M e t r o M a t h

N e w s l e t t e r

**Metropolitan New York Section of
The Mathematical Association of America**

April 2019

Bronx	**Brooklyn**	**Columbia**	**Dutchess**
Greene	**Manhattan**	**Nassau**	**Orange**
Putnam	**Queens**	**Richmond**	**Rockland**
Suffolk	**Sullivan**	**Ulster**	**Westchester**

A N N U A L   M E E T I N G

Saturday, 4 May 2019
8:30 AM – 5:45 PM

New York City College of Technology (CUNY)
Brooklyn, NY

(*More Information Contained Within*)

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TABLE OF CONTENTS

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Membership Count: 896 Individual and 5 Departmental as of 26 March 2019

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Section Web Page – sections.maa.org/metrony

MESSAGE FROM THE SECTION CHAIR

Warmest greetings to all the MAA Metropolitan New York Section members!

According to the National Science Board's Science and Engineering Indicators 2018, there was a strong growth in graduate enrollment in the areas of mathematics and statistics. However, the National Science Foundation's 2017 National Center for Science and Engineering Statistics (www.nsf.gov/statistics/wmpd) reported that the number of doctorates awarded in mathematics and statistics to underrepresented minorities in STEM is still at a dire rate. Only 1.9% of the doctorates were awarded to Hispanics or Latinos and 1.4% to Blacks or African Americans. The number of doctorates awarded to women is still at 28%, and this percentage has not changed compared to the rates a decade ago.

To promote diversity, equity, and inclusion in the mathematical sciences, our section is moving to a new direction to support more women and underrepresented minorities in addition to junior faculty. For this year's annual meeting on Saturday, May 4, 2019 at New York City College of Technology, we are honored and delighted to have three distinguished speakers: Dr. Kristin Lauter, a Polya Lecturer from Microsoft; Dr. Sylvester James "Jim" Gates, a 2011 National Medal of Science recipient and a Ford Foundation professor at Brown University; and Dr. Christina Sormani, an American Mathematical Society Fellow and a strong advocate in supporting diversity. We want to highlight our vibrant Metro NExT program, under the leadership of Drs. Mutiara Sondjaja, Johann Thiel, and Benjamin Gaines. A roundtable is being organized at the meeting to engage and support graduate students, post docs, and junior faculty.

We are also excited about the upcoming research and educational presentations from experts in the fields. Furthermore, we strongly encourage your students to present their research projects and receive valuable feedback from the Metro New York mathematical community. A Mathematics Career Panel, organized by Dr. Ira Gerhardt, will provide insights and guidance from graduates in the mathematics workforce.

President Russell K. Hotzler and I look forward to welcoming you at the May 4th meeting!

Janet Liou-Mark, New York City College of Technology (CUNY)

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MESSAGE FROM THE SECTION CHAIR-ELECT

My best wishes to all the MAA Metro New York section members, volunteers and supporters as we anticipate another impressive year.

Our next meeting will be held in May. Many of you have attended JMM in January, which is the perfect springboard to our meeting. We have an impressive array of speakers presenting on a wide range of topics and a variety of events planned that are guaranteed to stimulate challenge and elevate our knowledge.

In this year's meeting we will host everyone at New York City College of Technology's new state of the art academic building. City Tech is strategically located in Brooklyn and serves as a pillar to educating a diverse group of students with an impressive track record. Our heartfelt thanks to City Tech's President, Dr. Russell K. Hotzler and his administration for their support in providing the venue and other logistical support.

Come and enjoy a day of cutting-edge research in mathematics that span both undergraduate and graduate studies. Presenters hail from high school, academia and industry. There are panels of experts that will offer insight into teaching, research and interdisciplinary studies.

I look forward to meeting all of you at our annual meeting on May 4th.

Satyanand Singh, New York City College of Technology (CUNY)

MESSAGE FROM THE SECTION GOVERNOR

The role of the MAA Congress, the former Board of Governors, continues to deteriorate in my opinion. For example, governors had the assignment before the summer 2018 Congress meeting of finding an article in an MAA journal that they liked and at the meeting telling other governors what it was that they liked about it. The general focus was on governors being advocates for the MAA, both in one's local section and in developing ideas for promoting the MAA to a broader audience. Further, the Congress will now meet only at MathFest — it did not meet at the Joint Meetings in Baltimore in January 2019.

The big news, hinted at during the Congress and formally announced a month ago, is the MAA's decision to pull out of the winter Joint Mathematics Meetings. The core reason was that the MAA felt that the AMS was charging them too much. The split is sad for both organizations. The AMS is very likely to grow the educational component of its JMM programs to replace the former MAA education sessions, etc., setting up a competition between the organizations. Indeed, AMS Associate Executive Director Christine Stevens, the founder of the MAA's Project NeXT, is in charge of AMS Meetings and Professional Services — her MAA educational credentials top those of anyone in the MAA Washington office. So many people who are members of both organizations are likely to drop their MAA membership over the next few years. Of equal significance, this break codifies the MAA's distancing itself from the research mathematics community.

