



Mathesis

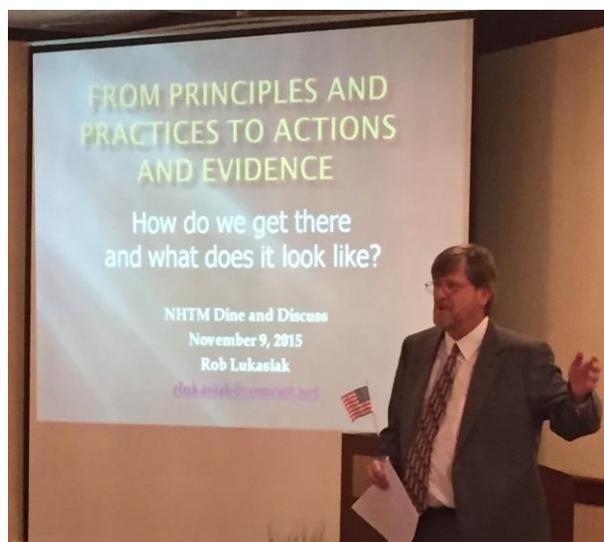
Volume 48, Issue 2

November 2015

Dine and Discuss:

From Principles and Practices to Actions and Evidence – How do we get there and what does it look like?

Nearly 100 educators from around the state gathered at the NHTM Dine and Discuss event in November to discuss how to move from principles and practices to actions and evidence. Robert Lukasiak was the keynote for this event. After dinner, Stephanie Wheeler and Jess Jacques (Pre-K-4), Annie Wallace (5-8), and Rob Lukasiak and Jeanine King (High School and Pre-service teachers) facilitated breakout sessions related to the concepts addressed in the keynote address.



Upcoming Deadlines:

- Prevost and Evans Award Nominations- December 15th
- NHTM Spring 2016 Conference Proposals- December 21st
- Balomenos Award Nominations- January 1st
- Information for February Mathesis- January 18th
- ATMNE 2016 Fall Conference Proposals- February 8th
- NHTM/PSU NH State Mathematics Competition- March 15th

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President's Message: **Keeping Members Up-to-Date on NHTM Happenings!**

By Cecile Carlton

Did you know that when you join **NHTM** – **New Hampshire Teachers of Mathematics**, you automatically become a member of the **Association of Teachers of Mathematics in New England (ATMNE)**? **ATMNE** members receive two annual newsletters, the New England Mathematics Journal (NEMJ), invitations to regional conferences at member rates and more. All ATMNE publications have gone **GREEN** so make sure you keep your email up to date. The New England Math Journal will require a login via our www.nhmathteachers.org web site. Be sure to keep your e-mail contact information up-to-date and watch for the message to set up your login to the website for access to the New England Mathematics Journal (NEMJ).

Did you know that sometimes members confuse NHTM with NCTM? We are affiliated with ATMNE, which is also an affiliate of NCTM. Being a member of **NCTM** does not give you NHTM privileges, such as registration to NHTM or ATMNE activities, you need to be a member of NHTM for those amenities. Our membership may keep you informed of NCTM activities, but you also need to be an NCTM member to be afforded membership rates at their conferences and workshops. You can join NCTM on-line at www.nctm.org and when you become a member, check that your local affiliate is NHTM.

ATMNE 2015, “Show us your **Moxie!** Distinctively DIFFERENT Teaching” just concluded a very successful two-day conference in Portland, Maine on October 29-30, 2015. Keynoters and sessions were well attended, over 550 participants joined in. Congratulations to ATOMIM, Maine’s teacher group on a conference done well! Next year NHTM is hosting and we are expecting as good a turnout or better. With help from our membership, we can make it happen. Here is a link for a SAVE the Date reminder <http://www.nhmathteachers.org/ATMNE-2016>. The link to the Fall conference is atmne2016.org. You can also access us via our www.nhmathteachers.org.

Items of Interest:

October: NHTM submitted a proposal for an ATMNE grant and at the October 28, 2015 board meeting we were awarded the grant. It’s purpose: *to introduce and carry out a state-wide book study using the **NHTM regional structure** to sustain small groups in discussion of the readings and using the NHTM Dine and Discuss Dinner Conference in November 2015 to launch the book study and to provide a culminating activity/discussion as one session at our 2016 Spring Conference.* Watch for information from your regional coordinator if you are interested and seeking more information. See [web site](#) for identifying contacts in your region.

November: Dine & Discuss at Holiday Inn in Concord NH on November 9th. **“From Principles and Practices to Actions and Evidence—How do we get there and what does it look like?”** Rob Lukasiak was the Keynote Presenter.

President's Message: **Keeping Members Up-to-Date on NHTM Happenings!**

(CONTINUED FROM PAGE 2)

November-February: Nominate outstanding teachers for the [Prevost Award](#) (teachers in their first 5 years of teaching), [Evans Award](#) (teachers with more than 5 years of teaching), or [Balomenos Service Award](#) (members who provide service to the mathematics education community).

Are you looking to expand your leadership experiences? Consider running for a seat on the NHTM Executive Board. Contact [Annie Wallace](#), our President-Elect and chair for NHTM Nominations if you want to run for the Secretary position or the Post Secondary position or you want to nominate an individual. (Those running for office do need to be members whose dues are up-to-date.)

NHTM Executive board meeting is scheduled for December 1, 2015 in Concord, NH at PSU 2 Pillsbury Street. Meeting is scheduled to begin at 4:30 pm. Contact [me](#) if you would like to attend.

