THE MATHEMATICAL ASSOCIATION OF AMERICA

The MAA Metropolitan New York Section
2017 Annual Meeting

Saturday, April 29, 2017

Hostos Community College

MAA
MATHEMATICAL ASSOCIATION OF AMERICA

Hostos Community College

April 29, 2017

Dear MAA Metro New York Conference Participants,

As the organizers of the Annual Meeting of the Metropolitan New York Section of the Mathematical Association of America, we would like to welcome all the participants to Eugenio María de Hostos Community College in the South Bronx.

The highlighted speakers of this year's conference include:

- Dr. Rosa Orellana from Dartmouth College,
- Dr. Carl Simon from the University of Michigan,
- Dr. Ron Buckmire from the National Science Foundation, and
- A panel of experts on teaching

The contributed papers and posters include presentations that cover pedagogical strategies, educational research, and mathematical research topics. There are also several STEM posters presentations being made by students from Hostos Community College and other institutions. Please support the presenters by attending one or more of the sessions that support your teaching or research interests and by browsing through the posters in the afternoon. We hope you will enjoy the conference.

We want to express our gratitude to our President, Dr. Gomez, to our Provost, Dr. Mangino, to the guest speakers, and to all the presenters, as well as to the Chair of the Metropolitan New York Section of the MAA, Dr. Elena Goloubeva.

We also appreciate the contribution of those presenting at today's conference.

We look forward to a motivating, inspiring, and enlightening conference.

Best regards,

The Local Organizing Committee

WELCOME
BIENVENIDA

THE METROPOLITAN NEW YORK SECTION OF THE MAA
and
THE MATHEMATICS DEPARTMENT OF EUGENIO MARÍA DE HOSTOS COMMUNITY COLLEGE

express our gratitude to all who made this event possible

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Olen Dias (Chair/Coordinator), Reginald Dorcely, James Kennis, Moise Koffi, Nelson Ortiz, Tanvir Prince, Edme Soho, Anders Stachelek, Lauren Wolf, Ramah Sharaf, Willy Baez Lara, Lissette Maspons, and Fidelia Okolo

MAA METRO NEW YORK CONFERENCE ORGANIZERS

Elena Goloubeva (Chair), Emad Alfar, Armen Baderian, Nadia Benalki, Vindya Bhat, Florin Catrina, Loucas Chrysafi, Ashley Dias, Johanna Franklin, Raymond Greenwell, Ida Klikovac, Chia-Ling Lin, Janet Liou-Mark, Abraham Mantell, Mikhail Semenov, Valentina Semenova, David Seppala-Holtzman, Satyanand Singh, Mutiara Sondjaja, and Johann Thiel

CONTRIBUTED PAPER AND POSTER SESSIONS ORGANIZING COMMITTEE

Ida Klikovac (Chair), Emad Alfar, Chia-ling Lin, and Tanvir Prince

METRO NExT ORGANIZING COMMITTEE

Johanna Franklin, Mutiara Sondjaja, and Johann Thiel

THE MAA ANNUAL MEETING OF THE METROPOLITAN NEW YORK SECTION

APRIL 29, 2017

Hostos Community College

AGENDA

8:30-12:15 PM	Registration	3rd Floor Hallway
8:30-12:00 PM 3:15-5:15 PM	Refreshments	Café 311
8:30-3:30 PM	Book Exhibits	Bridge 3rd Floor
9:15-9:35 AM	Welcome Dr. Christine Mangino, Provost, Hostos Community College Dr. William Baker, Chairman, Department of Mathematics, Hostos Community College Dr. Elena Goloubeva, Chair of the Metropolitan New York Section of the MAA, Webb Institute	Café 311
9:35-10:35 AM	Invited Speaker *Mathematics is Contagious and Contagion can be Mathematical* Dr. Carl Simon, University of Michigan	Café 311
10:35-10:45 AM	Break	
10:45-12:20 PM	Strategies and Research in Teaching Moderator: Dr. David Seppala-Holtzman, St. Joseph's College *Teaching Via Guided Discovery* Dr. Rosa Orellana, Dartmouth College *Helping Students in Lower Division Mathematics Courses* Dr. Danté Tawfeeq, John Jay College of Criminal Justice *The Creativity of Teaching-Research Methodology TR/NYCity Model* Dr. Bronislaw Czarnocha, Hostos Community College *Formative Summative Assessments: Some of My Favorite Exam Questions* Dr. Ron Buckmire, National Science Foundation	Café 311
12:20-1:30 PM	Lunch	Gym 3rd Floor
1:30-1:55 PM	Business Meeting and Awards Ceremony	Café 311

2:00-3:00 PM	Invited Speaker *Symmetry and Coloring* Dr. Rosa Orellana, Dartmouth College	Café 311
3:15-5:15 PM	Metro NExT New Experiences in Teaching Moderators: Dr. Johanna Franklin, Hofstra University Dr. Mutiara Sondjaja, New York University	Café 311
3:15-4:00 PM	Metro NExT Invited Speaker *Funding Opportunities at the National Science Foundation in Mathematical Sciences* Dr. Ron Buckmire, National Science Foundation	Café 311
4:10-5:15 PM	Metro NExT: Panel Discussion on Diversity in the Mathematics Classrooms Panelists: Dr. Trace Jordan, New York University Dr. Janet Liou-Mark, New York City College of Technology Dr. Danté Tawfeeq, John Jay College of Criminal Justice	Café 311
3:15-5:15 PM	Contributed Papers Sessions	
	Research Session	C 356
	Pedagogy Session	C 451
	Miscellaneous Session	C 352
	Faculty/Student Session	C 466
	Student Session I	C 359
	Session II	C 355
3:15-4:15 PM	Contributed Poster Session	Atrium & Bridge 3rd floor
4:10-4:55 PM	Pearson for Mathematics and MyMathLab	C 351

Internet login:

username: Hostos-MAA17
password: Hcc2017MAA$$

INVITED SPEAKERS

MATHEMATICS IS CONTAGIOUS AND CONTAGION CAN BE MATHEMATICAL

Dr. Carl Simon
The University of Michigan

Abstract: Analyses of mathematical models of the spread of contagious infections have suggested effective interventions to stop or slow disease spread – interventions such as vaccination regimes (who and when), prophylactic treatments, hospital procedures, and behavioral recommendations. A key component in these analyses has been the basic reproduction number as a threshold between endemic disease and no disease. This lecture will present some background on these analyses and describe recent efforts to extend them to smoking and crime. Why do teenagers start smoking? What difference does it make? What are the advantages and disadvantages of different interventions in the fight against crime, interventions such as harsher or gentler prison sentences, increased or decreased police presence, more or less intense social programs? What data do we need to evaluate these interventions and how can we find such data?