First the MAA leadership drops the Board of Governors and now it severs its connection with the AMS. I do not think this will end well. The challenge is to keep the MAA sections vital and locally connected with AMS-oriented mathematicians.

Alan Tucker, Stony Brook University (SUNY)

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TREASURER'S REPORT
(as of 3/01/19)

Business Checking	$ 7,417.53
Business Money Market	$15,085.22
Total	$23,502.75

All accounts are with J.P. Morgan Chase Bank. Further details will be provided at the annual meeting.

Armen Baderian, Nassau Community College (SUNY)

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25 and 50 Year Members

The following members will be recognized during the Awards Ceremony at our May meeting. The 25 year members are offered free registration, the 50 year members free registration *and* lunch (who said there's no such thing as a *free lunch*?!!).

25 Years: Nkechi M. Agwu (Borough of Manhattan Community College - CUNY), James E. Helmriech (Marist College), Paul Issack, Elliott Landowne, Richard Lipton, Yajun Yang (Farmingdale State College - SUNY)

50 Years: William Beckmann, Keith Harrow, Mahmoud Sayrafiezadeh (Medgar Evers College - CUNY)

8:30 - 12:00 PM	Registration
8:30 - 10:00 AM	Refreshments
8:30 - 3:00 PM	Book Exhibits
9:00 - 9:20 AM	<u>Welcome and Introductions</u> Dr. Russell Hotzler, President, New York City College of Technology Dr. Sandu Han, Chair of the Department of Mathematics, New York City College of Tech. Dr. Janet Liou-Mark, Chair of the Metro New York Section of the MAA, NYC Col. of Tech.
9:20 - 10:15 AM	<u>Polya Lecturer</u> *How to Keep your Secrets in a Post-Quantum World* Dr. Kristin Lauter, Microsoft, University of Chicago
10:20 - 11:15 AM	<u>Invited Speaker</u> *A Mathematical Journey Thru SUSY, Error-Correcting Codes, Evolution, and a Sustainable Reality* Dr. Sylvester James "Jim" Gates, Jr., Ford Foundation Professor and an Affiliate Professor, Brown University
11:15 - 11:30 PM	Break
11:30 - 12:30 PM	<u>Contributed Paper Sessions I</u> Research Session I: Applied Mathematics Research Session I: Pure Mathematics Research Session I: Data Science/Big Data Pedagogy Session I: Math Education Student/Faculty Session I Student Session I Miscellaneous Session I (Maple)
12:30 - 1:30 PM	Lunch <u>Metro NExT Roundtable</u> Dr. Benjamin Gaines, Iona College Dr. Mutiara Sondjaja, New York University Dr. Johann Thiel, New York City College of Technology (CUNY)
12:30 - 1:30 PM	Contributed Poster Session
1:45 - 2:30 PM	Business Meeting and Awards Ceremony
1:45 - 2:30 PM	<u>Mathematics Career Panel</u> Moderator: Dr. Ira Gerhardt, Manhattan College
2:30 - 3:00 PM	*A Conversation with Dr. Gates* *Dr. Sylvester James "Jim" Gates,* Ford Foundation Professor and an Affiliate Professor, Brown University
3:00 - 3:15 PM	Break
3:15 - 4:15 PM	<u>Contributed Paper Sessions II</u> Research Session II: Applied Mathematics Research Session II: Pure Mathematics

Research Session II: Data Science/Big Data
Pedagogy Session II: Math Education
Student/Faculty Session II
Student Session II
Miscellaneous Session II

4:30 - 5:20 PM   <u>Invited Speaker</u>
When do Sequences of Metric Spaces Converge?
Dr. Christina Sormani, Lehman College and CUNY Graduate Center

5:25 - 5:45 PM   Closing Ceremony

See pages 8-9 for Abstracts and brief Speaker Biographies

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New York City College of Technology (CUNY) Map

Presentation Abstracts and Speaker Biographies

INVITED SPEAKERS

HOW TO KEEP YOUR SECRETS IN A POST-QUANTUM WORLD
DR. KRISTIN LAUTER (A POLYA LECTURER), Microsoft, University of Chicago

Abstract: As we move towards a world which includes quantum computers which exist at scale, we are forced to consider the question of what hard problems in mathematics our next generation of cryptographic systems will be based on. Supersingular Isogeny Graphs were proposed for use in cryptography in 2006 by Charles, Goren, and Lauter. Supersingular Isogeny Graphs are examples of Ramanujan graphs, which are optimal expander graphs. These graphs have the property that relatively short walks on the graph approximate the uniform distribution, and for this reason, walks on expander graphs are often used as a good source of randomness in computer science. But the reason these graphs are important for cryptography is that finding paths in these graphs, i.e. routing, is hard: there are no known subexponential algorithms to solve this problem, either classically or on a quantum computer. For this reason, cryptosystems based on the hardness of problems on Supersingular Isogeny Graphs are currently under consideration for standardization in the NIST Post-Quantum Cryptography (PQC) Competition. This talk will introduce these graphs, the cryptographic applications, and the various algorithmic approaches which have been tried to attack these systems.