Submit your proposal to speak at our **NHTM Spring 2016 Conference**. Are you ready to advance to your next level in your professional development -

Consider submitting a proposal to present at our **March 18, 2016** NHTM Conference: The New Hampshire Teachers of Mathematics (NHTM) will be hosting its annual spring conference on March 18, 2016, Keene State College, in Keene, NH. The title of the conference is "March Forth with R2Q2." (March Forth with Rigor and

Relevance and Quality in Questioning). NHTM is looking for presentations that emphasize the eight standards for mathematical practice found in the Common Core State Standards for Mathematics, along with presentations focused on the connections between the Standards for Mathematical Practice, the Standards for Mathematical Content and STEM connections. There are two formats for presentations: sessions (1 hour) and workshops (1.5 hours). **The submission deadline for speaker proposals is December 21, 2015.** Speakers will be notified by January 25, 2016.

NHTM is also hosting ATMNE 2016. The web page for ATMNE 2016 is under development but you can also submit a proposal to present at the **Fall ATMNE 2016 "Vote with Math! Developing Informed Citizens Through Mathematics"**. [Submit your speaker proposal by February 8, 2016 to be considered for the program.](#)

March: The New Hampshire Teachers of Mathematics (NHTM) will be hosting its annual spring conference on March 18, 2016, Keene State College, in Keene, NH. The title of the conference is "March Forth with R2Q2." (March Forth with Rigor and Relevance and Quality in Questioning). *Watch for registration information in late January. Information will also be posted on our [website](#).*

NHTM State Mathematics Contest – *Plymouth State University, Plymouth NH-* Tuesday, March 15th, 2016 (with a snow date of Wednesday, March 16th, 2016) at Plymouth State University

May: Scholarship information will be due. Scholarships for [High School Students](#) and for NHTM Mathematics Major & Mathematics Education Major Scholarship: [Undergraduate College Student](#).

President's Message: **Keeping Members Up-to-Date on NHTM Happenings!**

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Summer: June 27-29, 2016 at IONA College (near NYC) **The First New3 Math Conference.** See information in this issue. Make plans now – mark your calendars!

We will also need help on our committees for the ATMNE conference – if you live in

or near Manchester and would like to chair our Hospitality committee – contact me nhtmpresident@nhmathteachers.org. It would also be great if we had some Manchester teachers who would be willing to chair the 'Volunteers Committee' <https://sites.google.com/a/nhmathteachers.org/atmne2016/call-for-volunteers> and offer to have some students help out over the 2 days in October 20-21, 2016 with session support or other areas where an extra pair of hands would be appreciated.

There is much to do – we hope you can join in on some if not all of our planned activities!

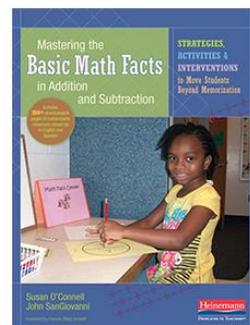
Elementary Representative **Computational Fluency Without the Stress**

By Amy Gregoire

I often hear teachers' concerns that their students don't know their facts, whether it is addition and subtraction or multiplication and division. This is usually followed by, "When I was in school we just had to memorize them. Why don't they know their facts?" In the past the fix for this problem for many teachers, including myself, has been to administer timed tests to their students.

Jo Boaler, a Stanford professor of mathematics education has done a great deal of research on the effect of timed tests on students. She states that for about one-third of students, the onset of timed testing is the beginning of math anxiety. Sian Beilock and her colleagues conducted a study. They studied people's brains through MRI imaging and found that math facts are held in the working memory section of the brain. When students are stressed, such as when they are taking a timed math test, the working memory becomes blocked, and students cannot access the math facts they know. As students realize they are not successful on timed tests, they start to develop anxiety and their mathematical confidence suffers. This often turns students away from math. Professor Mahesh Sharma, President of the Center for Teaching/Learning of Mathematics, states that understanding results in competent performance; competent performance produces lasting self-esteem; and self-esteem is the motivating factor for all learning.

Computational fluency is important, but instead of memorization it should come from a place of conceptual understanding. Students should have an understanding of number relationships and should develop strategies.

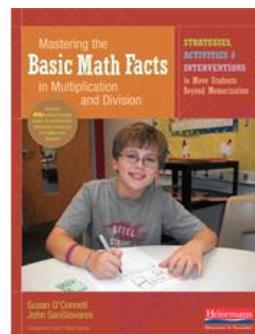


Elementary Representative **Computational Fluency Without the Stress**

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Examples of strategies would be solving $9+8$ by making it $10+8$ (18) and subtracting 1 (17) or knowing that 4×3 (12) will yield the same product as two groups of 2×3 . It was found that strategy users solved test questions at the same speed as the memorizers and showed a better ability to transfer their knowledge to new problems (Delazer et al., 2005).

I suggest two books written by Susan O'Connell and John SanGiovanni to be highly beneficial to teachers who are committed in their efforts in helping students develop computational fluency, Mastering the Basic Facts in Addition and Subtraction and Mastering the Basic Facts in Multiplication and Division. Both of these books have activities and games that help students develop computational strategies. Let's help students develop a strong sense of number leading to confident mathematical risk takers.



Art's Attic **Emilie du Châtelet**

By Art Johnson

In the history of mathematics there are a number of 'could-have been' stories. What if Galois had lived beyond his 20 years, suppose Pascal had lived to be 70, or what if Newton had not spent two-thirds of his time wrestling with cosmological questions? A large category of 'could-have beens' includes most women mathematicians. Usually society and events beyond their control prevented them from reaching their full potential. In the case of Emilie du Châtelet (1706-1749), it was society and a short life that makes her story all the more interesting.