Biography: Carl P. Simon is Professor of Mathematics, Economics, Complex Systems and Public Policy at The University of Michigan. He was the founding Director of the UM Center for the Study of Complex Systems (1999-2009). He has served as the Associate Director for Social Science and Policy of the Michigan Energy Institute and as Director of the U-M Science and Technology Policy Program. His research interests center around the theory and applications of dynamical systems. He has applied dynamic modeling to the spread of AIDS (in particular, the role of primary infection), staph infection, malaria and gonorrhea, to smoking initiation, the spread of crime, and the evolution of ecological and economic systems. His research team won the 1995 Howard M. Temin Award in Epidemiology for Scientific Excellence in the Fight against HIV/AIDS and the 2005 Kenneth Rothman Epidemiology Prize for paper of the year in *Epidemiology*, He was named the U-M LS&A Distinguished Senior Lecturer for 2007 and received the U-M Distinguished Faculty Achievement Award in 2012.

SYMMETRY AND COLORING

Dr. Rosa C. Orellana
Dartmouth College

Abstract: The theory of symmetric functions has many applications to enumerative combinatorics, group theory, Lie Theory and algebraic geometry. This talk is a short introduction to the theory of symmetric functions and their applications. We'll discuss a particular case of these functions - symmetric chromatic functions, and the connection between the symmetric chromatic function and graph coloring.

Biography: Rosa Orellana received her Ph.D. from UCSD in 1999 under the guidance of Hans Wenzl. After graduation, she won a University of California President's Postdoctoral Fellowship at UC San Diego. In 2000, she joined the department of mathematics at Dartmouth College. She is currently Full Professor at Dartmouth where she is lucky enough to teach some of the best students in the country. Rosa has mentored many students on research projects and during the summer of 2013, she led a group of eighteen minority students for MSRI-UP. In 2006, she received the John M. Manley Huntington Memorial Award at Dartmouth for outstanding research, teaching and mentoring. Rosa is very interested in making students feel welcome, so at Dartmouth she has served as the advisor for the math club. In addition, Rosa co-founded a chapter of the Association for Women in Mathematics in an effort to increase the number of women taking and majoring in mathematics at Dartmouth. She has also organized Sonia Kovalevsky Math days to encourage middle and high school girls in our community to study mathematics.

Her area of research is algebraic combinatorics. Algebraic combinatorics is an area of mathematics that studies objects that have combinatorial and algebraic properties. An example of such object is the ring of symmetric functions. In algebraic combinatorics, algebraic methods are used to answer combinatorial questions, and conversely, combinatorial techniques are applied to problems in algebra. Recently her work has focused on the Kronecker product of two irreducible representations of the symmetric group.

METRO NExT INVITED SPEAKER

FUNDING OPPORTUNITIES AT THE NATIONAL SCIENCE FOUNDATION IN MATHEMATICAL SCIENCES

Dr. Ron Buckmire, National Science Foundation

Abstract: We shall present examples of funding opportunities at the National Science Foundation to support mathematical sciences. We will discuss programs that reside in the Division of Mathematical Sciences (DMS), in the Directorate for Mathematical and Physical Sciences (MPS), in the Division of Undergraduate Education (DUE), and in the Directorate for Education and Human Resources (EHR). Examples of currently funded projects will be included and questions and inquiries encouraged.

Biography: Ron Buckmire is the Lead Program Director of the Scholarships for Science, Technology, Engineering and Mathematics (S-STEM) program housed in the Division of Undergraduate Education (DUE) at the National Science Foundation (NSF). Before coming to NSF in May 2016 as a permanent program director responsible for mathematics education, he had served as a rotator (temporary NSF Program Director) in DUE from 2011-2013. He has been a faculty member at Occidental College in Los Angeles since 1994, serving as chair of the Mathematics department (2005-2010, 2015-2016) and achieving the rank of Full Professor in 2014 after beginning his academic career as a Minority Postdoctoral Scholar-in-Residence. Ron holds Mathematics degrees (Ph.D., M.Sc. and B.Sc.) from Rensselaer Polytechnic Institute. He was the Principal Investigator on an S-STEM project: DUE-1457943, Creating Opportunities in Science and Mathematics for Occidental Students (COSMOS). He has published peer-reviewed articles in an eclectic collection of journals such as *Numerical Methods for Partial Differential Equations, IMA Journal of Management Mathematics, Works and Days* and the *Albany Law Review*. His primary areas of research interest include mathematical modeling, applied mathematics, numerical analysis (specifically nonstandard finite-difference approximations of ordinary and partial differential equations), mathematics education and the scholarship of teaching and learning. He is an avid tennis fan, often active on social media (on Twitter @madprofessah and on Instagram @ronbuckmire) and has regularly updated the blog *The Mad Professah Lectures* since 2005.

STRATEGIES AND RESEARCH IN TEACHING PANELISTS

10:45 – 12:20 PM

TEACHING VIA GUIDED DISCOVERY

Dr. Rosa C. Orellana
Dartmouth College

Abstract: The philosophy behind guided discovery is that students can discover ideas and methods by themselves. The book for the course consists of carefully designed problems to lead the students to discover and prove the main ideas. There is considerable evidence that this leads to deeper learning and more understanding.

FORMATIVE SUMMATIVE ASSESSMENTS: SOME OF MY FAVORITE EXAM QUESTIONS

Dr. Ron Buckmire
National Science Foundation

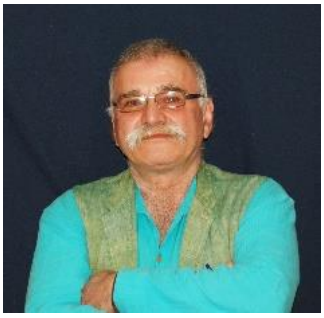
Abstract: Assessment is a key component of all teaching and learning. These are often categorized into two parts: formative and summative. Formative assessments are evaluation instruments used before the end of the learning period to provide students and teachers with feedback to assist in the learning process. Summative assessments are evaluation instruments that are used at the end of a learning period to provide information about the level of learning that occurred compared to some benchmark or standard. In this talk I will present some examples of some summative assessments from undergraduate mathematics (primarily calculus) that I believe had a formative effect (i.e. profound and long-lasting) on both students and myself.

THE CREATIVITY OF TEACHING-RESEARCH METHODOLOGY TR/NYCITY MODEL

Dr. Bronislaw Czarnocha

Hostos Community College

Abstract: Dr.Czarnocha will discuss the creativity of TR/NYCity methodology of teaching and doing research simultaneously. The methodology has been developed and practiced in the community colleges of the Bronx leading to deep understanding of learning pathways of its student population while at the same contributing to the general knowledge in the field. Central in grasping creativity of the TR/NYCity model is the concept of bisociation introduced by Koestler (1964). He defined bisociation "as a spontaneous flash of insight, which…connects previously unconnected frames of reference and makes us experience reality at several planes at once". Manifestations of student mathematical creativity will be discussed.

