics as mathematical process standards, Common Core State Standards, SMARTER Balanced Assessment Consortium, response to intervention, differentiated instruction, formative assessment strategies, as well as connections to habits of mind, quantitative literacy, and NCTM process standards. There are two formats for presentations: sessions (1 hour) and workshops (1.5 hours).

NHTM does not offer an honorarium to its speakers. However, one speaker for each session receives a complimentary registration to the conference, including meals.

An exciting program is in the works and over 200 mathematics educators are expected to attend. Proposal forms and directions are available at: <http://tinyurl.com/8onz2aw>.

They can be submitted online, by email, mail or by fax. Proposals can be mailed to Christine Downing, 42 Brickyard Road, Goshen, NH 03752 or faxed to 603.863.1889. Please submit your proposal by December 3, 2012. Individuals will be notified about proposal decisions no later than January 15, 2013.

Should you have questions, please contact one of the program chairpersons listed below.

Christine Downing  
603.582.7340  
[Christine.downing@yahoo.com](mailto:Christine.downing@yahoo.com)

Kim Knighton  
603.991.9170  
[kknig@profile.k12.nh.us](mailto:kknig@profile.k12.nh.us)

Katrina Hall  
603.289.4923  
[katrinaleighhall@gmail.com](mailto:katrinaleighhall@gmail.com)

Suzy Gagnon  
[ssgagnon@gmail.com](mailto:ssgagnon@gmail.com)

# *Elementary Representative*

# Generational Diversity

By Stephanie Wheeler

I recently took the course ***Staff Development and Evaluation*** with Rose Colby at Plymouth State College. One aspect of the course that really intrigued me was our work around generational characteristics. In sharing what I learned, I would like to recognize that most of the information below comes from a powerpoint shared with me by Rose Colby. Please note that in the article I focus primarily on the “***Millennial*** Generation.” Information on “***GenNexters***” is a bit premature, as many “***GenNexters***” have not even been born yet! However, it is my belief that accommodating the learning styles of ***Millenials*** will also benefit our ***GenNexters***, who are our elementary school students right now.

Our “***Millennial*** Generation” students, roughly defined as students born between 1979–2000, and our “***GenNexters***,” those born in 2001 and after, clearly have generational characteristics that may be very different from you and me. Less characteristic differences if you yourself are a ***Millennial*** however. Remember, that many of our young teachers (anyone in their early 30’s and younger) are themselves ***Millenials*** and therefore may share many of the generational characteristics of their students.

These ***Millennial*** characteristics include:

- Feeling Confident but Pressured (both characteristics encouraged by Baby Boomer and GenX parents)
- Being Diverse, Hopeful and Civic Minded
  - A “No one left behind” mantra
  - Being Achievement Oriented but not “Workaholics”
  - Function best when “networked” and as part of a team
  - Thrive on instant gratification and can “multi-task”
  - Being a Digital Native
  - Having a larger visual cortex in the brain

So how important are these characteristic differences when we are teaching with, or teaching to, a ***Millennial*** or ***GenNexter***? The traditional thinking that we, as teachers, have about our students’ cognitive development, may no longer hold true for our ***Millenials*** and ***GenNexters***. Take a look at how these differences may contribute to a disconnect between how we may be inclined to teach and how a ***Millennial*** would like to learn:

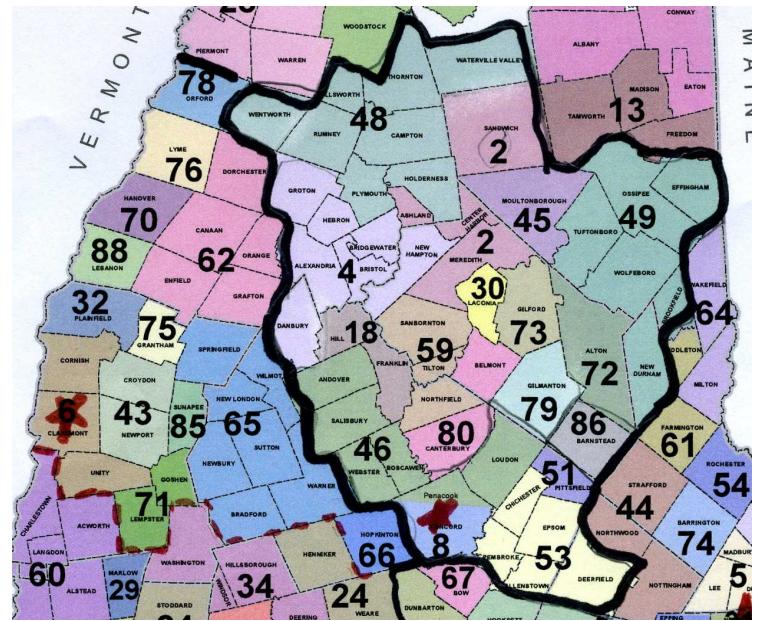
If we characterize the learning style of ***Millenials***, it would include:

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## Many Opportunities to Support Mathematics Education in New Hampshire

## Regional Coordinators Needed in Western and West Central Regions

Are you an NHTM Member living in the area mapped to the right, either the Central Region from Concord to Waterville Valley or the West Central Region including Claremont, Hanover, and Hopkinton? If so, please consider being a regional coordinator. It's a great way to meet other mathematics teachers in your region and to bring NHTM and NCTM professional development and networking events to your area. NHTM will assist you in planning, funding, and promoting these events. Contact [katrinalleighhall@gmail.com](mailto:katrinalleighhall@gmail.com) for more information about this opportunity.



# **WANTED**

## **Writer for State Mathematics Competition**

Each year NHTM and the Mathematics Departments of the University System of New Hampshire invite high schools to form ten member mathematics teams to compete in the state mathematics competition. Teams have the opportunity to meet with other students from throughout the state and solve challenging

mathematics exercises in six different categories – Team, Recreational Mathematics, Algebra I, Geometry, Algebra II, and Advanced Mathematics.

The questions for the state mathematics contest are written by a secret committee. One of the members of this writing committee, pictured here, is retiring. Thus, the writing committee is looking for a new member. If you are interested in this volunteer position, please send an e-mail to [nhmathcontest@gmail.com](mailto:nhmathcontest@gmail.com).

While the writing committee can not mention the retiring member by name (since the committee is secret after all), they would like to sincerely thank this member for years of dedication. The committee wishes this member the best.

## Call for Nominations to the NHTM Board

The NHTM Executive Board seeks members who are willing to become active on the Board and to share ideas. Please consider nominating yourself or another person for one of the three positions described below.

The **President-Elect** shall be elected in odd-numbered years, become President after one year, and serve a term of two years, to be followed by a term of one year as Past-President.

The **Treasurer** serves for two years and may be reelected at the will of the membership. The Treasurer shall collect all monies due NHTM; prepare a budget for consideration by the Board at its spring meeting; be custodian of the NHTM funds, expend funds as authorized by the Board; and prepare a financial report for each Executive Board meeting and the annual business meeting.

The **Post-Secondary Representative** shall serve for three years. S/he represents the concerns of the post-secondary school mathematics community in all activities associated with NHTM; attends all Executive Board meetings; promotes activities of NHTM to colleagues; assists in planning conferences and professional development opportunities; writes a column for each issue of *Mathesis*; and, once a year, prepares or secures a special classroom activity insert for *Mathesis*.

To nominate yourself or suggest another NHTM member for any of these positions, please contact Judy Curran Buck at [jcurranbuck@aim.com](mailto:jcurranbuck@aim.com).



Exhibits, presentations, workshops, and networking are all key features at NHTM conferences. In this photo, math teachers enjoy the exhibits at the March 2012 NHTM Conference in Plymouth. Make plans to attend this spring's conference and 50th anniversary celebration, April 4-5, 2013, in Manchester.