Emilie du Châtelet, properly known as Gabrielle-Emilie Le Tonnelier de Breteuil, grew up in a large house in Paris, overlooking the Tuileries Gardens. Her father bought a position in the court of



Louis XIV, and was an esteemed member of the court. Voltaire tells us in his *Eloge Historique de Madame la Marquise du Châtelet* (her married name) that she learned Spanish, Italian, English and Latin. She also had lessons in fencing, riding, and gymnastics. Her home was a center of Parisian social life and many intellectuals of the day were frequent guests there. It is likely that she developed her love of mathematics from meeting some of the mathematicians who attended the salons at her house.

At sixteen she was introduced to the court Cartesian, Newtonian, and Leibnizian

Art's Attic

Emilie du Châtelet

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of Louis XV by her father. If ever a young lady took full tilt to the life of a courtesan it was Emilie. Before and after her marriage in 1725 to the Marquis Florent-Clouse Chastellet, she was an active member of the ladies in the royal court, and, as was common, she took a number of lovers. One of her lovers was Pierre Louis de Maupertuis, the foremost French mathematician of the times. He helped her to develop her mathematics. She was more than a pretty face, however. One member of the court wrote that she is "...the only French woman of her time seriously to develop her talent of mathematics and physics."

She further developed her mathematics by attending meetings of mathematicians and scientists in the Café Gordot in Paris. She was denied entrance when she first attempted to attend but returned a week later in a very poor disguise. Everyone in the Café recognized how ridiculous the rule barring women was, and she was admitted from then on. Still, in Emilie's words, she had to struggle to be fully accepted as an intellectual. "I feel the full weight of the prejudice which so universally excludes us from the sciences."

A few years (and many lovers) later she and Voltaire began a lifelong liaison. They even made a ménage à trois with her husband at the family estate. Her husband seemed to accept this arrangement, benefiting from the money Voltaire spent in needed repairs to the estate. It was during this time that Emilie began to put her mathematics to use. She composed a text, *Institutions de physique*, that integrated

ideas of science and metaphysics.

She then began her major work, a translation of Newton's *Principia*. *Principia* contained all of Newton's discoveries in mathematics and physics. Emilie used a Latin translation of *Principia* (All major scientific papers of the times were published in Latin). Although she completed the entire translation into French by 1749, it was not published until 1759. Her masterpiece was not only a translation but also a commentary. Her goal was to place Newton's discoveries within reach of anyone who could read French. The fact that she succeeded is shown by the fact that there was no subsequent translation for many years. She was on the cusp of national recognition. Alas, it was not to be.

It was in 1749 that fate stepped in to add Emilie to the list of 'could-have beens.' At the age of 42, Emilie became infatuated with minor poet Jean-Francois de Saint-Lambert. He became her lover for a time (all while she was still married and still involved with Voltaire). She became pregnant, and died shortly after giving birth. Her husband, Voltaire and Saint-Lambert were at Emilie's side when she died.

It is left to Voltaire, the greatest man of Belles Lettres in France, to sum up Emilie's life:

"No woman was ever more learned than she was. For a long time she moved in circles which did not know her worth and she paid no attention to such ignorance... Seldom has so fine a mind and so much taste been united with so much ardor for learning."

*Post-Secondary Representative***Working Flexibly Between Various Forms of Linear Functions**

By Rich Andrusiak

This semester I have the pleasure of teaching Functions and Modeling I (a college-algebra and trigonometry course), Calculus I, and Multivariable Calculus. Thus, I'm constantly reflecting on the importance of a strong foundation in linear functions for students, and the need for students to work flexibility between various symbolic forms of equations of lines, along with tables, graphs, and verbal descriptions. Students in all three of the aforementioned courses have a preference for using the slope-intercept form of an equation of a line. This preference might be due to the strong connection to a start-up value and rate of change in a situation with a meaningful context to students. Hence, students can demonstrate the skill of writing an equation for a linear relationship prior to any instruction introducing $y = b + mx$. However, point-slope form and standard form are equally important and many times preferential in various situations. Being explicit about situations where various forms of equations of lines are useful helps students to make meaningful connections. I'll focus on just a few examples of point-slope and standard form from the classes that I'm currently teaching. I'm encouraging you to think about where the various forms of equations of lines are meaningful in the courses that you are currently teaching, no matter what level you are teaching (e.g, elementary teachers might focus on two numbers that add to 10 or $\square + \Delta = 10$). If you send me some examples, I'll make certain to include a follow-up article highlighting those contributions.

Example 1 – Developing an understanding of an equation of a line as describing all points on the line (point-slope form)

Given a line with slope m and a point, (x, y) , on the line, we can determine if a point $(a, f(a))$ is on the line if $\frac{y - f(a)}{x - a} = m$. This results in the point-slope form of a line, $y - f(a) = m(x - a)$ or equivalently $y = f(a) + m(x - a)$. Thus, $b = -ma + f(a)$, where b is from the typical slope-intercept form.

The 44th Annual NHTM/PSU NH State Mathematics Competition will be on Tuesday, March 15th, 2016 (with a snow date of Wednesday, March 16th, 2016) at Plymouth State University.

Registration information will be forthcoming in the next month so stay tuned!

Post-Secondary Representative Working Flexibly Between Various Forms of Linear Functions

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Example 2 – Developing an understanding of an equation of a plane as describing all points on the plane (using normal vector & developing standard form)

A solid understanding of Example 1 facilitates student understanding of this example. Suppose we have a plane passing through $P_0(x_0, y_0, z_0)$ with normal vector $\vec{N} = A\vec{i} + B\vec{j} + C\vec{k}$. How can we determine if $P(x, y, z)$ is on the plane? P is on the plane if $\vec{N} \cdot \vec{P_0P} = 0$ ($\vec{P_0P}$ is perpendicular to \vec{N} so the dot product is 0). Since $\vec{P_0P} = (x - x_0)\vec{i} + (y - y_0)\vec{j} + (z - z_0)\vec{k}$, we have $A(x - x_0) + B(y - y_0) + C(z - z_0) = 0$ or $Ax + By + Cz = D$ where $D = Ax_0 + By_0 + Cz_0$.