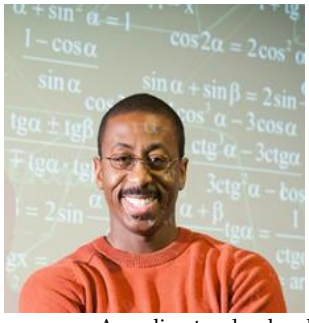


Biography: Dr. Broni Czarnocha is a quantum physicist PhD turned mathematics teacher-researcher. Faculty member in the Mathematics Department of Hostos CC since Sept. 1993, and in 2010 he was granted full professorship; one of the founding members of the RUMEC (Research in Mathematics Education Community), the nationally based research group which widely introduced the APOS theory of mathematical conceptual development into Math Ed profession. He was the Principal Investigator (with Vrunda Prabhu) on the 2002 - 2006 NSF/ROLE Grant # 0126141 ($400,000), 3 years for the Teaching Experiment Introducing Indivisibles into Calculus Instruction, and successful grant writer and coordinator of mathematics teaching-research for the 2005-2008 Comenius 2.1, European Commission (476,000euro) international grant Professional Development of Teacher-Researchers anchored in Poland with participation of Hungary, Italy, Spain and Portugal. He published 42 papers and edited two Handbooks of teaching-research. Originally interested in the Teaching-Research methodology, since the local CUNY grant received in 2010 he focused his investigations on the mathematical creativity of Aha! Moment proposing bisociation of Arthur Koestler as the new definition of creativity. He is also currently investigating the Mathematics of Fairy Tales and the application of mathematics to the detailed analysis of social events. His hobby is glider pilot.

HELPING STUDENTS IN LOWER DIVISION MATHEMATICS COURSES TO BECOME BETTER MANAGERS OF PROBLEMS THAT THEY PERCEIVE TO HAVE NO APPARENT SOLUTIONS

Dr. Danté A. Tawfeeq

John Jay College of Criminal Justice



Abstract: In this discussion I will engage issues related to college level at-risks students' success in lower division mathematics course. This discussion will be grounded in issues related to efficacy and the possible repercussions on the learning of mathematics during post-secondary education do to assessment policies at the secondary level. Also, I speak about some of the curriculum and policy initiatives that were implemented in the Math Foundations Quantitative Reasoning program that helped in reducing the failure rates of at-risk students in college algebra.

Biography: Dr. Danté A. Tawfeeq is an associate professor of mathematics at John Jay College of the City University of New York. He is also the director of the Math Foundations Quantitative Reasoning program. As a director, he develops curriculum and policies that support students' learning of mathematics at the college. His professional portfolio includes 9 years of teaching and program assessment at middle and secondary schools. Additionally, Dr. Tawfeeq has 14 years of experience teaching mathematics and mathematics teacher education courses at both majority and minority serving institutions of higher education. Dr. Tawfeeq was named a Massachusetts Institute for College and Career Readiness (MICCR) Senior Research Fellow. He will be in this role from 2015 to 2018. Dr. Tawfeeq also received a Fulbright Award in January 2015 to work with the Namibia University of Science & Technology (NUST). Dr. Tawfeeq's research interest includes the analysis of Black and Hispanic students' performance on mathematical assessments; PD for in-service teachers of mathematics that work with large at-risk populations; the instruction of mathematics to underprepared college students; problem centered learning in algebra and calculus, the design and validity of mathematics assessments; and the intellectual identity of urban at risk male students. The results from several research and service funded projects that Dr. Tawfeeq directed has led to published work.

METRO NY SECTION NEWS

MESSAGE FROM SECTION CHAIR

I would like to begin this message by thanking the team of section officers, committee chairs, and active members. The section has a great team of people working together to make sure that it is active and that the programming remains diverse, meaningful, and rewarding for the entire membership. It is a real pleasure and honor to work for them and with them.

The 2016 Section Meeting at Vaughn College was extremely successful. Vaughn College did an amazing job hosting the event, and I want to thank all people that were involved in planning and putting this event together. We hope that we will enjoy this meeting as well.

We are very thankful to our hosting institution Eugenio María de Hostos Community College!

WE ARE ALMOST SURE THAT OUR NEXT MEETING WILL TAKE PLACE AT HOFSTRA UNIVERSITY ON APRIL 29, 2018.

Details of this meeting and other events will be on our website: http://sections.maa.org/metrony/.

Young faculty, please come and join Section NExT (Metro NExT). This program is active again. It is aimed at supporting young faculty, new and rising PhD's in mathematics or mathematics education.

Please use our Speakers Bureau. We will be happy to serve local schools and communities by providing interesting speakers on a wide variety of mathematical topics.

Dear colleagues, we invite you to be actively involved in the Section!

Please contact me or the section officers if you would like to become actively involved, seek more information, or share ideas. Step up to become a section officer. You can start by hosting a future Metro NY section meeting.

Last year, I invited a guest to our section meeting. Her name was Olen Dias. Today, we all are enjoying the warm welcome from Hostos Community College. We want to extend our special thanks to the Hostos chairwomen and coordinator of this meeting, Olen Dias, who brought all of us here to Hostos.

Let us know if your institution would be willing to host a future meeting. Visit the MAA NY Metro website to see what is happening. As always, I welcome your input and feedback on all section matters.

Elena Goloubeva, Webb Institute

MESSAGE FROM SECTION CHAIR-ELECT

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

In *the Mathematical Sciences in 2025*, the National Research Council (2013) recommended that mathematics departments enable students of all social, ethnic, and economic backgrounds to succeed in their pursuit of a mathematics degree and to be supported through best practices.

Retaining underrepresented groups (minorities and women) in the mathematical sciences at all levels continues to be a national challenge. Many of these students face significant barriers which prevents them to reach their academic potential. This year's annual meeting at Hostos Community College will provide engaging presentations and discussions, not only in the mathematical sciences, but also in promoting a diverse and supportive mathematical climate for all students. Our prominent guest speakers will expand your mathematical and pedagogical knowledge and our Metro NExT program will welcome untenured faculty into an engaging and supportive community. Please enjoy the meeting!

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

National Research Council. (2013). The Mathematical Sciences in 2025. Washington, DC: The National Academies Press.

FAREWELL TO RAYMOND GREENWELL

Elena Goloubeva

One of the oldest (not in terms of age, but in terms of involvement) and the most influential members of our section is moving out of the New York area to experience the Wild West life.

Raymond N. Greenwell of Hofstra University has faithfully served the Metropolitan New York Section for about thirty-five years. His official involvement began in the 1980's when he served as a Departmental Liaison. From 1995 to 1997, he was the Vice Chair for Four-Year Colleges. Later in 1999, he became the Chair of the section, and he served as a Chair until 2001. He was governor from to 2002 to 2005. From 1980's until now he served as the Liaison Coordinator and Webmaster of the section. Professor Raymond N. Greenwell was the Service Award co-winner in 2003, Teaching Award winner in 2010. He has been the Service Award Committee chair since 2004. He ran the student problem solving competition at the annual section meeting in 2010 and 2015, and served on a panel at the annual section meeting in 1989. He presided over a contributed paper session at the annual section meeting in 1995, and he gave a talk at the joint Metropolitan New York/Seaway section meeting in 2006.

For many years, he has been a member of the planning committee for the annual meeting. His service to the MAA is not limited to the section. He is also involved in MAA on the national level. He has been a reviewer for the Media Highlights column of The College Mathematics Journal since 1993. He published one article and reviewed many for The College Mathematics Journal. He participated in a Project NExT panel, and he has been an active project NExT consultant for many years.