Biography: Kristin Lauter is a Principal Researcher and Research Manager for the Cryptography group at Microsoft Research. Her research focuses on post-quantum cryptography, algorithmic number theory, elliptic curve, pairing-based, and lattice-based cryptography, homomorphic encryption, and cloud security and privacy, including privacy for healthcare. Her work has been featured in the press in articles in Science, Nature, American Scientist, and PNAS. She has published over 75 research articles and 5 books, her work appearing in venues ranging from the American Journal of Mathematics to the Journal of Biomedical Informatics and the Proceedings of CRYPTO and EUROCRYPT. Lauter has served the mathematical community as President of the Association for Women in Mathematics, and on the Council of the American Mathematical Society. She is a Fellow of the American Mathematical Society and the Association for Women in Mathematics. She was a co-founder of the Women in Numbers Network, a research collaboration community for women in number theory, and she serves on the Scientific Advisory Board for BIRS, the Banff International Research Station. Lauter is also an Affiliate Professor in the Department of Mathematics at the University of Washington. In 2008, Lauter, together with her coauthors, was awarded the Selfridge Prize in Computational Number Theory. She loves to engage audience with accessible lectures highlighting the importance of mathematics in society.

A MATHEMATICAL JOURNEY THRU SUSY, ERROR-CORRECTING CODES, EVOLUTION, AND A SUSTAINABLE REALITY
DR. SYLVESTER JAMES "JIM" CATES, JR., BROWN UNIVERSITY

Abstract: This presentation will describe an arc in mathematical/theoretical physics traversing concepts from equations, graphs, error-correction, and pointing toward evidence of an evolution-like process for mathematical laws that sustain reality.

Biography: Sylvester Jim Gates is an American theoretical physicist. He received two B.S. degrees and a Ph.D. degree from the Massachusetts Institute of Technology, the latter in 1977. His doctoral thesis was the first one at MIT to deal with supersymmetry. In 2017, Gates retired from the University of Maryland and is currently the Ford Foundation Professor of Physics, and an Affiliate Mathematics Professor at Brown University. While at the University of Maryland, Gates was a University System Regents Professor, the John S. Toll Professor of Physics at the

University of Maryland, College Park, the Director of the String and Particle Theory Center, Affiliate Professor of Mathematics.

Gates served on the U.S. President's Council of Advisors on Science and Technology and contemporaneously on Maryland State Board of Education from 2009-2016, and the National Commission on Forensic Science from 2013-1016. He is known for his work on supersymmetry, supergravity, and superstring theory. He is a past president of the National Society of Black Physicists, and is an NSBP Fellow, as well as a Fellow of the American Physical Society, the American Association for the Advancement of Science, and the Institute of Physics in the U.K. He also is an elected member of the American Academy of Arts and Sciences and the American Philosophical Society. In 2013, he was elected to the National Academy of Sciences, becoming the first African-American theoretical physicist so recognized in its 150-year history. On November 16, 2013, Prof. Gates was awarded the Mendel Medal by Villanova University "in recognition of his influential work in supersymmetry, supergravity and string theory, as well as his advocacy for science and science education in the United States and abroad." President Obama awarded Prof. Gates the 2011 National Medal of Science, the highest award given to scientists in the U.S., at a White House ceremony in 2013. During 2014, he was named the Harvard Foundation's ''Scientist of the Year.'' In 2015, he became a member of the Board of Directors of the Achieve, Inc and the Board of Councillors for the Boy Scout of America's STEM National Council. He currently continues his research in supersymmetry in systems of particles, fields, and strings.

WHEN DO SEQUENCES OF METRIC SPACES CONVERGE?
Dr. Christina Sormani, Lehman College and CUNY Graduate Center

Abstract: When one has a sequence of circles of smaller and smaller radii they could be said to converge to a point or to disappear. If one has a sequence of spheres with a single increasingly thin well, they could be said to converge to a sphere with a line segment attached, or one could say the wells disappear and only the sphere remains. What if a sequence of spheres has increasingly many increasingly thin wells? Here we will present two different notions of convergence: one defined by Gromov and one by Sormani-Wenger. I will also mention work by my most recent doctoral students, Perales and Lakzian, and by my old undergraduate LSAMP team at Lehman College.

