

Attend the 31<sup>st</sup> Annual National Convention in Denver!!

# THE MATHEMATICAL LOG

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## S.I.A.M.

**THE SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS**

BY JIM CROWLEY

EXECUTIVE DIRECTOR OF S.I.A.M.

Today, applied mathematics is an important part of the field of mathematics. Applied mathematics seeks to explore, analyze and predict by developing new mathematical and computational methods for solving extremely complex problems, and it has become a critical component of the engineering discipline of computational science and engineering. One can also define the discipline by describing what people in it do. Applied mathematics is an extremely diverse field of study, and the kinds of jobs and types of work performed by applied mathematicians are equally diverse. S.I.A.M., The Society for Industrial and Applied Mathematics, is an organization that “fosters the development of the methodologies.”

Mathematicians in the early 1800s developed mathematical theories in order to solve real-world problems, and these theories motivated many of the developments in analysis in the 19<sup>th</sup> century and later, including methods for solving partial differential equations and work on Fourier series. Mathematicians like Gauss, Euler, Lagrange, and Fourier worked in this era to develop theories to analyze and solve physical problems.

In the first half of the twentieth century, many mathematicians viewed their discipline as an abstract subject, independent from applications. They were motivated by its inner depth and beauty. Attitudes began to shift after World War II. The usefulness of mathematics and science in general was demonstrated during the war. Codebreaking is one example that has received a lot of popular attention recently, in particular with respect to the work of Alan Turing and his peers. But mathematicians also played a critical role in the Manhattan Project, which led to the testing of the first atomic bomb. They developed methods for calculating ballistic trajectories for the army, and they also began to develop techniques for optimizing the location of scarce resources. It was in this postwar era that the Society for Industrial and Applied Mathematics was created to foster the development of applied mathematics. A major goal of S.I.A.M. is to advance the application of mathematics to science and industry.

Applied mathematics has not only flourished since World War II. There has been an explosion of connections to a diversity of applications. Applied mathematics once focused on those parts of mathematics that dealt with solid and fluid mechanics. Today applied mathematics reaches into biology, and medicine, telecommunications, and virtually every area of science and technology as quantitative analysis becomes an essential tool for understanding and predicting the world around us.

What has caused this change? The use of computing to design a diverse era of new products (e.g. the Boeing 777 to new drugs) requires mathematical models, computational algorithms, and mathematical tools to perform the simulation of complex systems and to optimize and control such systems. The Boeing 777 was the first airplane to be designed completely by computer simulation. To accomplish this feat, the huge design team used mathematics and computational simulations to understand how the shapes would behave under different air flow conditions, how parts would react under stress, and to predict and optimize flight characteristics.

Problems like this arise in companies that manufacture aircraft, automobiles, engines, textiles, computers, communications systems, chemicals, drugs, and a host of other industrial and consumer products. Mathematical problems also arise in many interdisciplinary issues that become research initiatives of the federal government, such as global change, biotechnology, and advanced materials. Industrial mathematics is the term used to describe that part of mathematics that is motivated by real-world problems arising in industrial applications.

*continued on page 2*

What was true in the era of Euler and Lagrange is still true today, but with a new twist—rapid computation changes the way we use mathematical models. Today mathematics finds quick application through its ability to predict, design, optimize and control. Not only can we create models and compute solutions based on those models, but we can use the computational simulations as much as physical experiments were used fifty years ago.

Applied mathematics is not simply the modeling of real-world phenomena, but also the development of the mathematics required to model, analyze, and solve the problems related to those phenomena. Applied mathematicians don't simply apply mathematics to solve problems, they also develop mathematics motivated by real-world problems, and S.I.A.M. "fosters the development of the methodologies needed" for solution to these problems.

## News

### • National Convention

Relax in the Rocky Mountains  
attend the 31<sup>st</sup> Annual  
Mu Alpha Theta National Convention  
Denver, Colorado

Thursday, July 26 – Tuesday, July 31, 2001

- Speakers and Workshops
- Various Competitive Testing
- Chapter Competitions
- Visits to local attractions
- Social Events

Hosted by Ponderosa High School (Colorado)  
and Thomas Jefferson High School (Seattle, WA)

**Cost: \$400\*** per registrant

\*If payment is received by April 1, 2001

If you would like to receive a registration packet please  
contact

Tom Norris at [tnorris@fwsd.wednet.edu](mailto:tnorris@fwsd.wednet.edu)

### • Tennessee State Convention

The Mu Alpha Theta Tennessee Convention  
will be held during the weekend of April 7, 2001 at  
Meigs County High School in Decatur, Tennessee.