# Middle Level Representative Perseverance

By Katrina Hall

With the transition to the Common Core and a recent session at the IMPACT Center at Plymouth State University, the mathematical habit of mind “perseverance” has come into the forefront of my teaching and planning. What does it mean for students to persevere in the math classroom? How can we teach this to students? How can our lessons, activities, instruction and curriculum encompass this idea of perseverance?

The quick and easy answer here is problem solving. Ask teachers how to challenge students and the likely response will include problem solving. Check in with directors of mathematical instruction and surely problem solving will arise as a focus or solution in one way or another. However, problem solving does not appear to be a simple answer for developing and promoting perseverance in our students. In reality problem solving is what makes our students throw their hands in the air. One could say problem solving is the anti-perseverance.

Engaging students in the problem-solving process can be described as exploring, examining, applying, testing, reflecting and developing conjectures. Students are given mathematical problem upon problem with the dream that consistent exposure will develop student understanding and mathematical skills needed for the real-world. The emphasis becomes cooperative learning, active participation and investigations that build new knowledge. Again, where does the habit of perseverance come into play? It is expected but how is it taught?

Perseverance is commitment, hard work, patience and endurance. Perseverance is a willingness to try and try again. Check Web-

ster’s online dictionary and you will see perseverance defined as a “continued effort to do or achieve something despite difficulties, failure, or opposition: the action or condition or an instance of persevering.” How do we incorporate this into our mathematical classrooms? We expect our students to persevere and want students to develop this habit of mind. How can we accomplish this?

There is not a quick and simple answer to teaching perseverance. It is not going to magically happen in one class or even in one year. As educators we can only model, expose and encourage this habit on a regular basis.

Here are some suggestions on how to develop perseverance:

- Give students non-routine problems which may appear impossible.
- Let students wonder and inquire for extended times. Refrain from giving out the correct answer. Prolong the awe and wonderment for class periods, days, and even weeks.
- Allow students to share observations and build off one another’s reasoning. Let students support and argue the findings of another.
- Ask questions and expect students to prove themselves. Expect convincing arguments.
- Let students experience failure. It is okay for students to take a risk and find out that was the wrong route to take.
- Work with students and show them that you don’t have all the answers. Model the process of learning together.

Perseverance....the habit of mind which teachers are expected to teach requires perseverance by teachers to perfect.

*Activities for the Classroom:*

## Persevering Problems

Let your students develop perseverance:

- This problem has been attributed to Sir Isaac Newton. Three cows eat in two weeks all the grass on two acres of land, together with all the grass that grows there in the two weeks. Two cows eat in four weeks all the grass on two acres of land, together with all the grass that grows there in the four weeks. How many cows, then, will eat in six weeks all the grass on six acres of land together with all the grass that grows there in the six weeks? Assume that the quantity of grass on each acre is the same when the cows begin to graze, that the rate of growth is uniform during the time of grazing, and that the cows eat the same amount of grass each week.
- On the last day of school, Mrs. Hall gave jellybeans to her class. She gave each boy as many jellybeans as there were boys in the class. She gave each girl as many jellybeans as there were girls in the class. She had bought 400 jellybeans. When she finished giving them out, she had 6 left; she ate these herself. How many students were in her class?
  - o Extensions: What if there were the same number of boys and girls in the class? Will Mrs. Hall necessarily have more jellybeans for herself?
- What is the largest amount of money you can have using U.S. coins and still not be able to make a dollar exactly?
- In a non-leap year, what day is exactly in the middle of the year and what time is it?
- Create a 10-digit number so the digit in the first box tells how many zeros are in the entire 10-digit number, the digit in the box marked "1" tells how many 1's are in the number, and so on.