Biography: Christina Sormani grew up in New York City attending PS 166, IS 44, and Hunter College High School. Awarded a scholarship, she commuted to NYU for college and stayed there with an NSF fellowship for the doctorate. After completing postdoctoral positions at Harvard and Johns Hopkins University, she came back home to work at CUNY. She presents her research on geometric analysis around the world and is an American Mathematical Society Fellow. Today she will present undergraduate research completed with Lehman College students: Shanell George, Ulysses Hernandez, Fifonsi Lantonkpode, Vanessa Ortiz, Amanda Rodriguez, and Benjamin Arthur.

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FEATURED ARTICLES

A Unique Experience for Gifted and Talented Students
by Art Kalish, Director of the Institute of MERIT
(Mathematics Education, Research, and Instructional Technology)
SUNY College at Old Westbury

The Institute of Creative Problem Solving for Gifted and Talented Students (ICPS) is designed to enhance the problem-solving skills of exceptionally talented students using advanced mathematics and creative thinking strategies, with access to all qualified students from Long Island's public, private and parochial schools. The ICPS program is an innovative, multi-disciplinary academic program that complements in-school learning, driving students to excel and achieve at a very high level.

The ICPS precollege program accepts students in grade 5 through grade 10. Selection by the Institute is based on the following criteria: (1) rigorous entrance exam, (2) teacher recommendation and (3) school transcript. Each year approximately 600 outstanding students apply for the 85 available seats which implies that these students are among the top one-tenth of one percent of all students in mathematics on Long Island within their grade. Although there is a small cost to take the entrance exam, there is no further cost to the parents. The program is paid for through donations from current and past participants as well as mathematics organizations such as *Math For America*.

Classes for ICPS students are structured by grade level: grade 5/6, grade 7/8, and grade 9/10. During the school year, 20 class sessions are held on Saturday mornings at SUNY College at Old Westbury. The curriculum covers mathematical topics such as algebra, geometry, and number theory, as well as others not included in the standard courses of study, like problem-solving applied to probability, theory of finite differences, and mass point geometry. Additionally, selected applications of mathematics taken from science and engineering are presented and discussed with all lessons designed to present problems outside of the standard grade level material. The problem-solving questions are selected by the individual instructor within their field of expertise (math, science, or technology). The instructors are experienced teachers who have had years of experience working with gifted children and they present ideas in an open-ended, non-routine style, which drives the gifted students to use creative problem-solving techniques. Teamwork and competition are integrated to create an environment that is exciting for the students. Almost every problem that is presented has multiple strategies for reaching a solution. Participants develop their ability to use a variety of problem-solving skills and strategies; increase their interest and enthusiasm for problem-solving in mathematics; sharpen their mathematical intuition; acquaint themselves with interesting and important mathematical ideas; and experience the fun, satisfaction, and thrill of discovery associated with creative problem solving. The students in our program look forward to the challenges presented in their ICPS classes while meeting other children with similar likes and ability levels.

Coordinators are responsible for scheduling the instructors who vary from week to week so that students are exposed to a diverse approach to problem solving and problem creating, which adds to the program's innovative methodology. The instructors have backgrounds in elementary, middle, high school or college education.

In order to accommodate the overwhelming interest in the Institute, students are limited to one year in the program. For those students, who wish to continue their extra curricula studies two additional follow up programs were created: a research and technology course, and a math and computer science program, which are only available to students who have completed the one-year ICPS program. The research program is held at SUNY College at Old Westbury and requires the students be sophomores or juniors in high school. The ICPS graduates may also attend classes at Brookhaven National Laboratory (BNL). The BNL program only accepts students who have successfully completed the ICPS program or children whose parents are employed at BNL. The BNL program was formed by parents of

children who attended the ICPS class. The BNL and Research classes have a small cost associated with them.

Students accepted into the research class are expected to participate in The Al Kalfus Long Island Mathematics Fair held at Hofstra University. This year, of the 20 students attending the Fair, 16 were invited back for the medal round. The research coordinator is an expert in developing interesting research ideas and in having students write and present their work. In addition to presenting at the Fair, the students have participated in the HMMT competition held at either MIT or Harvard.

In addition to classes for the students we offer several workshops for their parents. The first of these programs is held on opening day. It consists of introducing the parents to the type of questioning that the students will be seeing in their classrooms. Parents are treated to a challenging set of questions in an open forum auditorium so that they may all participate. The second workshop is led by a psychology professor from Stony Brook University to discuss the difficulties of dealing with extremely gifted children and ways to help alleviate some of their struggles. The third parent workshop is presented by the expert in educational strategies for getting children into the appropriate colleges. These presiders have had all of their children attend the Institute of Creative Problem Solving and they volunteer their time to help make the program a success.