Example 3 – Local Linearization (using the tangent line to estimate values of a function near $x = a$)

If f is differentiable at $x = a$, then we can use the tangent line at $x = a$, to approximate values of $f(x)$ near $x = a$. In particular, $f(x) \approx f(a) + f'(a)(x - a)$. This relationship is shown geometrically in Figure 1. Calculus students often believe that they need to memorize this formula or revert back to slope-intercept form (i.e., use the derivative to find the slope of the tangent line and use the point to determine the y -intercept). Students who develop a strong understanding of Example 1, know that $y = f(a) + m(x - a)$ is the point-slope form of an equation of a line passing through $(a, f(a))$ with slope m . For these students, it is a simple connection that $m = f'(a)$.

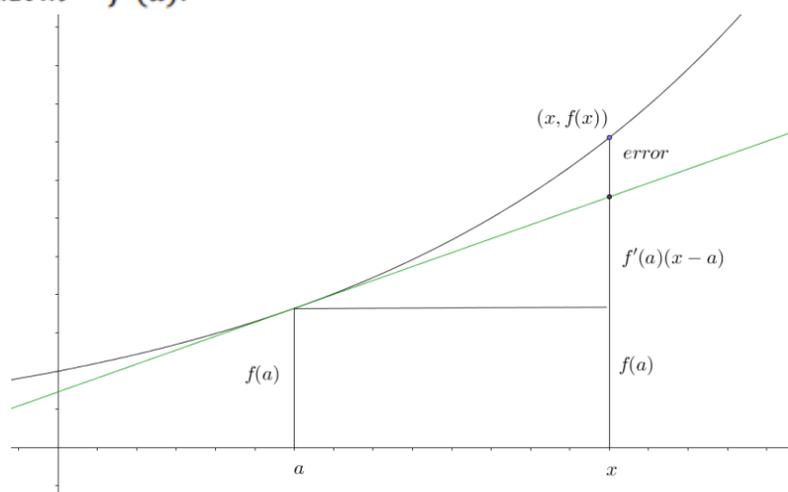


Figure 1

Post-Secondary Representative Working Flexibly Between Various Forms of Linear Functions

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Example 4 – Local Linearization (using the tangent plane to estimate values of a function near $(x, y) = (a, b)$)

This example assumes that students built an understanding of the point-slope form of an equation of a plane (Example 1 is essential to this understanding). For a plane with slope m in the x -direction and slope n in the y -direction and passing through the point $(a, b, f(a, b))$, the equation is $z = f(x, y) = f(a, b) + m(x - a) + n(y - b)$. Thus, if f is differentiable at (a, b) , we can approximate $f(x, y)$ near the point (a, b) using the tangent plane. This relationship is shown geometrically in Figure 2. Students who have a strong foundation with Example 1 and Example 3 easily make the connection that $m = f_x(a, b)$ and $n = f_y(a, b)$.

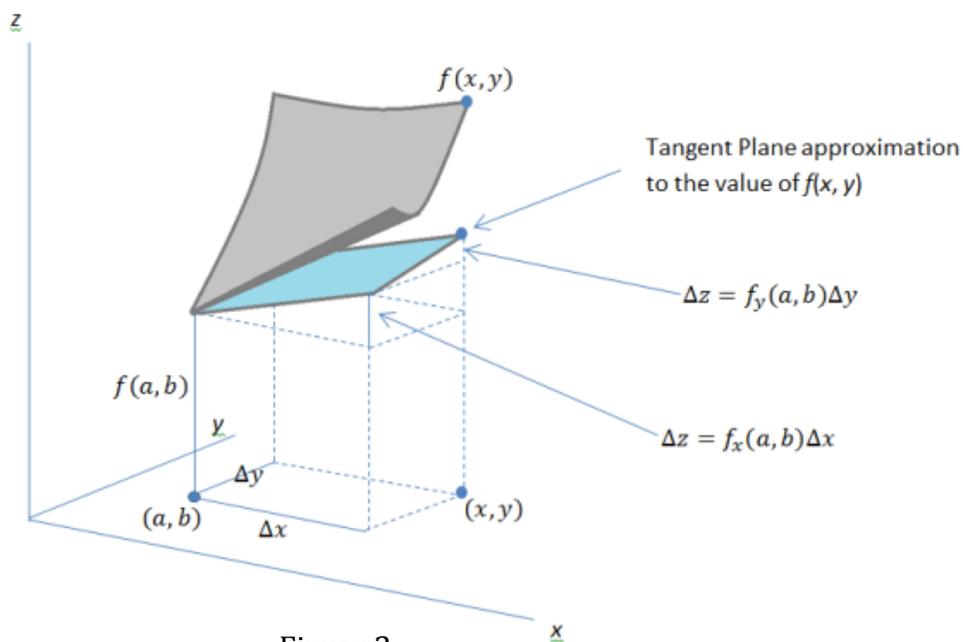


Figure 2

Therefore, $f(x, y) \approx L(x, y) = f(a, b) + f_x(a, b)(x - a) + f_y(a, b)(y - b)$.

Post-Secondary Representative Working Flexibly Between Various Forms of Linear Functions

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It is a small step now to better approximations in Examples 3 and 4 by adding on quadratic terms and so forth leading to Taylor Polynomial approximations.