*Stephanie Wheeler observes as Dine and Discuss participants try elementary math iPad applications.*

## Across the Regions

### South Central Region: Discovering Tasks

By Pat Marquette

On Wednesday, October 24<sup>th</sup>, NHTM's southern region held their first event of the year entitled "Discovering CCSS Mathematical Tasks". With 25 teachers from around the state attending, the time was spent meeting and sharing perspective on the common core. While some schools were just beginning to transition, others were mapping the GLEs to the common core using crosswalks, and some were starting to embed the CCSS into their current curriculum. Various grade levels were represented ranging from grades three to eight. As they sat by grade level, they discovered just how rigorous the common core tasks are by looking at various samples and working through them. What they realized is that students will be asked to draw upon previous knowledge so the focal point might be a certain standard but by no means is it isolated to just that one standard. Teachers shared not only where they are in the transition, but what strategies they were using to sort through numerous resources.

### Regional Coordinators:

We are still looking for a Central and a West Central coordinator (or a pair of co-coordinators). If you're interested in volunteering, contact Katrina Hall or any NHTM Board member.

North: Kim Knighton      [kknig@profile.k12.nh.us](mailto:kknig@profile.k12.nh.us)

Southwest: Bernadette Kuhn      [bkuhn@mrsd.org](mailto:bkuhn@mrsd.org)

West Central: open

South Central: Pat Marquette & Katrina Hall

[patricia.marquette@sau41.org](mailto:patricia.marquette@sau41.org)  
[katrinaleighhall@gmail.com](mailto:katrinaleighhall@gmail.com)

Central: open

South East: Lauren Provost    [laureneliz2@yahoo.com](mailto:laureneliz2@yahoo.com)

# President's Message

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That brings me to our next big thing: NHTM's 50<sup>th</sup> Celebration and Conference on April 4 & 5, 2013. Our theme is "50 Years of Achievement – Infinitely More to Come." We have lots of ideas in the works including a dinner on Thursday night celebrating the "50 Years of Achievement," followed by some historical comments by those who have been involved in our organization for years (we hope these are both fun and reflective!), as well as some other entertaining ideas I'm not allowed to reveal yet! I know Dave Kent, NHTM's Historian, is working to dig up all kinds of interesting artifacts. On Friday, we will have the main conference focused on "Infinitely More to Come." There are too many on the conference committee to list here (about 20), but thanks go to all of you! We plan to have this event kick-off the yearlong celebration. Amanda Benware, Andrea Drake, and Craig Sheil continue to work on events and activities to engage the membership beyond the conference. It truly is a great accomplishment – 50 years!

That's 50 years of folks serving each other. It takes a great deal of time and sacrifice to make an organization such as this run. It takes a great commitment and unseen sacrifices on the part of many, rather than a few. I cannot even begin to estimate the time folks have given during those 50 years. I have just a glimpse of that now in my current role in the organization and it astounds me. Connie Upshulte continues to keep our finances in order as Treasurer of NHTM as well as picks up the slack in most anything we ask her to do. Many of these things she and other Board members do go unseen and, sometimes, under appreciated. Don West weighs in from an administrators perspective whenever we need him. He does his best to fit us in between all the meetings and responsibilities every school administrator struggles with daily. God bless them! I haven't even mentioned our new website. It has taken years, and hours and hours of individual members' time, to get this up and running including a ton of time training and polishing by Matt Treamer as Webmaster. It continues to be, and always will be, a work in progress for us. Finally, this great newsletter takes the resources of many to create, but none compared to what Terri Magnus as Editor does now and David Kent did for so many years. Terri and Matt have been working to move this to the electronic version you see today. No more trips to the publisher and mailroom!

So, please remember this when you receive your next email from your regional representative, attend an NHTM conference, see a post updating you on NHTM doings on NHMathEd, hear of the awards NHTM gives (yes, your grade level representatives and others will be spending hour after hour seeking nominations, going through applications, looking at work, and visiting classrooms very soon), or see anything else related to NHTM. These are people, just like you, who are very busy in their own personal and professional lives sacrificing hours and hours every year for the growth and betterment of your organization, mathematics teaching, and the mathematics students of New Hampshire. Thank them next time you see one of them. I know I do.

## Secondary: Resources for Modeling

(Continued from page 5)

### Modeling Resources:

[www.comap.com](http://www.comap.com)

This website, sponsored by CoMAP, includes textbooks, modeling handbooks, contests, online resources, and more. The Math Modeling Handbook contains 20 activities aligned with the Common Core in the area of modeling.