Having used using quantitative, qualitative, and attitudinal approaches, we have measured the accomplishments of the ICPS classes and the impact on the students. Students develop many new problem-solving strategies, enhance their ability to persevere when the problems are challenging and interesting, gain a sense of teamwork, a love of mathematics and logical reasoning and perhaps most importantly, they experience the thrill of discovery and new friendships

The Institute of Creative Problem Solving for Gifted and Talented Students is celebrating its 27th year. Dr. Jong Pil Lee founded the Institute based on the need that a gifted mathematics education program be available for talented students on a tuition free basis. It remains a tuition free program that serves the needs of gifted students to enhance their mathematical and creative thinking skills. Over 2000 students have benefited from the Institute (of whom approximately 70% are minorities) which has developed young leaders and role models in mathematics, science and technology to allow them to contribute greatly to society.

If you are interested in learning more about the program or making a donation please visit our website at http://institutecreativeproblemsolving.org/index.htm, a non-profit 501-c3 tax exempt organization.

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Some Results of Morley Triangles and their Mother Triangle

by Laura Debella (student) and Shing So
Department of Mathematics, Pace University

Abstract

In this paper, we study the relationship of some special triangles and their Morley internal and external triangles. In particular, we focus on equilateral triangles, right isosceles triangles, isosceles triangles, and right triangles.

Preliminary

The well-known Morley's theorem [1, 2] in modern geometry states that in any triangle, the points of intersection of the adjacent angle trisectors form an equilateral triangle, which is called the internal Morley triangle in this paper. Similarly, for any triangle, the points of intersection of the adjacent exterior angle trisectors also form an equilateral triangle, which is called the external Morley triangle. The aims of this paper is to investigate the close relationship between the internal Morley triangles, external

(continued)

Morley triangles and their Mother triangles. Some special results are obtained when the Mother triangles are equilateral triangles, right isosceles triangles, isosceles triangles, and right triangles.

<u>Special Examples</u>: Equilateral and Right Isosceles Triangles In this section, we consider the relationship between internal Morley triangle, external Morley triangle and their mother triangles for equilateral triangles and right isosceles triangles.

Theorem 1. Suppose the mother triangle ΔABC is an equilateral triangle such that $A = (0,0), B = (b,0), C = (0, b)$. Let ΔDEF and ΔPQR be the internal and external Morley triangles, respectively. Then (a) their centroids, vertices C, F, R, the midpoints of the sides $\overline{PQ}, \overline{DE}, \overline{AB}$, are collinear, (b) the points C, S, N. F, and M are collinear, where X is the intersection ray $\overrightarrow{AE}$ and $\overrightarrow{BD}$, N and M are the midpoints of $\overline{DE}$ and $\overline{AB}$, respectively.
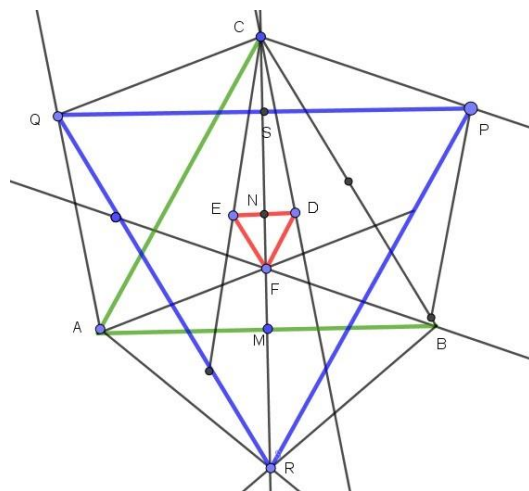
Theorem 2. Suppose the mother triangle ΔABC is an isosceles triangle such that $A = (-a,0), B = (a,0), C = (0,\sqrt{3}a)$. Let ΔDEF and ΔPQR be the internal and external Morley triangles, respectively. Then (a) the midpoints of $\overline{QR}, \overline{EF}$, $\overline{BC}$ .are collinear, (b) the lines $\overleftrightarrow{QR}, \overleftrightarrow{EF}, \overleftrightarrow{BC}$ are parallel, and (c) The quadrilateral ABPC is a square.

<u>Finding a Mother Triangle from its Morley Internal and External Triangles</u>
In this section, we study how to obtain the mother triangles (equilateral triangles: Theorem 3 and isosceles triangles: Theorem 4). If the internal and external triangles as well as additional collinearity properties are given.