Raymond N. Greenwell is an amazing person and leader. People like him are the heart and soul of this organization. For many years, he involved, inspired, and encouraged so many of the section officers, young MAA members, and members of the mathematics community. Many people were drawn to the MAA and had stayed actively involved with the organization because of him. Through all the years in the section, he kept his focus on the activities, life, and survivability of the section and the MAA as a whole. Raymond N. Greenwell was a well-deserved winner of Meritorious Service Award 2016.

His active involvement in the MAA is just part of his participation in the mathematical community and education. He is the author of several textbooks, advisor of several masters' theses; he is actively involved in William Lowell Putnam Mathematical Competition as a Hofstra team trainer and much more.

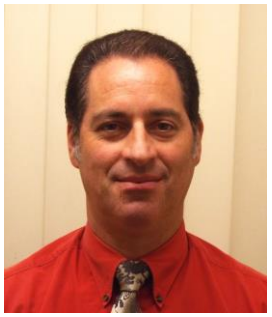
We wish him farewell and good luck! We will truly miss him and his enthusiasm, his true devotion to the section, his desire to inspire, and his organizational skills that made the section run smoothly.

CHANGE OF GOVERNOR

This year is the year when the Section changes the Governor. We would like to welcome the next Governor of the section Dr. Alan Tucker.

Dr. Tucker is a SUNY Distinguished Teaching Professor at Stony Brook University in the Department of Applied Mathematics and Statistics as well as Associate Dean for Resources in the Stony Brook Engineering College. He obtained his Ph.D. in Mathematics from Stanford University in 1969. Dr. Tucker has been at Stony Brook ever since. He is the author of widely used text *Applied Combinatorics*, now in its sixth edition. Dr. Tucker has been very active in the Mathematical Association of America: he was a MAA First Vice-President and chair of its MAA's Education Council and Publication Committee as well as Metro New York Section chair and now Section Governor. He developed an innovative Applied Mathematics major at Stony Brook that was ranked last year as third best in the U.S. by *USA Today*, ahead of Harvard and Stanford. At Stony Brook, only Psychology and Biology graduate more majors than Applied Mathematics.

We would like to thank our present Governor Abe Mantell, who is almost at the end of his Governor term, for the great job. Abe is a very active and positive person. He devoted many years of his life to the Section as a section officer. He is a key player in the Section. His constant presence and participation in the Section became an essential life of the Section.



Abe earned a B.S. in Mathematics from Rensselaer Polytechnic Institute, an M.S. in Applied Mathematics from SUNY Stony Brook, and completed three years of Ph.D. study (A.B.D.) also at SUNY Stony Brook in Applied Mathematics. Upon leaving Stony Brook, he joined the faculty at Nassau Community College (SUNY), where he has been ever since. Additionally, he has taught as an adjunct at: Dowling College, Suffolk Community College, Polytechnic University (both the Long Island and Brooklyn campuses), The U.S. Merchant Marine Academy, and the Webb Institute. He has given over thirty presentations at regional and national conferences and as an invited speaker at local area events.

Abe has maintained active roles in professional organizations. He has served both the Metropolitan New York Section of the MAA and the New York State Mathematics Association of Two-Year Colleges (NSYMATYC) for more than fifteen years. Positions held with the Metro Section of the MAA have been: Vice-Chair for Two-Year Colleges, Chair-Elect, Chair, and he currently serves as Newsletter Editor and is at the end of his term as Section Governor, where he represented the Section by serving on the Board of Governor's at the national level. Positions held with NYSMATYC include: Webmaster, Scholarship Chair, Member-at-Large, President-Elect, President, and Past-President (having served the presidential cycle twice), and is currently the Math League Contest Coordinator.

He has received the following awards: The Distinguished Service Award by the Metro NY Section of the MAA, the Outstanding Contributions Award by NYSMATYC, and the Distinguished Educators Award from the East Meadow Civic and Community Service Association.

MAA DEPARTMENTAL MEMBERSHIP

David Seppala-Holtzman

The MAA has created a new Departmental Membership with the following benefits: One faculty member (the Departmental Membership Administrator) would receive the following full membership privileges:

- Membership in the local MAA Section
- Online subscriptions to:
  - *The American Mathematical Monthly* (10 issues per year)
  - *The College Mathematics Journal* (5 issues per year)
  - *Mathematics Magazine* (5 issues per year)
  - *Math Horizons* (4 issues per year)
  - *MAA FOCUS* (6 issues per year)
- All faculty members in the department will receive $100 off every hosted WeBWorK course.
- Administrator and Student Nominees will also receive *MAA Math Alert*, the MAA's monthly e-newsletter, filled with the latest news and happenings from across the mathematical community.
- Student and Administrator Members receive discounts on MAA books (typically 20% off list price), and discounted registration for MAA MathFest and the Joint Mathematics Meetings (JMM).
- Student and Administrator Members are eligible to join any of MAA's Special Interest Groups (SIGMAAs).

The Departmental Membership Administrator may nominate ***any number*** of mathematics students (undergraduate and graduate) for MAA membership at no additional cost. The students you nominate become MAA members with these benefits:

- Online access to all MAA journals: The American Mathematical Monthly, Mathematics Magazine, and the College Mathematics Journal
- Online access to Math Horizons
- Online access to MAA FOCUS

- Online access to archives for all MAA journals.
- Access to the online Member Library, featuring a selection of MAA's outstanding books
- Discounts on meeting registration fees at both MAA MathFest and the Joint Mathematics Meetings
- Discounts on purchases of MAA books

The fee to become a Departmental Member is based upon the size of the academic institution in question as well as whether or not it is a Ph.D. granting institution. For more information and how to apply, visit www.maa.org. With this new procedure in place, it is now quite inexpensive and easy to bring large numbers of your students into the mathematical community. Once they become members, they are quite likely to see the benefits of having joined. There are, of course, the tangible benefits, listed above, that include access to journals, archived materials and discounts. But, just as importantly, they will come to feel a part of something larger, a community of like-minded people. Once they come to appreciate that, your students are apt to remain members for the rest of their lives.

METRO NEW EXPERIENCES IN TEACHING (NExT)

3:15 – 4:15 PM

Organizers: Dr. Johanna Franklin, Hofstra University
Dr. Tia Sondjaja, New York University
Dr. Johann Thiel, New York City College of Technology, CUNY

The Metropolitan New York Section of the MAA is pleased to introduce a special program aimed at supporting new and rising Ph.D's in mathematics or mathematics education. Metro NExT (New Experiences in Teaching) will be a local version of the highly successful national MAA program Project NExT. Like Project NExT, Metro NExT's goal is to support new and pre-tenured faculty who are interested in improving the teaching and learning of undergraduate mathematics.

Metro NExT aims to provide mathematicians in the metropolitan New York area who have recently entered the profession with practical information about, and concrete suggestions for, implementing more effective pedagogical and professional strategies, ranging from new teaching methods to writing grant proposals and balancing teaching and research responsibilities. Metro NExT events will also provide opportunities for its fellows to meet other young professionals, socialize, and network. Furthermore, Metro NExT fellows will be invited to participate in some future Project NExT events including those at the Joint Meetings and at Mathfest.

Metro NExT is open to all Metropolitan New York MAA Section faculty members holding a Ph.D. in mathematics or mathematics education and having full-time, pre-tenure status at a post-secondary institution. Metro NExT is also open to all graduate mathematics or mathematics education students in their final two years of doctoral study.