<http://www.mathmodels.org/>

This is a modeling forum affiliated with CoMAP and houses a number of different projects / activities.

### Contests:

**High School Mathematics Contest in Modeling** (<http://www.comap.com/highschool/contests/>) - This 36-hour contest takes place in early November. Schools can register as many teams as they want, with a maximum of four students per team. There is a registration fee associated with this contest.

**Moody's Mega Math Contest** (<http://m3challenge.siam.org/>) is a 14-hour contest in March of each year. This contest is open to up to two teams of five from each school, and there is no registration fee.

Contest problems often reflect current issues; for example, past **HiMCM** problems have focused on skyscraper evacuation plans, tsunami warning systems, and gasoline supply and demand chains. Other problems are more timeless, such as the classic falling ladder problem and a cops-and-robbers scenario.

### Conferences:

I highly recommend the Anja S. Greer Conference on Mathematics, Science, and Technology ([http://www.exeter.edu/summer\\_programs/7325.aspx](http://www.exeter.edu/summer_programs/7325.aspx)). There are many opportunities for learning more about modeling with mathematics.

### Call for Nominations

A final reminder that we are still accepting nominations for the **2013 Richard C. Evans Distinguished Mathematics Educator Award** given by the New Hampshire Teachers of Mathematics. The intent of the award is to highlight creativity and innovation in the teaching of mathematics to all students. The recipient of this award will represent Dick's philosophy, passion and knowledge of mathematics education.

The recipient will receive a plaque of achievement, a \$500 prize, a one year membership to NHTM, and become an honorary board member for one year. The presentation of the award will be made at the NHTM Spring Conference.

Nomination forms and applications can be found at [www.nhmathteachers.org](http://www.nhmathteachers.org).

Nominations are due by December 15th and should be sent to:

Greta Mills c/o Hanover High School  
41 Lebanon Street  
Hanover, NH 03755  
(603) 643 3431 x2309  
FAX: (603) 643 0661  
[greta.mills@dresden.us](mailto:greta.mills@dresden.us)

## Elementary Representative: How do Millenials Learn?

(Continued from page 7)

Millenials Prefer...	Many Educators Prefer...
Receiving information quickly from multiple sources	A controlled release of information from limited sources
To process pictures and video BEFORE text	To provide text BEFORE pictures and video
Random access to hyperlinked multimedia information	Information in a linear, logical and sequential order
Simultaneous networking with others	Students to work independently BEFORE networking with others
Instant gratification and immediate rewards	Deferred gratification and delayed rewards
Learning that is relevant, active, fun and instantly useful	Teaching memorization or teaching in lecture format

Learning by doing and interacting;

Never reading directions,

Why would I read directions when I can learn it by doing it?

Find lectures boring;

Prefer active learning, including simulations and technology integration

So how are we going to respond to the information about the developmental nature of the brain of the **Millennial** learner? What are the educational implications for us as educators? Here are a few major take-aways:

Observe our students' learning behaviors and **ask them** what they like to learn and how they like to learn it;

Ensure that learning is fun by:

Giving students the opportunity to learn together everyday,

Letting them work with their friends;

Respect and validate both student ideas and student ideals,

Seek out student input;

Be flexible,

Don't resist changing the "way we've always done it",

Learn alongside our students;

Utilize technology,

Let out students help us utilize the technology.

From the desk of the membership Chair:

## RENEW and/Invite Others to Join NHTM

**Membership Updates:**

As of 9 November 2012

	Current until Dec <b>11-12</b>				Up-to- date <b>Total</b>
		<b>12-13</b>	<b>13-14</b>	<b>14-15-16</b>	
<b>Individual</b>	121	296	29	3	449
<b>Institution-</b>	1	3			4
<b>Totals</b>	122	299	29	3	453

This may be your last issue of Mathesis - do consider renewing to keep current with professional information and keep connected with mathematics teachers across the state. Our regional groups have held and continue to plan sessions around the Common Core and teaching related to elementary, middle, or secondary levels. Don't miss out - keep current with your dues. See our \*web site: <http://www.nhmathteachers.org/> for an NHTM renewal form or information for elementary teachers about New Hampshire Joint Membership with other content professional organizations -NHJEM.