In the end, as teachers, we shouldn't assume that our students are explicitly making connections. We need to plan instruction that carefully guides students to develop new knowledge from previous knowledge. I'm amazed by how often I hear students describe calculus as a "different type of mathematics." I've only provided a few examples here and haven't explicitly detailed all the connections, but hopefully I've illustrated my point with regards to the importance of students working flexibly between various forms of linear function and making connections between previous material and new material.

If you have any questions or comments, please contact me at randrusiak@ccsnh.edu.

NCTM Representative News from NCTM: Conferences and Politics

By Terri Magnus

The National Council of Teachers of Mathematics invites all math educators to the 2016 Annual Meeting and Exposition, Building a Bridge to Student Success. Many NHTM members took advantage of the proximity of last year's conference in Boston, but this April, the conference offers us the opportunity to travel to San Francisco. Every NCTM Meeting comes alive with the enthusiasm, expertise, and synergy of mathematics educators from across the country gathered together for a few days. Participants can hear nationally recognized speakers and attend smaller workshops both to challenge their thinking on mathematics education and gather ready-to-use ideas for their classrooms.



The conference runs April 13-16, 2016 and is preceded by preconference workshops and the NCSM (Math Ed Leadership) Conference. Visit www.nctm.org/sanfrancisco for more information and to register.

NCTM Representative News from NCTM: Conferences and Politics

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In February, NCTM offers another Interactive Institute, this one in Dallas and targeted toward PreK-grade 5, 6-8, and High School teachers and administrators—a session for everyone! Entitled “Implementing College- and Career-Ready Standards,” participants will use the principles and practices in NCTM’s publication **Principles to Actions: Ensuring Mathematical Success for All** as they learn how to transform their classrooms into an environment where students learn to examine, interpret, and think critically about math concepts. More information can be found at <http://www.nctm.org/ptainst/>.

Looking for electronic resources for teaching mathematics? NCTM has a collection of Lessons and Interactive “E-

Examples” from Principles and Standards for School Mathematics. Access these at <http://illuminations.nctm.org/eexamples/>.

Presenters are sought for next fall’s NCTM Regional Conferences in Phoenix and Philadelphia. The deadline to submit a proposal is December 1.

NCTM continues to lobby in support of mathematics education. They are watching closely the changes in Washington as John Boehner, Speaker of the House, and Arne Duncan, Secretary of Education, step down. The organization continues to support the implementation of the Common Core State Standards with advocacy and resources. The NCTM response to the 2015 NAEP Scores can be read at <http://www.nctm.org/News-and-Calendar/News/NCTM-News-Releases/2015-NAEP-Scores-Reflect-Ongoing-Transition--in-Math-in-Grades-4-and-8/>.

Stay Informed!



- NHTM New Hampshire
Teachers of Mathematics

- @NHTM1964

Nominate a NH Math Educator for a NHTM Award

NHTM encourages its members to nominate mathematics teachers for the Fernand J. Prevost Teaching Award, the Richard C. Evans Distinguished Educator Award, and the Richard H. Balomenos Memorial Award. Nomination forms and applications for each of these awards can be found on the NHTM website www.nhmathteachers.org. The descriptions and instructions for each of these awards are described on the following page.

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Fernand J. Prevost Mathematics Teaching Award

Nominees are being sought for the annual FERNAND J. PREVOST MATHEMATICS TEACHING AWARD. NHTM is presenting the award in recognition of the contribution that Ferd has made to the mathematics educators of New Hampshire during his thirty years as the state mathematics consultant. The award is being given to a beginning teacher in her/his first, second, third, or fourth year who meets the following criteria which exemplify the characteristics which Ferd has brought to his teaching:

- commitment to good mathematics
- confidence that children can learn
- a spirit of self reflection and professional curiosity
- caring and concern for colleagues
- a willingness to explore, to learn, and to grow as a teacher of mathematics
- a willingness to share mathematical and pedagogical activities with others

The recipient will receive a plaque of achievement, a \$250 prize, and a one year membership to NHTM. The presentation of the award will be made at the NHTM Spring Conference.

Nomination forms and applications can be found on the NHTM web site at www.nhmathteachers.org or can be obtained by sending a request to the e-mail address below.

Nominations are due by December 15, 2015 and should be sent to (electronic nomination preferred):

Rich Andrusiak
River Valley Community College
1 College Place
Claremont, NH 03743
randrusiak@ccsnh.edu

603.542.7744 x5437

The 2015 Richard C. Evans Distinguished Mathematics Educator Award

In December 2006, Dr. Richard Evans retired from Plymouth State University after serving for more than 40 years as a mathematics educator. The extent of his work in the State of New Hampshire is enormous. It is difficult to find a mathematics teacher in the State who has not been affected by his work. Dick has an unsurpassed passion for mathematics education and has dedicated his life to improving mathematics education for all in the State of New Hampshire.

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The intent of this award is to highlight that passion, creativity and innovation in the teaching of mathematics to all students. The recipient of this award will represent

Dr. Evans philosophy, passion and knowledge of mathematics education. Those with 5 or more years of experience teaching mathematics at any level from Pre-K to 16 may be nominated.

The award recipient will receive \$500, a plaque, a one year membership to NHTM, become an honorary board member for one year, be invited to present at the spring conference, be invited to contribute articles for the quarterly newsletter, Mathesis, and will be encouraged to offer professional development opportunities for mathematics educators with the support of NHTM.

The presentation of the award will be made at the NHTM Spring Conference. Please consider nominating a Pre-K to 16 mathematics educator for the 2014 Richard C. Evans Distinguished Mathematics Educator Award given by the New Hampshire Teachers of Mathematics.