METRO NExT — Location: Café 311

3:15 – 4:00 p.m. **Funding Opportunities at the National Science Foundation in Mathematical Sciences**
Dr. Ron Buckmire, *National Science Foundation*

4:10 – 5:15 p.m. **Panel Discussion on Diversity in the Mathematics Classrooms**

Dr. Trace Jordan, *New York University*
Dr. Janet Liou-Mark, *New York City College of Technology, CUNY*
Dr. Danté Tawfeeq, *John Jay College of Criminal Justice, CUNY*

Abstract: In this interactive panel session, we will learn from three panelists about the problems and their experiences related to the Diversity in the Mathematics Classrooms. The presentations will be followed by a discussion and Q&A with the audience.

CONTRIBUTED PAPER AND POSTER SESSIONS

3:15 – 5:15 PM

RESEARCH SESSION — Location: C356

Presider: *Mikhail Semenov*

3:15 p.m. **Primes and Divisibility Patterns in the Repunit Sequence 1, 11, 111, 1111, 11111, …**
Jay L. Schiffman, Rowan University

The repunit (repeated digit) sequence is one of the most appealing integer sequences. In this paper, I will demonstrate using modular arithmetic divisibility patterns in the sequence which are recurring as well as when early primes initially enter the sequence. In addition, we demonstrate the complete factorizations for the initial one hundred terms in the sequence. For example, the prime 11 is a factor of every even numbered term in the sequence while the prime 3 is a factor of every third term in the sequence and the prime 101 appears as a factor in every fourth term of this sequence. The first five primes in the repunit sequence are R_2 (11), R_{19} (1,111,111,111,111,111,111), R_{23}, R_{317} and R_{1031}. What is likewise fascinating is that large primes such as 333667, 2906161 and 121499449 enter the sequence fairly early as factors of the ninth, fifteenth and twenty-eighth terms respectively. In contrast, the primes 149, 227 and 229 do not appear as factors in any of the first one hundred terms of the sequence. All of the primes with the exception of 2 and 5 eventually appear as factors in the sequence. Please join us to witness a fascinating integer sequence.

3:35 p.m. **The Future Impact of Artificial Intelligence on College Mathematics Education**
Alex Atwood, Suffolk Community College

How will increasingly powerful artificial intelligence systems change the way in which mathematics is taught in colleges? Several case studies of the impact of artificial intelligence systems in various professions (in education and outside of education) will be presented, and a possible future of mathematics education will be envisioned.

3:55 p.m. **Can a Planar Graph Always be 4-Colored via Kempe Exchanges?**
James A. Tilley, Harvard University (retired), Morgan Stanley as Chief Information Officer

This presentation explores the question of whether a planar graph with a given k-coloring, $k > 4$, can always be recolored by means of Kempe exchanges alone to achieve a 4-coloring. Our conjecture is that it can: we describe and test a method to accomplish this by *resolving* one at a time each vertex that has a color label $j > 4$. We draw a distinction between strict reducibility, a concept used in proving the 4-color theorem, and the less-stringent notion of resolvability.

4:15 p.m. **Properties of Permutations and Their Graphs**
Sanju Vaidya, Mercy College

Various concepts in Discrete Mathematics provide powerful tools to solve problems in many fields such as computational Molecular Biology and Computer Science. For example, properties of permutations play a crucial role in analyzing the genetic make ups or genomes of different species. In this presentation, I will analyze various properties of permutations such as longest increasing and decreasing subsequences, up-down signatures, permutation graphs and their applications to various fields such as biology.

4:35 p.m. **Curvature and Centripetal Acceleration: How Geometry and Physics Intertwine**
Frank Wang, LaGuardia Community College, CUNY

In many calculus textbooks, the curvature is defined as the change of unit tangent vector with respect the arclength of a space curve. In many cases, the authors derive a formula to express the curvature using the first and second time derivatives of the space curve. Such a presentation emphasizes on calculation, and students often fail to recognize the beautiful connection between curvature and centripetal acceleration (that they might have encountered in a physics course). This presentation provides a clarification of the meaning of curvature, and highlights its importance in physical motion. Newton's mountain model for orbiting the Earth will be discussed.

4:55 p.m. **Elephant Metabolic Heat Regulation by Convective Heat Transfer from the Pinnae**
Moise Koffi, Hostos Community College, CUNY

Studies have shown that elephants produce a significant amount of metabolic heat up to 5.12 kW in their daily motions. The question is how they regulate such a substantial amount of thermal energy generated. Despite their large body surface area, previous work indicates that ear flapping should be considered as the principal thermoregulatory mechanism for elephants. The present experimental and computational work investigates how the flow induced by the flapping pinnae of the elephant participates in the animal's heat dissipation. Two full size models of elephant pinnae, one flexible and one rigid, were designed and tested in the laboratory. The flow in the vicinity of the rotational oscillating models was visualized using water vapor-based smoke particles. Small size J-types thermocouples were used to monitor the transient surface temperature of the moving pinnae, which was heated at constant flux, over several flapping cycles. A 3-D computational investigation of the flow around the pinna models with Fluent was carried using the dynamic mesh method. Numerical results confirmed the presence of a hooked-shaped vortical structure which was revealed by the flow visualization experiment. It has been found that the shedding of induced vortices at end cycles is mainly responsible for the enhancement of the thermal characteristics from the pinnae. Furthermore, the cooling rate is improved by 30% when the flexible model of the pinnae compared to the rigid model.

PEDAGOGY SESSION — Location: C451

Presider: *Satyanand Singh*

3:15 p.m. **An Integration of Learning Theory and Creativity Theory**
William Baker, Hostos Community College, CUNY

Piaget spent much of work describing how children learn or modify existing schema to construct new ones during problem solving activity. The work of Piaget differentiates between minor modifications in which an individual can assimilate a new problem situation into existing schema from the situation in which signification change must occur to accommodate the new problem. Koestler focused much of his work on describing creativity i.e. how an individual creates a new schema. Although the theories of Piaget and Koestler have different focal points they have two noticeable commonalities. The first is that Koestler also differentiates between the situations in which an individual exercises his understanding using existing schema from that in which he/she must make progress in understanding by synthesizing existing schema to form a new one. A second commonality is that both theories provide precise descriptions of a mechanism for the construction of a schema. In this presentation Piaget's mechanism of learning 'reflective abstraction' is integrated with Koestler's mechanism of creativity 'bisociation' and this integrated framework is used to analyze student's use of intuitive knowledge to engage in mathematical reasoning e.g. students' use intuitive knowledge of percents to engage in proportional reasoning to solve percent problems.

3:35 p.m. **Introducing Computational Thinking Through Hands-on Projects Using R with Applications to Calculus, Probability, and Data Analysis**
Nadia Benakli, New York City College of Technology, CUNY
Boyan Kostadinov, New York City College of Technology, CUNY
Ashwin Satyanarayana, New York City College of Technology, CUNY
Satyanand Singh, New York City College of Technology, CUNY

In this presentation, we show how to promote computational thinking in STEM disciplines through hands-on computer experiments. These activities empower students to learn, create and invent with technology and engage computational thinking through simulations, visualizations and data analysis. We are using the free (open-source) statistical programming language R. These interactive computer activities are easily integrated into a smart classroom. We discuss activities that keep students motivated and actively engaged in the process of learning as they sharpen their skills.