Also a huge *Thank You* to all members who have made additional contributions to our scholarship fund.

Have a wonderful Holiday and don't forget to send in your renewal. E-mail me if you need to check on your status: [cecile.carlton@comcast.net](mailto:cecile.carlton@comcast.net). Dues must be received by December 15<sup>th</sup> to keep you on our mailing list. We have a grand 50<sup>th</sup> celebration coming in April 2013 - you will want to be able join us!

Make your Check payable to NHTM - \$25 for 1 Year

Mail to: Cecile M Carlton, NHTM Membership Chmn., 3 Wentworth St., Nashua NH 03060

### NHMathEd Listserv

Are you a member of the NHMathEd listserv? This is a free service for Mathematics Educators throughout the state of New Hampshire. Messages relating to workshop opportunities, participation in projects, collaboration with fellow mathematics educators; and much more are posted through this service.

Use the link <http://toto.plymouth.edu/mailman/listinfo/nhmathed> and follow the directions provided. If you have questions about this service, contact Christine Downing at [Christine.downing@yahoo.com](mailto:Christine.downing@yahoo.com). Please consider joining today!

# Crawf's Cauchy Corner

## *Greetings from Arizona – The Grand Cranky State!*

By Jim Crawford

My latest incarnation finds me here in the heat, tutoring at Central Arizona College in Coolidge. The school, formerly the Pinal County Community College, offers math courses ranging from arithmetic to differential equations and serves both a traditional-residential and a non-traditional group of students.

The Learning Center of the school, where I do my work, is staffed from 8AM to 8PM. At the busiest times of the day there are at least three math teachers available to answer questions and help students with the completion of homework assignments. It offers these students, who would be struggling and failing, the opportunity to not just pass, but to do very well in their math courses. Now isn't that a novel idea?

Is there a reason we can't offer this same type of assistance to our middle and senior high school students now that we insist on their taking Algebra I, ready or not?

My view on the "Algebra for Everyone at the Same Time and Level" fad has already been documented. But if the people in charge insist upon doing it they should start supplying the wherewithal for students to meet the expectations of the course. It is all well and good to shout from the rooftops that "This is the math they will need to get meaningful jobs!" but it certainly does little good if the student fails the course. Expecting all thirteen and fourteen year olds to reach a mature decision about what they need to do to pass is pure folly.

As I reported a couple years ago, Arnold, in his infinite wisdom (except about extramarital affairs) decided that all California 8<sup>th</sup> graders would be taking Algebra I. What a great idea! This would even give them a jump on the poorer, but well meaning states that decided that all 9<sup>th</sup> graders would be thrown into the Algebra pit. Whoops, over fifty percent of these students are repeating Algebra in high school. But, the people in charge decided that they would have to make a harder course for those who failed, because obviously they must have learned something the first time around, and "God Forbid" that they find any math course less challenging than sky diving the cliffs of Acapulco.

So I would propose that we offer tutoring for all these students floating helplessly through Algebra. If we are going to make them take it, give them a decent shot at passing it. What could be holding us back? Only the driving force of American Public Education – MONEY! If it costs, we ain't doin it.

One solution might be that we set off an area in the library and assign a math person or two or three or four to cover it. Let some upperclassmen join in the fun of tutoring. Maybe a parent or two could help. If it is good for society that all these puppies are taking Algebra, then society should be getting into the mix. Perhaps an hour or two at night could be set aside for help sessions.

Those are just a couple suggestions, but the solutions should be left to those who have determined that Algebra can be taught to the unwilling.

## Art's Attic: Lobachevsky

(Continued from page 2)

ceive local awards and honors for his work, he was still largely unknown, even within the greater mathematics community. The next year Lobachevsky died, he and his work relatively unknown to the outside world.