Theorem 3. Let ΔDEF and ΔPQR be the internal Morley triangle and external Morley triangle coming from the same unknown mother triangle ΔABC. Suppose the following conditions are satisfied:
1. The midpoints S of $\overline{PQ}$, N of $\overline{DE}$, vertex F, vertex R are collinear;
2. The midpoints of $\overline{QR}$, $\overline{EF}$, vertex D, vertex P are collinear;
3. The midpoints of $\overline{PR}$, $\overline{DF}$, vertex E, vertex Q are collinear.
Then the mother triangle ΔABC can be constructed.
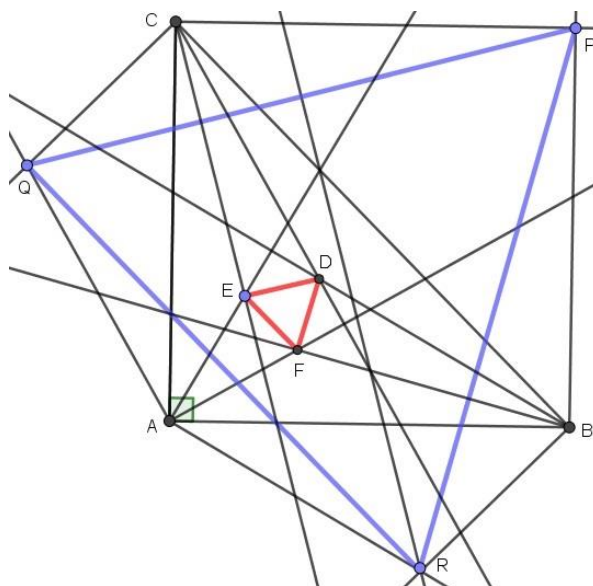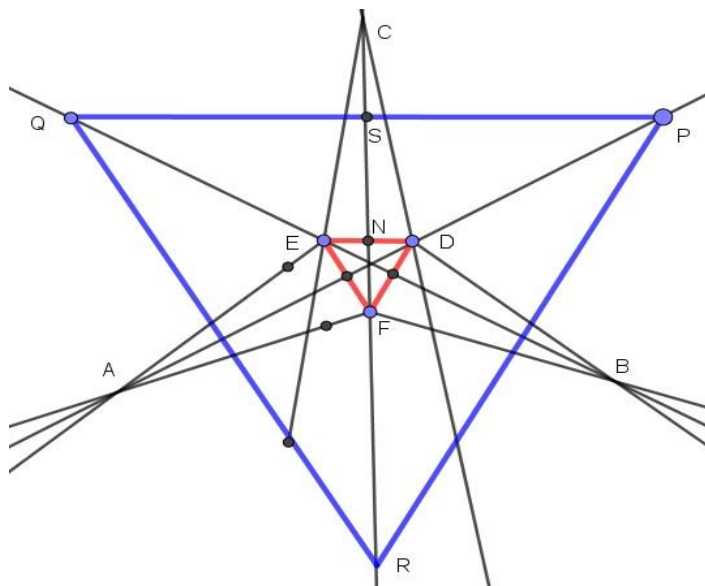
Theorem 4.   as shown in the figure. Let M and N be the midpoints of $\overline{EF}$ of $\overline{QR}$. If the points If the points *P, D, M,* and N are collinear, and the lines $\overleftrightarrow{EF}$, $\overrightarrow{PQ}$ are parallel, then the mother triangle $\triangle ABC$ can be determined.
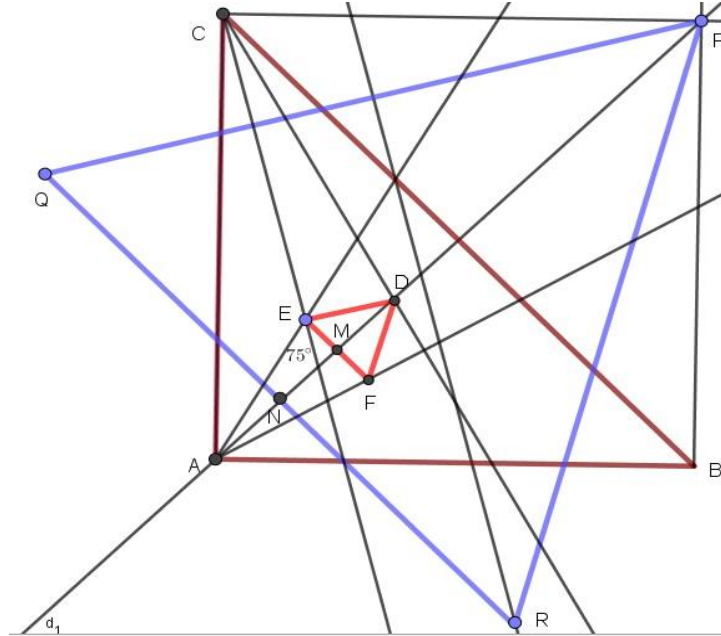

Some General Results for Isosceles Triangles
In Sections 2 and 3, we have discussed two special cases: (a) the mother triangle is an equilateral triangle (all three sides are congruent). (b) the mother triangle is an isosceles triangle with a right angle (two sides are congruent with a right angle). In other words, triangles satisfy Three conditions.

In this section, we focus our study on mother triangles which are isosceles triangles.