3:55 p.m. **Olinde Rodrigues and His Work in Catalán Numbers**
Johannes C. Familton, Borough of Manhattan Community College, CUNY

Benjamin Olinde Rodrigues (1795–1851), was born into a family of Iberian Jews residing in France. Most mathematicians who heard of Rodrigues connect him with Rodrigues rotations, which were based in his PhD thesis, and a later lead to a paper that he wrote in 1840. Few mathematicians know that he also contributed to combinatorics, specifically to Catalan numbers.
This presentation will put this fascinating man's life in context with his 1838 contribution to Catalan numbers. A brief history about what lead to the problem that Rodrigues tackled will be included. This will be followed by what Rodrigues pointed out and showed in his notes. This will include a summary of his first observation followed by a summary of a 'shorter proof' he later wrote of his original observation.

4:15 p.m. **Developing "Zero Text Book Cost" Section for "Introduction to College Mathematics" in Hostos Community College**
Tanvir Prince, Hostos Community College, CUNY

In the fall 2016, I participated in the initiative to develop a "zero textbook cost" section for MAT 100 (introduction to college mathematics). The section is completely developed and approved by the Lumen Learning and is offering in the spring 2017. This is developed using the "MyOpenMath" platform. "MyOpenMath" runs on the open source, providing free hosted use of this platform in support of free, open textbooks. The intent is to provide classroom use of the platform, without any required cost to students and to provide students self-study opportunities.
In this presentation, I will demonstrate the use of "MyOpenMath" software in developing the course and some pros and cons of using the software. After the presentation, the audience will have some basic idea about the platform and will be able to start the process of developing their own course using the software. The audience are encouraged to bring a laptop if they want a hand on experience during the presentation.

4:35 p.m. **From NICHE to NICE: Training Faculty in Best Practices for Quantitative Reasoning Instruction**
Esther Isabelle Wilder, Lehman College, CUNY
Frank Wang, LaGuardia Community College, CUNY
Sarah Hoiland, Hostos Community College, CUNY

In an effort to respond to the persistent challenges of innumeracy, a Numeracy Infusion Course for Higher Education (NICHE) was developed to provide instruction in best practices for effective quantitative reasoning (QR) pedagogy to faculty from across the disciplines. The Numeracy Infusion for College Educators (NICE) Program represents an extension of NICHE and is focused on understanding how different ways of offering the training program impact its success, especially among faculty teaching at community colleges. In both our NICHE and NICE programs, faculty participants undertake a variety of exercises grounded in best practices, engage in hands-on activities related to QR teaching methods, and develop QR instructional and assessment materials. Our research to date has shown that our initiative is associated with a significant improvement in faculty QR skills, a greater commitment to teaching QR, and increased awareness of tools and techniques for effective QR instruction.

MISCELLANEOUS SESSION — Location: C352

Presider: *Loucas Chrysafi*

3:15 p.m. **The Do's and Don'ts of a Statistics Project**
Christine M. Brady, Suffolk County Community College

At Suffolk County Community College, we offer two statistics courses. MAT103 is an introductory statistics course whereas MAT104 expands on those statistical concepts learned in MAT103 as well as introduces the students to more advanced statistical techniques. One of the course goals for MAT104 is to train students to conduct statistical studies as well as prepare them to analyze and present their results. One of my course requirements for MAT104 is a project that consists of developing a survey, collecting data, summarizing the data, constructing confidence intervals, performing hypothesis tests and writing an analysis report. I have had the opportunity to teach MAT104 four times. Over time, the structure of how I assign this project has changed based on my experience of what has seemed to work. In this presentation, I will share the evolution of this project and provide tips of how to create a successful and manageable class project.

3:35 p.m. **The Mathematics Behind the Stock Market Game for Our Students**
Vincent Young, SIFMA Foundation
Ruben Worrell, Hostos Community College, CUNY

The SIFMA Foundation's Stock Market Game program provides students with the opportunity to see the math they are learning in the

classroom in action in the real world. It is also an opportunity for students to apply what they've learned to the essential life skill of saving and investing. The program's *Math Behind the Market* student activity book assists students with making the transition from math text book to real world. A FINRA-funded study by the American Institute for Research found that students in the SIFMA Foundation's Stock Market Game program performed better on math assessment tests than students who did not participate. Students will be able to interpret and use of the concepts of slopes, trends, mathematical expectations, Odds in favor and Odds against, and the statistics of their investments to be presented in their respective ePorfolios at the end of the semester.

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3:55 p.m. **Applications of Image Morphing Techniques to Analyze Changes in Our Environment**
Yanicel Fragoso, Hostos Community College, CUNY (student)
Ousmane Gaye, Hostos Community College, CUNY (student)

The purpose of this research is to analyze the mathematics behind image morphing and its usage towards environmental changes. Linear transformations can be used to distort and blend two images to produce a morph. Image morphing is considered an average between two different images. In other words, if we put one image on top of the other assuming one image is at time t=0 and the other at t=1, we can predict what would be the point's location at any time "t" between them, generating its corresponding triangle pattern, therefore the image. Triangulation of an image is the distribution of key points along an image, which guarantees that the rectangular shape of the original picture is preserved and that the resulting triangulation is similar to the original. The morph is applied from triangle to triangle by affine transformations. This procedure represents the basics of morphing calculations using linear algebra parameterization of line segments to determine the path and final location of each point compared to the rest. In real life, each image has a large number of points and triangles that form the triangulation pattern, for this reason we use many different application software to create image morphs. *Abrosoft Fantamorph* software is used in order to create a series of time- varying frames. This research studies the slow decrease of water in different lakes, where we observe the gradual change from one image to the next during the respective periods of time. The study of the Global Water Crisis is performed with the software creating frames of the map from 1995-2025. In this case, we can predict what would be the areas in the world affected by this crisis during the years between and in the future. In addition, we study the snowpack in California's Sierra Nevada with images taken in March 2010 and March 2015. With the morphs of these images we analyze how the snow slowly decreases during the five years and how the colors change as the image transitions to the next. Image morphing provides important techniques that benefit the study on the changes in our environment while contributes to research agencies as NASA. The main limitation encountered in this research is that *Abrosoft Fantamorph* only permits the creation of morphs as linear functions. For further research, different software may be used to create morphs as exponential functions.

4:15 p.m. **Sums of Powers via Matrices**
Loucas Chrysafi, Farmingdale State College
Carlos Marques, Farmingdale State College

We derive a formula for the sum of powers of consecutive integers by exploiting difference tables using matrices.