As with a number of other mathematicians,

fame and adulation have settled on Lobachevsky's shoulders, but long after his death. There are stamps, statues, plaques on buildings and the title Father of Non-Euclidean Geometry. All of it a bit late for the visionary Russian mathematician whose imaginary geometry was an unparalleled (I couldn't resist!) discovery.

# Recommendations for High School Mathematics

(Continued from page 4)

## Revised Recommendation #2

Encourage all students to complete mathematics each of their four years in high school demonstrating proficiency and substantial depth of understanding that is directly aligned to any of the four model course pathways articulated in *Common Core State Standards for Mathematics Appendix A : Designing High School Mathematics Courses Based on the Common Core State Standards*. In addition, ensure that the high school mathematics curriculum focuses on mathematical practices, quantitative literacy, and statistical reasoning so all students meet rigorous competencies in these areas that are aligned to Common Core State Standards. Develop flexible paths that allow students to meet these standards through a focus on communication, reasoning and sense making, and mathematical modeling.

This is an important shift in mathematics for the state of New Hampshire and one of the first steps in addressing the mathematics remediation issue at post-secondary institutions. The next step is making this recommendation part of state policy (i.e., part of the school approval standards).

The NHTM executive board has already made contact with the Department of Education regarding this important step. Stay tuned for further updates.

If you have comments, questions, or concerns, please feel free to write to me at [randrusi.ak@ccsnh.edu](mailto:randrusi.ak@ccsnh.edu).

## ***Professional Development and Conferences***

### National

Joint Mathematics Meetings	San Diego CA	9 - 12 January 2013
NCSM 45th Annual Conference	Denver CO	15 - 17 April 2013
NCTM 91st Annual Meeting & Exposition	Denver CO	17 - 20 April 2013
T3 Annual Conference	Philadelphia PA	8 - 10 March 2013
ICTCM 25th Annual Conference	Boston MA	21-24 March 2013
AMATYC 39th Annual Conference	Anaheim CA	31 October - 3 November 2013

### Regional

NCTM	Baltimore MD	16 - 18 October, 2013
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### State

Christa McAuliffe Technology Conference	Manchester NH	27 - 29 November 2012
NHTM Annual Spring Conference	Manchester NH	4-5 April 2013
41 <sup>st</sup> annual State Mathematics Contest	TBA	March 2013

*Mathesis* is the newsletter of the New Hampshire Teachers of Mathematics. It is published four times a year: August, November, February, and May. The mission of the New Hampshire Teachers of Mathematics is to provide vision and leadership in improving the teaching of mathematics so that each student is ensured quality mathematics education and each teacher of mathematics is ensured the opportunity to grow professionally.

# NHTM Executive Board

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Please visit <[www.nhmathteachers.org](http://www.nhmathteachers.org)> for more detailed Board information.

## NewsBytes—NewsBytes—NewsBytes

### A message from NCTM to affiliates:

On November 20, 2012, at 10 a.m. Pacific Time, Change the Equation (CTEq) released iON Future—a suite of free online learning games to introduce middle to early high school students to an array of STEM-based professions—at NASA's Jet Propulsion Laboratory in Pasadena, California. Educators, adult youth leaders, and parents may use the learning guide to introduce iON Future to your people anytime after November 20. It will remain available free of charge. And pending evaluation, CTEq's board will consider building the game out in new ways in 2013.

### Spotted in another affiliate's Newsletter:

The National Council of Supervisors of Mathematics, NCSM, a nationwide affiliate of NCTM, spotlighted NHTM past-president, Judy Curran Buck in their Winter 2012-2013 newsletter. Judy was recognized for her service to NCSM, NCTM, ATMNE, NHTM, and mathematics education in New Hampshire, including her service as Program Chair for last month's NCTM conference in Hartford, as NCSM's NH State Team Leader, and her on-going work to provide professional development and assist New Hampshire implement the CCSSM standards. Congratulations, Judy! We appreciate your contributions to NHTM and mathematics education in general!