**For further information contact:**

Bill Danner at [rbdanner@usit.net](mailto:rbdanner@usit.net)

### • Texas State Convention

The Texas Mu Alpha Theta Convention  
will be held on Friday, February 16, and Saturday,  
February 17, 2001 at Edinburg High School in  
Edinburg, Texas.

**For further information contact:**

Texas Mu Alpha Theta President  
Nicholas de la Garza at [azrael@rgv.net](mailto:azrael@rgv.net)

### • MAΘ Student Delegate/Chapter President Mail List

Student Delegates and Chapter Presidents play a large role in the success of Mu Alpha Theta, so they are asked to join in on the discussion of important issues of the organization. This mail list throughout the year will have an open discussion of any topics related to Mu Alpha Theta. Sponsors are also invited to join the list to provide some additional suggestions/comments to members. To join the discussion, please visit the list's home page at <http://MUDelegates2000.listbot.com>

### • *The Art of Problem Solving*

Paul Zeitz, former coach of the United States Olympiad team, referred to the texts as a **must** for any serious math library.

The ART of PROBLEM SOLVING is a pair of texts for those students involved in extracurricular mathematics. The authors, Sandor Lehoczky and Richard Rusczyk are former Mu Alpha Theta students and participants in Math Olympiad Programs (students who pass the AHSME/AIME/USAMO series of tests produced by the Mathematical Association of America).

The texts have been used by successful students, teams, and clubs in grades 7-12 since 1994. Volume 1 covers mathematics commonly occurring in MATHCOUNTS and the AHSME, as well as many local and state math contests. Volume 2 covers more advanced topics found on the AHSME, as well as the AIME and USAMO. Included in the texts are hundreds of challenging problems from national tests such as ARML, MathCounts, the national Mu Alpha Theta conventions, and the MAA series of exams which determine the national math team. If you have further questions about the texts, contact the national office at [matheta@ou.edu](mailto:matheta@ou.edu) or 405-325-4489. Prices are shown below; make checks and purchase orders payable to Mu Alpha Theta. Discounts for bulk orders are available.

Volume 1 text	\$26
Volume 1, text and solutions	\$34
Volume 2, text	\$28
Volume 2, text and solutions	\$37
Volume 1 and 2, text	\$50
Volume 1 and 2, text and solutions	\$64

## $\sqrt{\textit{At the Root of it All}}$

### **Deborah Patonai**, *Activities Editor*

What is a good definition of a Mu Alpha Theta sponsor? A Mu Alpha Theta sponsor is a unique individual who is truly dedicated to his/her students and to his/her profession. He/she devotes countless hours to normal chapter responsibilities, gives up many weekends and summer vacation days to take students to meetings and to competitions, and coordinates math tournaments. Most importantly, however, a MA $\theta$  sponsor is a wonderful role model for his/her students, loving not only the subject matter but also the students. Although most of MA $\theta$ 's sponsors fit this definition, some even surpass it. Each summer at the National MA $\theta$  convention, MA $\theta$  searches for and honors the one or two sponsors who go well beyond the basic responsibilities of an advisor. One of the most coveted awards given at this time to a MA $\theta$  sponsor is the Sister Scholastica Most Committed Sponsor Award, named after one of MA $\theta$ 's most beloved sponsors, Sister Scholastica from San Antonio, Texas. The 2000 recipient of this special award is Ms. Suzy Baker of Hoover High School in Hoover, Alabama.  $\sqrt{\textit{At the Root of it All}}$  is

honored to highlight Ms. Baker's stellar character, her outstanding teaching ability, and her dedication to students.

Ms. Baker, a mathematics teacher and MA $\theta$  sponsor at Hoover for many years, sets a wonderful example of how to live life and at how to be dedicated to others. One of her amazing qualities is her devotion to her students. To her, students are the reason she is a teacher, because she cares for all of her students deeply and she believes that they can achieve and surpass goals beyond their wildest imaginations. Her main goal, as she explains it to parents every year, "is for her students to improve their math skills to enable them to excel on ACT's and SAT's as well as to gain credit in their AP Calculus classes." A parent of one of her math team members recalls, "She cares that they grow as mathematicians, and their test scores show how well she has prepared them." More important than producing great math students, Ms. Baker wants to produce students with the ability to thrive in college and beyond.