FACULTY/STUDENT SESSION — Location: C466

Presider: Janet Liou-Mark

3:15 p.m. **Enhancing Mathematical Understanding through a Peer Leadership Program**
Janet Liou-Mark, New York City College of Technology (faculty)
Carlos Alvarez, New York City College of Technology (student)
Ronaldo Carhuaricra, New York City College of Technology (student)
Joel Chapman, New York City College of Technology (student)
Elizabeth Ferreira Pichardo, New York City College of Technology (student)
Farjana Shati, New York City College of Technology (student)
Gary Zeng, New York City College of Technology (student)
Xuebin Zou, New York City College of Technology (student)

It is well known that the best way to understand a concept is to teach it to someone. New York City College of Technology's Peer-Led Team Learning (PLTL) Leadership program has been instrumental in strengthening the mathematical understanding of undergraduates. By facilitating a PLTL mathematics workshop, undergraduates who serve as peer leaders improve in the following areas: 1) creating innovative ways to engage their peers in instruction; 2) developing stronger work habits to understand the material; 3) recalling the concepts; and 4) applying the concepts more effectively. Components of the leadership program include: a training course and a seminar series. This project is supported by The Department of Education Minority Science and Engineering Improvement Program (MSEIP) grant # P120A150063.

STUDENT SESSION I — Location: C359

Presider: *Johann Thiel/Valentina Semenova*

3:15 p.m. A Probabilistic Analysis of *Songs for a New World*

Jason Belanger, Hofstra University (student)

One way to analyze functional harmony in music is called Roman Numeral Analysis (RNA), which examines how different chords "function" in relation to the chords around them. In this paper, I use RNA to examine *Songs for a New World*, a song cycle by Jason Robert Brown, from a probabilistic perspective. I examine seven songs from the show and find they can be analyzed with ergodic Markov chains.

I limited my analysis to six of the basic functional chords of RNA and examined the transition and limiting matrices for patterns. The final song had the most similarities to the other songs, prompting me to examine its mean recurrence time and mean first passage time matrices. This revealed that Brown spent most of his time using I and IV chords while spending very little time on ii chords.

Further analysis of the transition matrices shows that Brown favors a IV-I transition to get back to a I chord rather than V-I, and overall spends more time using predominant chords than dominant ones. There are also some 0 entries in these matrices, indicating Brown didn't use certain chord transitions throughout the show. The limiting matrices of the first and last songs are also very similar, showing they accomplish their goals of introducing and recapitulating the harmonic themes of the show. This paper examines the musical implications of these discoveries and how they can be applied to musical analysis.

3:35 p.m. The Mathematics and Applications Behind Image Warping and Morphing

Sakhr Aldaylam, Hostos Community College (student)

The purpose of this research is to reveal the mathematics and applications of the computer animation techniques of warping and morphing. A warp is a twist or distortion in the form of an object in an image while a morph is the smooth and gradual transformation of an object in one image into the object in another image. Linear algebra makes these computer animation techniques possible; the first phase of this research delves into how those mathematical processes translate into image warps and morphs. Image morphs and morphs were identified as affine transformations of original images. The second part of this study requires the analysis and application of image warping and morphing techniques in an array of fields. The team utilized the computer software, *Abrosoft Fantamorph,*[1] and *Morpheus* [2] in order to create a series of warps and morphs. The final phase of this research was to identify what uses NASA can have for these computer animation techniques and what further research can be done to expand our knowledge of warps and morphs. By identifying the mechanics of warps and morph, we can discover how they can assist scientists and organization, such as NASA, to create depictions of objects, ideas, places, and events. Ultimately, studying morphing and warping techniques allows us to find better ways to represent visual data - whether it is images of the ozone hole or maps of the ever-changing weather in a region. The limitations that were found during the study can be used to conduct further research about warps and morphs - such as distorting images using quadratics or varying the rate at which each part of a transformation happens.

3:55 p.m. An Analysis of *Risk* using Markov Chains

Jonathan Butterworth, Hofstra University (student)

A pivotal part of the board game *Risk* is the wars between countries. In this analysis, I determined the player who is more likely to win a war based on the number of soldiers brought into the war. Also, the implications of a house rule called "Alien Invasion" are analyzed. In this version of the game, if the two warring parties roll either all fives, all sixes, or all fives and sixes, then an alien invasion will come and wipe out all of the armies. During the warring process, players are allowed a certain number of dice based upon how many soldiers either player has. The attacking player is allowed at most 3 dice and the defending player is allowed at most 2 dice. These battles can be modeled as an absorbing Markov Chain; I determined the absorption probabilities for each initial state during. In order to make the calculations reasonable, the analysis was done with at most 3 armies for each player. As expected, the player with more armies was more likely to win the overall war. However, the addition of the rule of "Alien Invasion" did not affect the overall trend of the game. Also, the alien invasion had a roughly 10% chance of occurring, which is higher than I expected.

4:15 p.m. Classification of MRI Data Using Small Sample Sizes

Hope Miedema, Manhattan College (student)

While magnetic resonance imaging (MRI) is sometimes critical for the detection of tumors, it is limited because it is slow. As an effort to accelerate the imaging process, it is useful to know which classifiers work best for the detection of tumors. It is especially important for current research in MRI imaging to analyze the accuracy of prediction of classifiers given a small sample size because observations can take a long time to generate. We used logistic regression, linear discriminant analysis, and Firth's bias-reduced logistic regression on samples of various sizes to see if either outperforms the other on images with and without total variation regularization. Preliminary results suggest that methods

using logistic regression perform better than linear discriminant analysis and that total variation regularization to reconstruct images can result in decreased detectability of small tumors.

4:35 p.m. **A New Method to Generate Uniformly Distributed Random Variables on the D-Dimensional Unit Spherical Shell**
Stephanie Nagel, Hofstra University (student)

Generating uniformly distributed random variables on the unit spherical shell is extremely important. For example, generating these random variables is a crucial step in the simulation of the multivariate normal distribution. There already exist methods to generate uniformly on the unit spherical shell, including methods involving scaling of normal vectors and spherical coordinates. The new method presented in this paper involves recursively writing the joint density of the vector of random variables as the product of the marginal distribution of one component and the corresponding conditional distribution for the rest of the components. After this decomposition, the re-scaling turns out to correspond to the density of another uniformly distributed random variable on a unit spherical shell of lower dimension. In this research, we detail each algorithm that can be used to generate on the unit spherical shell, and we conduct tests on each method to determine which one is quicker and more efficient.

4:55 p.m. **Optimizing the Passenger Throughput at an Airport Security Checkpoint**
Zijia Lu, New York University (student)
Yi Yin, New York University (student)
Yueying Zhang, New York University (student)

Airport security check is an indispensable step of keeping flights safe. However, those procedures inevitably cost more time and increase the inconvenience of passengers. During the 2017 Interdisciplinary Contest in Modeling, we approached the problem by modeling the security check process as a queueing procedure and aimed at reducing the mean and variance of waiting time without influencing its quality. By combining the knowledges from queue theories and available data, we found the separation of lines for pre-check and regular check passengers is the main cause of the long waiting time for security check.

Aiming at this bottleneck, we proposed a one-line-in-total model which can reduce more than 50% of the average waiting time and approximately 90% of variance in waiting time in equilibrium. We further took into account that people with certain cultural background may still value the priority of having separated pre-check lines. Therefore, we derived the utility of passengers as a function of waiting time and their cultural values attached to individual priority, collective efficiency and personal privacy. On the basis of the cultural analysis, we proposed several modified solutions for each type of cultural groups.