Theorem 5. Suppose the mother triangle $\triangle ABC$ is an isosceles triangle such that $A = (-a, 0), B = (a, 0), C = (0, c)$. Let $\triangle DEF$ and $\triangle PQR$ be the internal and external Morley triangle of $\triangle ABC$ in the figure. Then the following results hold: (a) For $\triangle DEF$ and $\triangle PQR$, the vertices *C, F, R, the midpoints L, M, and N of sides* of $\overline{PQ}$, $\overline{DE}$, $\overline{AB}$, respectively, are collinear. (b) The lines $\overleftrightarrow{AB}$, $\overleftrightarrow{ED}$, $\overrightarrow{PQ}$ are parallel.
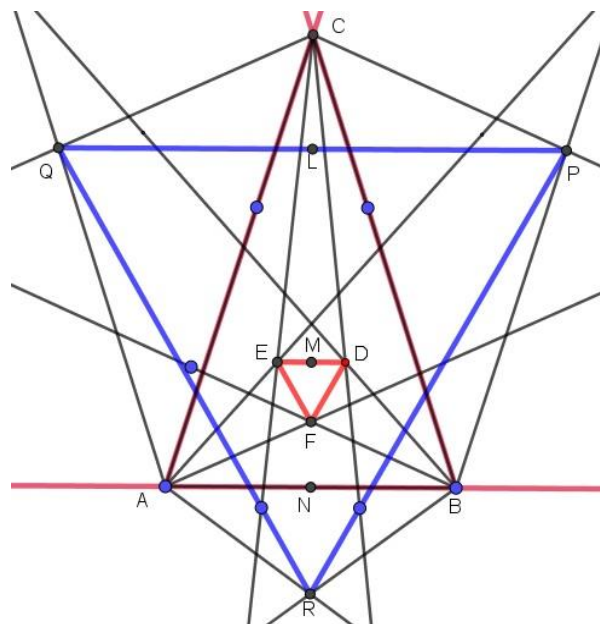
CALL FOR PARTICIPANTS AND INVOLVEMENT

Go Back to School, Join *The Mathematics Speakers Bureau!*

Do you have a talk which would be suitable for local area students or their faculty? We are seeking mathematicians interested in sharing their knowledge, enthusiasm, and love of mathematics. Now in its 54th year, the Mathematics Speakers Bureau (MSB) is composed of dedicated mathematicians who volunteer to speak to students and faculty of regional middle schools, high schools, colleges and universities on topics reaching beyond the traditional mathematics curriculum.

The primary goals of the MSB are to stimulate the interests of local youth in mathematics, to provide opportunities for students to meet active and enthusiastic mathematicians, to motivate students towards careers in the mathematical sciences, and to encourage cooperation between corporate and academic institutions in the mathematical education of area youth. Volunteers provide information about talks they are willing to give and the Bureau, in turn, advertises these talks to the faculty of local area schools. Schools contact speaker volunteers directly to make specific arrangements for a visit. Volunteers determine the number of presentations they give in any given academic year and always maintain the right to decline any invitation to speak. The Bureau web-page (sections.maa.org/metrony/speakers.html) contains an up-to-date listing of available speakers and their proposed talks. Additional information regarding the goals, history and operation of the Bureau can also be found at this site. If you wish to volunteer with the MSB, please contact Bureau Chair Abe Mantell at mantell@ncc.edu.

MetroMath Needs You!

Consider submitting a short announcement, commentary, article, study, experience, or other news-worthy item in the next issue of *MetroMath*. Contact the editor, Abe Mantell, via e-mail: mantell@ncc.edu.

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MATH IN THE NEWS FROM THE MAA
(much more can be found at: http://www.maa.org/news)

Columbia University Places in Top 5 Among Putnam Teams

The Columbia University team placed fourth in the 2018 William Lowell Putnam Mathematical Competition. The top five scoring teams in the 79th annual Putnam Competition are: Harvard University, MIT, UCLA, Columbia University, and Stanford University.

There were 4,623 participants from 568 institutions in this competition on December 1, 2018. A list of top college and university teams and top student participants is available from the Mathematical Association of America. The highest score on the six-hour exam was 114 out of a possible 120 points. Cash prizes are awarded to the Putnam Fellows, the Elizabeth Lowell Putnam Prize winner, and the mathematics departments and student members of the highest ranked teams.

U.S. Team Takes Top Prize at Romanian Master of Mathematics

A team of United States high school students, organized by the Mathematical Association of America, won first place for the second consecutive year at the Romanian Master of Mathematics (RMM) competition held Feb. 20 - 25 in Bucharest, Romania.

The Romanian Master of Mathematics is one of the most challenging international high school mathematics

competitions and allows students to demonstrate their mathematical abilities, exchange ideas, and to enhance cross-cultural contacts in high school mathematics.