Ms. Baker's love for life is another contagious quality that she shares constantly with her students and colleagues. Her personality and sense of humor are a product of a great outlook on life. Michael Carpenter, last year's recipient of the Sister Scholastica Award, describes Suzy as always finding "something to be glad about, to smile

about, to laugh about, and to cheer about. Just being around her for five minutes can make any bad mood

disappear." This positive quality gives students a model to understand that life, in all of its ups and downs, is beautiful and that every day is precious.

Besides just loving her students and hoping that they are successful in mathematics, Ms. Baker cares that they are happy, well-rounded students. Some sponsors of math teams insist that their students become "Just Math" students, dropping out of other activities in order to live, eat, sleep, and breathe mathematics. Ms. Baker prefers that her students participate in other activities in addition to math team. She typically encourages her team members to take part in band, choir and in art as well as in cheerleading and in athletics. She wants her students to do well in many activities and to have many outside interests.

As a mathematics teacher, Ms. Baker is an excellent instructor. She employs unique strategies which, in turn, motivate and encourage students. Her classes develop in students strong mathematics and problem-solving skills with a dedication to the conceptual approach and not just to the computational approach. Her talents have not gone unrecognized at the school, as she has won the Teacher of the Year Award several times in addition to other honors.

Thanks to her dedication to her students and to MA $\theta$ , hundreds of students have been afforded an opportunity that thousands of Alabama students never have had: the opportunity for enrichment in mathematics through participation in a mathematics honorary club as well as in mathematical competitions on a local, state, and national level. Over the years, Ms. Baker has produced a strong MA $\theta$  chapter and math team program at Hoover High School. However, this action does not come without sacrifice. In order to ensure that her students have the chance to prove their math abilities, she gives up countless hours of her personal time. Attending at least ten Saturday math tournaments a year, students on her math team hone their skills for hours after school in preparation. All of this hard work pays off as she consistently heads her math team to achieve some of the top scores in competition. "Although she wants us to perform well at all of our competitions," recounts one of her math team members, "Miss Baker has something positive to say, even if the team does not live up to its potential. For Ms. Baker, there is always next week."

In addition to her own math team practices, she also spends numerous hours from October until February preparing for the Hoover High School Mathematics Tournament. Often at school until 9:00 or 10:00 at night, she single-handedly organizes the tests and lines up parent and student helpers. Attracting approximately 1500 participants in grades seven through twelve, this tournament allows many students from

schools all over the area to participate and to have the opportunity to enrich their mathematical understanding.

As if teaching, math team, and math tournaments are not enough, Ms. Baker often inspires her students to pursue mathematics or education as careers, showing them how exciting such endeavors in those fields can be. One such student, K. Deloughery, decided during her tenth grade that she wanted to be a mathematics teacher after being in Ms. Baker's class. She remembers "Miss Baker's selfless dedication to her students led me to this decision. I know she was making a difference in my life, and I could see that she had made a difference in the lives of many she taught. I want to be like her; hopefully, I will be able to touch just half as many lives as she has." Another former student, now a colleague at Hoover, J. Parker, laments, "I could not have survived my first year of teaching mathematics without her unselfish and untiring assistance."

The students Ms. Baker teaches and coaches develop in love and respect for her. She is always there for her students. As a math team member describes her, "When you have good news, she is always on the other end of the line, waiting to hear it. Also, when you have a problem, she is always there, ready to help guide you. However, she never told any of us how to fix our problems; instead, she set a good example through her own life and motivated us to always do what was right."

Returning to the original definition of a "Mu Alpha Theta sponsor," Ms. Suzy Baker far surpasses all the expectations of a MA $\theta$  sponsor. Not only are her students blessed to be able to learn from her, but MA $\theta$  is also fortunate to have her as one of its own. Congratulations, Ms Baker, and may you continue to exceed all the expectations of a MA $\theta$  sponsor!

## *Do you remember the Famous Chess Problem?*

**Drew Snyder** does! Drew sent in the correct answer to the Famous Chess Problem found in the October 2000 issue of the *The Mathematical Log*.

Drew's Solution: White rook to D7; Black king to H4; White rook to D1; Black King to H5, White rook to H1; Checkmate!