Nomination forms and applications are due by December 15th can be found at www.nhmathteachers.org. Nominations and questions should be sent to:

Amy Gregoire
35 Tonga Drive
Bow, NH 03304
agregoire@bownet.org

Richard H. Balomenos Memorial Service Award

The Richard H. Balomenos Memorial Service Award was established by the Executive Board of NHTM in 1987, to remember and honor a former colleague, educator and friend. Richard Balomenos and his wife, Georgia, died tragically in an automobile accident in December 1986. As both teacher and administrator at the University of New Hampshire for almost 25 years, Richard had a profound influence on mathematics education in the state of New Hampshire. The award is presented annually to a New Hampshire mathematics educator who has shown outstanding or meritorious service or leadership to the mathematics education community on a statewide basis. Past recipients include:

1988 Dr. Fernand J. Prevost	1989 Kay Reardon	1990 Dr. Carol Findell	1991 Laurie Boswell
1992 Dr. Richard Evans	1993 Dr. Joan Ferrini-Mundy	1994 Dr. Enid Burrows	1995 Betty M. Erickson
1996 Dr. Arthur V. Johnson II	1997 Dr. Lewis Knight	1998 Dr. Beverly J. Ferrucci	1999 Dr. Karen J. Graham
2000 David G. Kent	2001 Barbara D. Hill	2002 Cecile A. Carlton	2003 Roberta Kieronski
2004 Timothy D. Kurtz	2005 Dr. Judy Curran Buck	2006 Darien Lauten	2007 Dr. William J. Roberts
2008 Brian P. Beaudrie	2009 Albert B. Bennett	2010 Barbara Boschmans	2011 <i>No Award Given</i>
2012 <i>No Award Given</i>	2013 Christine Downing	2014 Rich Andrusiak	2015 Greg Superchi

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If you would like to nominate someone for this award, please send her/his name and a 1-2 page letter describing contributions to the State in the field of mathematics education to:

Cecile Carlton, President, NHTM
3 Wentworth Street
Nashua, NH 03060
nhtmpresident@nhmathteachers.org

All nominations must be received by 1 January 2016.

Affiliate News

2015 NAEP Scores Reflect Ongoing Transition in Math in Grades 4 and 8

Reston, Va., [October 28](#), 2015—The National Council of Teachers of Mathematics (NCTM) attributed the slight decline in nationwide results on the 2015 National Assessment of Educational Progress (NAEP) to a period of transition and changes in mathematics education. Different standards and the related demands on teachers will take time to be reflected in higher scores on the [Nation's Report Card](#).

In 2015, students had an average score in mathematics of 240 points at grade 4 and 282 points at grade 8 on a 500-point scale. The averages were one point lower in grade 4 and two points lower in grade 8 than on the 2013 assessment. Relatively recent changes in standards and the demands placed on teachers to implement new standards and, for some, teach in a different way could be one reason for the slight decline.

“The latest NAEP results may reflect some of the recent changes in mathematics education as teachers implement new standards,” said NCTM President Diane Briars. “Although looking more closely at the results indicates that instructional changes are paying off in some districts and states, it will take more time to see more broad-based benefits nationwide.”

“Another factor may be the mixed messages that many teachers have been receiving about standards and assessment over the past four years. States are doing teachers, students, and families a disservice by investing significant time and resources in disagreements about recently adopted standards instead of investing in effective implementation of these standards.”

“More troubling than the slight decline in the overall average scores are the persistent achievement gaps between various populations,” Briars said. “Much more must be done to improve test scores for African-American and Hispanic students, other minority students, and children in poverty.”

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Forty percent of fourth-grade students performed at or above proficient in 2015 compared to 42 percent in 2013 and 24 percent in 2000. In grade 8, 33 percent were at or above proficient in grade 8 compared to 35 percent in 2013 and 26 percent in 2000. Since 1990, NAEP math scores have risen steadily. Scores for grade 4 were 27 points higher in 2015 than in 1990 and they were 20 points higher in 2015 than in 1990 for grade 8.

The Nation's Report Card showed no statistically significant changes in the gap between whites and blacks from 2009. However, both Hispanic and black students have posted considerable gains, especially in math, since 1990.

"In order to see sustained, ongoing improvement over the long term, teachers must help students develop conceptual understanding, problem-solving, as well as procedural fluency. This requires engaging students in tasks that promote problem solving and reasoning on a regular basis. Engaging students in challenging problems should be part of the mathematics education of all students starting in early grades and going through high school," Briars said. "This is consistent with NCTM's longstanding emphasis on problem solving and reasoning as critical to improving the math proficiency of all students.

"Investing in ongoing professional development and in the continued improvement of teaching is critically important to increasing student learning," Briars said.

The National Council of Teachers of Mathematics is the world's largest professional organization dedicated to improving mathematics education for all students. NCTM's *Principles to Actions: Ensuring Mathematical Success for All* describes the principles and actions, including specific research-informed teaching practices, that are essential for a high-quality mathematics education for all students. The Council is committed to a constructive public dialogue to ensure a mathematics education of the highest quality for all students.

Media interested in arranging an interview with NCTM President Diane Briars should contact Tracy Cullen, NCTM Member Communications Manager, 703-620-9840, ext. 2189 or 571-423-6315 (cell).

Interested in following the NHmathed List Serve?

To subscribe go to <http://listserv.plymouth.edu/mailman/listinfo/nhmathed>

ATMNE 2016



Vote with Math!

**Developing Informed
Citizens through
Mathematics**

Conference Co-Chairs:

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Cecile Carlton
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Program Co-Chairs:

John Donovan
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Kim Knighton
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October 20-21, 2016

[Radisson Hotel](#)

Manchester, NH



November 2015

Dear Mathematics Educator or Enthusiast,

NHTM is excited to host the next ATMNE Fall Conference:
**"Vote with Math! Developing Informed Citizens Through
Mathematics."**

The conference will be held on October 20 & 21, 2016, at the
[Radisson Hotel](#) in Manchester, NH.