A total of 24 teams from around the world competed in the 11th Romanian Master of Mathematics. Contestants work through six problems over two days, and the team score is based on the combined highest three individual scores. In addition to the first place team placement, each of the four U.S. team members took home an individual award:

- Carl Schildkraut, gold medal
- Benjamin Qi, gold medal
- Daniel Zhu, gold medal
- Luke Robitaille, silver medal

Po-Shen Loh, Carnegie Mellon University, served as the U.S. Team Leader and Evan Chen served as the U.S. Team Deputy Leader.

Students who compete in the RMM take part in the MAA's training program, the Mathematical Olympiad Program, which focuses on the long-term development of young American mathematical talent. The Mathematical Olympiad Program draws from students who perform exceptionally well on the MAA American Mathematics Competitions 10/12 for high school students and subsequent invitational competitions. These students are invited to participate in a series of AMC examinations that culminate with the International Mathematical Olympiad each summer.

MAA and the Joint Mathematics Meetings

The recent announcement of the termination of the long-standing agreement between AMS and MAA to manage the Joint Mathematics Meetings after the 2021 meeting has raised questions about MAA's plans to serve our members' needs in subsequent years. The MAA has long viewed the Joint Mathematics Meetings as one of the core annual meetings of the Association, to include governance meetings, sessions organized by MAA committees (including many of the activities directed towards undergraduate students), and sessions, business meetings, and receptions of SIGMAAs.

However, following more than five years of discussions and after considering a variety of models to sustain the partnership, the MAA Board of Directors concluded that ending the partnership to manage the Joint Mathematics Meetings after 2021 will allow the MAA to develop new plans and redirect resources to most effectively serve our members and the broader mathematical sciences community.

With more than three years until significant changes in the winter meetings occur, we have adequate time to address the concerns and needs of the various MAA constituencies that have been raised since the announcement was made.

It was important that the discussions regarding management of the Joint Mathematics Meetings were held in confidence. We felt it was just as important, now that those discussions have concluded, to inform our community, and to do so long before the changes will take effect.

For more on this perspective see the recent article in *MAA FOCUS* newsmagazine, *Meeting the Future: MAA and the Joint Mathematics Meetings.*

Spliddit Provides Provably Fair Solutions

As reported in *The Aperiodical*, a new website called Spliddit makes fair division problems easier to solve.

Created by Ariel Procaccia and Jonathan Goldman (Carnegie Mellon University), Spliddit allows users to select a class of problem, then gives instructions and a description of the algorithm it will use to provide the "provably fair" solution it promises. Spliddit even links to the research paper on which the algorithm is based. Spliddit can be used to split rent, divide goods, or share credit.

Read more here:
https://aperiodical.com/2014/11/your-favourite-mathematical-party-trick-has-a-snazzy-website/

EVENTS CALENDAR

Metropolitan New York Section Meeting • May 4, 2019, NYC College of Technology, Brooklyn, NY.
For more information see this newsletter, or visit: sections.maa.org/metrony/

AMTNYS NEW³ Summer Conference/Workshop • June 30 - July 3, 2019, Loudonville, NY
For more information visit: www.amtnys.org/pages/summer-workshop.html

MathFest • July 31 - August 3, 2019, Cincinnati, OH
For more information visit: www.maa.org/meetings/mathfest

AMS Fall Eastern Sectional Meeting • October 12-13, 2019, Binghamton University (SUNY), NY
For more information visit: www.ams.org/meetings/sectional/2263_program.html

NCTM Regional Conference and Exposition • September 25-27, 2019, Boston, MA
For more information visit: www.nctm.org/boston2019/

Seaway Section Meeting • November 1-2, 2019, Ithaca College, Ithaca, NY
For more information visit: people.rit.edu/maacway/

Joint New Jersey and Metro NY Section Meeting • October 26, 2019, Essex County College, Newark, NJ
For more information visit: sections.maa.org/newjersey/Main/index.html

AMTNYS 69th Annual Fall Conference • November 15-16, 2019, Rochester, NY
For more information visit: www.amtnys.org/pages/fall-conference.html

MAA-AMS Joint Mathematics Meeting • January 6-9, 2020, Denver, CO
For more information visit: www.maa.org/meetings

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OF THE
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ANNUAL MEETING
SATURDAY, 4 May 2019

New York City College of Technology (CUNY)
Brooklyn, NY

INVITED SPEAKERS

Kristin Lauter, Microsoft, University of Chicago
How to Keep Your Secrets in a Post-Quantum World

Sylvester James "Jim" Gates, Jr., Brown University
*A Mathematical Journey Thru SUSY, Error-Correcting Codes,
Evolution, and Sustainable Reailty*

Christina Sormani, Lehman College and CUNY Graduate Center
When do Sequences of Metric Spaces Converge?

CONTRIBUTED PAPER AND POSTER SESSIONS
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sections.maa.org/metrony

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