***Congratulations Drew!***

*Where do counterfeiters coin their money?*

At a concurrency.

## "Calling all writers!"

*The Mathematical Log* is looking for members to submit articles for publication. Whether it is a poem you wrote, a theorem you proved, or something unique that your chapter has done, send an article for publication to the National Office at 601 Elm Ave., Room 423, Norman, OK 73019.

## The Mathematical Log

Volume 45, Number 1, February 2001

*The Mathematical Log* is the official publication of Mu Alpha Theta, national high school and junior college mathematics honor society and mathematics club federation. Founded in 1957 by Richard and Josephine Andree, Mu Alpha Theta is co-sponsored by the Mathematical Association of America (MAA), the National Council of Teachers of Mathematics (NCTM), and the Society of Industrial and Applied Mathematics (SIAM). Correspondence may be directed to Mu Alpha Theta National Office, 610 Elm Ave., Room 423, Norman, OK 73019, email: matheta@ou.edu or to Log editor Pat Bowler Johnson, New Trier High School, 385 Winnetka Avenue, Winnetka, IL 60093, email: bowlerjp@newtrier.k12.il.us

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### National Officers:

President:	<b>Claudia Carter</b> Mississippi School for Math and Science
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## Did you know...?

- S.I.A.M. membership has grown from a few hundred in the 1950s to about 9,000 members today. S.I.A.M. members are applied and computational mathematicians, computer scientists, numerical analysts, engineers, statisticians, and mathematical educators who work in industrial and service organizations, universities, colleges, and government agencies and laboratories all over the world.
- S.I.A.M. has over 300 institutional members---colleges, universities, corporations, and research organizations.
- Each year S.I.A.M. publishes eleven journals and monthly a news journal.
- S.I.A.M. offers many conferences on specialized topics each year. In addition to sponsoring regional sections, university chapters, and a visiting lecturer program.
- S.I.A.M.'s Web Site, [www.siam.org](http://www.siam.org), offers a variety of links to subjects of interest, including S.I.A.M.'s Careers Brochure and "Mathematics in Industry" report.

## Mu Alpha Theta Awards



Each Mu Alpha Theta Chapter would not be possible without the endless hours of devotion given by its sponsor. To honor "special" sponsors, both the Mu Alpha Theta Governing Board presents the **Hunke Distinguished Sponsor Award** and the Student Delegate Assembly gives the **Sister Scholastica Award** to a sponsor in attendance at the National Convention. Both of these honors recognize individuals who have allowed Mu Alpha Theta members a desire to explore the topics in mathematics that are usually not covered in a high school mathematics curriculum.

In addition to honoring sponsors, the Mu Alpha Theta Governing Board recognizes two members who are graduating high school seniors. The **Kalin Award**, awarded at the National Convention, recognizes a student who has been provided a unique opportunity by Mu Alpha Theta. While the **Andree Mathematics Education Award** recognizes an outstanding student who is planning to be a mathematics teacher. The Andree Awardee does not have to be present at the National Convention.

If you would like more information on any of these awards, contact the national Office at [matheta@org](mailto:matheta@org). Please consider nominating a student or a sponsor for one of these awards.

## Looking for a fundraising activity?

Well, here is a way you can honor your school's graduating seniors, earn money for your chapter, and have fun!

### Sell **Grad-O-Grams**

Grad-O-Grams is a fundraising activity of sponsor Mary Rhein's chapter at Lakota High School, Lakota, Ohio. Several days before graduation, sell diplomas to the students and staff of your school. On each diploma the buyer will then write a note to a graduating senior. Mu Alpha Theta members then roll up the note with a candy kiss inside the diploma and tie it with a ribbon. Then all that is left is to deliver each diploma.

## Some more Math Sniglets

**Calctitude** - The distance from a calculator to the floor prior to their collision.

**Moy** - (Word derived from the words math and joy.): the feeling a test taker gets as he/she proudly realizes that he/she has determined the correct answer to an extra credit question on a math test.  
By Robert Bovino

**Math Ketchup** - all the math assignments a student missed that he has to make up to catch up with his classmates.

**$X=Y^3$**  - function used to express the posture of a math student after 75 minutes of math class.

By Olga Kravchuk

Robert and Olga attend Secaucus High School in Secaucus, New Jersey. Sponsor: Marilyn Arnholz