Join NCTM President-elect [Matthew Larson](#), [Margaret
"Peg" Smith](#), and [Tom Reardon](#) in Manchester, NH at the
ATMNE 2016 Fall Conference. [Submit your speaker proposal by
February 8, 2016 to be considered for the program.](#)

We hope that you will submit a proposal. As teachers, we learn
best when we learn from each other. Please plan on joining us
in promoting the importance of mathematics in making daily
decisions as well as electing a new president!

If you have questions about the proposal form, feel free to
contact [John Donovan](#). If you have questions about the
conference, feel free to contact [Cecile Carlton](#).

Thank you for your contributions toward making this a great
conference.

The ATMNE 2016 Program Committee,

John Donovan
Holderness School

Kim Knighton
Profile School

S.T.E.M. Excellence in Teaching Awards Application

NOMINATE AN OUTSTANDING TEACHER AND HELP US RECOGNIZE THOSE INDIVIDUALS THAT GO ABOVE AND BEYOND TO EDUCATE OUR CHILDREN IN MATHEMATICS, SCIENCE, TECHNOLOGY AND PRE-ENGINEERING!

Nominations Due: January 29, 2016

Our future engineers and scientists will shape the progress of humankind in all aspects of society. Teachers of today are instrumental in shaping our future leaders, engineers and scientists and providing them with the tools, knowledge and principles required for success. Recognition of excellence in education is critical to support the continuous efforts of New Hampshire's outstanding teachers.

Three Awards

Elementary (1-5), Middle (6-8), and High School (9-12)

The Awards recognize excellence in the teaching of S.T.E.M in New Hampshire schools as evidenced by creativity, innovation, integration of programs, and learning effectiveness.

"Excellence" can be described as the creative use of class materials and teaching methods; the development of innovative curricula, materials or class activities; the integration of extra-curricular programs; and/or the involvement of professional organizations to help promote interest and learning in mathematics, science or pre-engineering curriculums.

Award nominations are made by PTO/PTA's, teaching colleagues, school administrators, or others by submitting the attached form. Nominations must be submitted with three (3) letters of reference in Adobe PDF or Microsoft WORD format by email to mhow@hoyletanner.com or in hardcopy to NHSPE, Attn: Teacher's Award, PO Box 1343, Concord NH. 03302-1343.

The Award Committee, comprised of one representative from each Sponsoring Organization, will make the final decision by consensus and recommend one proposed award recipient at each teaching level to the Board of Directors of the New Hampshire Society of Professional Engineers (NHSPE). NHSPE will notify award recipients on behalf of the sponsoring organizations. NHSPE will also send a letter to each nominee extending congratulations on their nomination for this statewide award.

The Awards will be presented at the award winners school at a mutually agreeable time, preferably in April 2016. Awards include a **plaque** bearing the name of the recipient and a **cash stipend** to assist with the expense of teaching materials and supplies. Press releases will be issued in local and statewide newspapers. Visit www.nhspe.org to see previous recipients.

Professional Development Resources

Are you looking for good professional development resources?

Consider the *New England Mathematics Journal*!



**Moving Principles into Actions: Understanding the Challenges
and Promise of Principles to Action – May 2015**

**Classroom Assessment to Achieve the Common Core Standards for
Mathematical Practice – May 2014**

Mathematics Coaching – Implications for Change- May 2013

**Envisioning Effective Implementation of the
Common Core Standards for Mathematics - May 2012**

Exploring the Richness of Geometry via Technology – May 2011

And Many More Issues at: <http://www.atmne.net/>

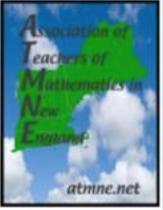
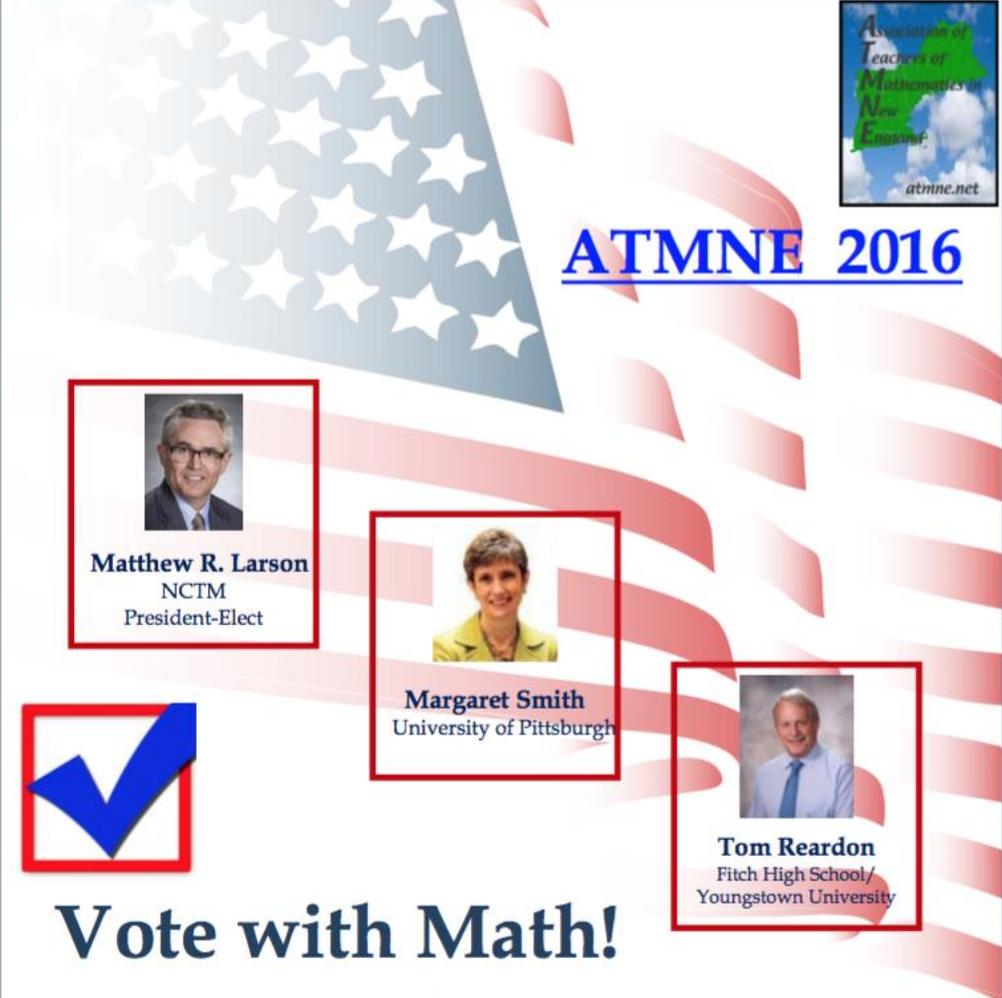
**For more information or to purchase issues contact:
atmne@keene.edu**