# WELCOME

## *Newly Chartered Chapters*

Alabama School of Fine Arts, Birmingham, AL  
Sponsor: Ruth Borden

Delaware Technical & Community College, Newark, DE  
Sponsor: Sue Fader

West Shore Junior/Senior High School, Melbourne, FL  
Sponsor: John Yantsios

Chaminade College Prep School, St. Louis, MO  
Sponsor: Elizabeth Lindsay

The Derryfield School, Manchester, NH  
Sponsor: Michelle Coombes

Brewster High School, Brewster, NY  
Sponsor: Andra Mahoney

Barberton High School, Barberton, OH  
Sponsor: Jennifer Schenkenberger

John F. Kennedy High School, Warren, OH  
Sponsor: Barbara Rupinsky

Zionsville Community High School, Zionsville, OH  
Sponsor: M. Andrew Schaaf

L'Anse Creuse High School, Harrison Township, PA  
Sponsor: Mara Wirtz

Karns High School, Knoxville, TN  
Sponsor: Carroll Kornrumpf

Seymour High School, Seymour, TN  
Sponsor: Kelly Berson

Crandall High School, Crandall, TX  
Sponsor: John Stewart

New Braunfels Christian Academy, New Braunfels, TX  
Sponsor: Karen Buchanan

Ocean Lakes High School, Virginia Beach, VA  
Sponsors: Judy Darden and Karel Wetzol

Colegio Karl C. Parrish, Barranquilla, Columbia,  
South America  
Sponsor: Consuelo Mejia Rubio

## *Reactivated Chapters*

Austin High School, Decatur, AL  
Sponsor: Vann/Berryman

Kate D. Smith DAR High School, Grant, AL  
Sponsor: Robert Martin

Cocoa Beach High School, Cocoa Beach, FL  
Sponsor: Virginia Hayes

Nova High School, Davie, FL  
Sponsor: Lisa Chappie

Destrehan High School, Destrehan, FL  
Sponsor: Sam Buhler

Westminister Academy, Ft. Lauderdale, FL  
Sponsor: Susan Peterson

Lehigh Senior High School, Lehigh Acres, FL  
Sponsor: Ruth Ann Morris

G. H. Braddock Senior High School, Miami, FL  
Sponsor: Carolina Degadillo

SW Miami Senior High School, Miami, FL  
Sponsor: Clara Gilman

Niceville Senior High School, Niceville, FL  
Sponsor: Eleanor L. Sheppard

Spruce Creek High School, Port Orange, FL  
Sponsor: Elizabeth Burnett

Tattnall Square Academy, Macon, GA  
Sponsor: Patti Judd

Lassiter High School, Marietta, GA  
Sponsor: Christine Free

Warren East High School, Bowling Green, KY  
Sponsor: Stacey Ford

Owensboro Catholic High School, Owensboro, KY  
Sponsor: Kathy Ebelhar

Northwest High School, Opelousas, LA  
Sponsor: Gina R. Mire

Mercy Cross High School, Biloxi, MS  
Sponsor: Sandra Simpson

Chaminade College Prep School, St. Louis, MO  
Sponsor: Elizabeth Lindsay

Scotland High School, Laurinburg, NC  
Sponsor: Jane Barnett

Barberton High School, Barberton, OH  
Sponsor: Jennifer

Capitol Hill High School, Oklahoma City, OK  
Sponsor: Karen Jacobs

Putman City West High School, Oklahoma City, OK  
Sponsor: Judy Harris

Chapman High School, Inman, SC  
Sponsor: Audrey Gasque Willis

Manassas High School, Memphis, TN  
Sponsor: Rose Wells

Science Academy of South Texas, Mercedes, TX  
Sponsor: Janet Hassan

Sherman High School, Sherman, TX  
Sponsor: Katherine Garrett

South Lakes High School, Reston, VA  
Sponsor: Nora Buchanan

### What would you like to see in the Mathematical Log?

Articles written by Mu Alpha Theta Members/Sponsors? Math Applications? Technology Articles? Interesting Math Concepts? Puzzles? Articles about chapters? Let me know what you'd like to see! Send your comments and any topics you would like to see in the Mathematical Log to:

Pat Bowler Johnson  
New Trier High School  
385 Winnetka Avenue  
Winnetka, IL 60093  
email: [bowlerjp@newtrier.k12.il.us](mailto:bowlerjp@newtrier.k12.il.us)