Do you know an exemplary math or science teacher? Nominate them for the Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) today!

The Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) program is pleased to announce that nominations and applications for the 2015-2016 award year are open. Assistance in nominating PAEMST candidates is an integral component to a successful candidate pool. With your help, we hope to secure an even higher number of submitted applications for the 2015-16 awards cycle than we have received in previous years. To submit a nomination for an exceptional K-6th grade teacher, complete the nomination form available on the PAEMST website, and submit the teacher's name, email address and school contact information. You are welcome to submit multiple nominations if you know more than one teacher deserving of this award. The 2015-2016 nomination deadline is April 1, 2016, and the application deadline is May 1, 2016. Teachers may also apply directly at www.paemst.org. There are also several resources available to you at <https://www.paemst.org/recruitment.TwitterPresidential>

PAEMST will honor outstanding K-6 grade teachers. Don't miss out on this wonderful opportunity to honor our nation's greatest educators! Should you have any questions about the program or the nomination process, please contact info@paemst.org or 855-723-6780. The contacts for the NH DOE are Donna Dubey – donna.dubey@doe.nh.gov for math questions and Erick Feldborg – eric.feldborg@doe.nh.gov for science questions.





ATMNE 2016



Matthew R. Larson
NCTM
President-Elect



Margaret Smith
University of Pittsburgh



Tom Reardon
Fitch High School/
Youngstown University



Vote with Math!

**Developing Informed Citizens
through Mathematics**



Join us in New Hampshire - a First in the Nation Primary State
Radisson Hotel - Manchester, NH

Save the date! October 20-21, 2016

atmne2016.org  www.nhmatteachers.org

The First New³ Math Conference

Coming Together for Learning, Teaching and Students

A Joint Conference of the Associations of Mathematics Teachers
Of

New York - AMTNY

New Jersey - AMTNJ

New England - ATMNE



Hosted By



June 27 – 29, 2016 at Iona College (near NYC)

Conference Program

- Exciting program drawing on outstanding mathematics educators from the northeast
- Narrow Grade Band Workshops for Pre-K – K, 1-2, 3-4, 5-6, 7-8, HS during each session time
- In-depth multi-part workshops

Featured Speakers

- Steve Leinwand
- Jenny Tsankova
- Eric Milou
- Mary Behr Altieri
- Jim Rubillo

Some Major Speakers

Janet Caldwell	Tammy Casey
Kees DeGroot	Ellen Falk
Karen Graham	Deby Ives
Mary Calder	Eric O'Brien
Nicole Panorkou	Steve Yurek
Suzy Koontz	Robyn Poulsen
Judy Curran Buck	

and many more

Other Conference Features

- Affordable - approximately \$250 for commuters, \$500 for residents
- No sub plans needed
- STEM Camp for participants' children grades 1 through 8
- Community Atmosphere
- Extra-curricular Events including Broadway, Yankees or Circle Line Cruise

The New³ Math Associations will be posting more information about this conference on their websites and sending e-blasts. If you would like to be on a conference distribution list for the latest updates, please e-mail conference coordinator, Jim Matthews at matthews@siena.edu. Please use "New Cubed" in the subject line of your e-mail.

NHTM Executive Board

<http://www.nhmathteachers.org/page-1715832>

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Please visit www.nhmathteachers.com for more detailed Board information.

Professional Development & Conferences

National

Joint Mathematics Meetings	Seattle, WA	January 6-9, 2016
T3 Annual Conference	Ft. Lauderdale, FL	February 10-12, 2016
ICTCM 28th Annual Conference	Atlanta, GA	March 10-13, 2016
2016 NCSM Annual Conference	Oakland-San Francisco Bay Area, CA	April 11-13, 2016
2016 NCTM Annual Meeting & Exposition	San Francisco, CA	April 13-16, 2016
MAA MathFest	Columbus, OH	August 3-6, 2016

Regional

The First New ³ Math Conference	New Rochelle, NY	June 27-29, 2016
ATMNE Fall Conference	Manchester, NH	October 20-21, 2016

State

44 th NHTM/PSU NH State Mathematics Competition	Plymouth, NH	March 15, 2016
NHTM Spring Conference	Keene, NH	March 18, 2016

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 shall be to provide vision and leadership in improving the teaching and learning of mathematics so that each student is ensured quality mathematics education and each teacher of mathematics is ensured the opportunity to grow professionally.