Another modification is to open more lines for the security check. To find the optimal number of lines for the airports, we modeled the expected total cost as a convex function with respect to the number of lines. This cost analysis also provides some interesting insights. For instance, the airport can create a more entertaining wait environment so that passengers will be more tolerant of long wait time, resulting in reduce of the wait cost which is a component of the total cost.

STUDENT SESSION II — Location: C355

Presider: Florin Catrina/ Ashley Dias

3:15 p.m. **Why Not a Female Math Major?**
Jacklyn Andracchi, Molloy College (student)
Alexandra Rizzo, Molloy College (student)

Just as mathematics have evolved from the days of collecting and counting from ancient Egypt, so has the idea of mathematics not suitable for women. From the 1800s when Sophie Germain's parents took her candles away to keep her from studying math to 2014 when Maryam Mirzakhani became the first woman to receive the Fields medal, the conception that females are innately worse at math than males have all been proven wrong by researchers. Yet, there has been much discussion on the continued (perceived?) gender gap in mathematics. We will discuss some of the factors for the gender gap and how they may explain why there are more men than women as math majors. We conclude with proposing ways to help motivate more women to enter the math field.

3:35 p.m. **Why Not a Math Major?**
Jon Buscarino, Molloy College (student)
Lyndsey Ruchalski, Molloy College (student)
Vijay Racktoo, Molloy College (student)

Just as mathematics have evolved from simple counting and measurement to often complex and abstract concepts, so has the undergraduate

program in mathematics. From the 1700s where mathematics was studied as an intellectual curiosity to the present where it is an integral part to STEM related fields, the changes in its curriculum were a reflection on society needs. With the many potential opportunities of being a math major, the number of people majoring in math remains low. We will discuss ways in which we can market a math major by understanding its evolution, assessing its current state, and proposing its future.

3:55 p.m. **Quantitative Literacy**
Teresa Ferreri, Molloy College (student)
Kenneth Levandoski, Molloy College (student)

The need for citizens to be able to identify, understand, reflect and communicate quantitative situations is increasingly becoming more important in today's data driven society. There has been much discussion and research on exactly what quantitative literacy is, how it should be assessed and ways in which citizens can be more literate. We will present some of the research in quantitative literacy, and discuss how it can be approached in the classroom.

4:15 p.m. **Developing a Geometrical Mindset**
Jennifer Bonziglia, ***Molloy College (student)***
Andrew Dacunto, ***Molloy College (student)***
Susan Daily, ***Molloy College (student)***

Mathematics was born out of a practical need to count, organize and measure. Many ancient mathematical works dealt with real problems and their solutions were written without any justifications. If we fast forward to the present, many of the math courses taught continue to overemphasize procedural techniques, which researchers believe hinder the development of conceptual understanding. We will present an overview of Dr. Deborah Upton's dissertation "Students' Solution Strategies to Differential Equations Problems in Mathematical and Non-mathematical Contexts", which explores the idea of using geometric over algebraic solutions to differential equations. We applied some of her ideas at the secondary level and reflect on our findings.

4:35 p.m. **The Anxiety of Mathematics**
Lauren Casquarelli, ***Molloy College (student)***
Matthew Castaneda, ***Molloy College (student)***
Taylor Sanchez, ***Molloy College (student)***

Many people have at some point experienced symptoms of anxiety when dealing with mathematics. Research have shown that math anxiety among college students can vary anywhere from 25% to as high as 60%. We will present an overview of math anxiety, which includes factors that may contribute to anxiety, assessment tools used to identify anxiety, and treatments to fight anxiety.

CONTRIBUTED POSTER SESSION — Location: Bridge 3rd floor/Atrium

Moderators: Tanvir Prince, Moise Koffi and Reginald Dorcely

Quantum Calculus: A Trigonometric Twist

Louiza Benhamou, Glen Ridge High School, New Jersey

In this article we discuss quantum calculus, an important topic with applications in several branches of mathematics and the sciences. We will pay particular attention to trigonometric identities in the quantum (q- calculus) setting and derive new trigonometric analogues. We will also discuss additional open problems.

Enriching Mathematics Instruction using Exciting Technology Methods

Jonathan Bravo, Mercy College

Once the first personal computer was invented by IBM in 1981, the educational world knew it was about to enter a new era. Since the 1980s, there were several technological advances such as the internet and smartphones which is recently now becoming a boom of incorporating technology-based applications to teach mathematics. What are the right technology methods that would be very effective in the classrooms? The main objective of this research project is to gain a deeper understanding of 6 different types of technology based applications: game format, informational format, quiz format, virtual crafting, static representations, and interactive mathematic objects. This project will give teachers an insight of the strengths and weaknesses of each format and be able to choose the correct method when teaching a lesson. There are better methods than others when teaching math concepts like Pascal's triangle or exponential functions. Based on statistical references, it is determined that technology in classrooms improve students' attitudes toward learning, student achievement, and students' engagement with mathematics.

Game Based Learning

Lou Giron, Mercy College

Video Games have become a huge part of our culture. The medium can be used in various ways including teaching. Research has been done on video games in education and there has been shown to be a lot of benefits in doing so, especially with kids and adolescents. A study was conducted in 2013 in which 876 sixth through ninth grade students played a game called River City. Playing the game, they learned the causes and effects of pollution. Reports showed that students displayed increased language use, vocabulary, and knowledge about lakes. The study showed that it was really easy for students to learn the concepts as it was very accessible for them. In the field of mathematics, many kids struggle with learning and understanding mathematical concepts. Due to the interactive nature of video games they can be a great way to teach concepts while making the process more fun and appealing for them. Using Game Maker and its built in language, GML, I have developed games to teach various mathematical concepts such as one-to-one functions and cryptographic algorithms.

Elegance of Number Theory within the Cryptosystems

James Pak, Mercy College

Throughout the history, various cryptographic systems were developed to hide sensitive information. Using prime numbers and algorithms in number theory, the cryptosystems were refined making data secured. This project focuses on specific type of cryptosystem called the Knapsack cryptosystem and its variations. The knapsack cryptopsystem is based on the Knapsack problem, superincreasing sequences and properties of congruence. These inspired cryptographers use number theories to develop more sophisticated cryptosystem.

Statistical Binary Classification of MRI Data

Sana Altaf, Manhattan College

Magnetic Resonance Imaging (MRI) is a versatile medical imaging modality that is limited because it is slow. As part of an effort to optimize the performance of methods to accelerate MRI, we evaluated various statistical learning methods to detect the presence of a tumor. We used logistic regression, linear discriminant analysis (LDA) and support vector machines (SVM) to classify both simulated data and data from MRI images. We concluded that all methods performed well to classify both the simulated data and the data from MRI images.

What Are Your Options? Hedging All Bets!

Adam Gronowski, New York City College of Technology

The project that was done in cooperation with Professor Singh was about two options pricing models. The first model was the Black-Scholes model to evaluate European styled options (which at this point is used more as an educational tool) and the more sought after American styled options using the Binomial Options Pricing Model. The paper covers the background of the basic principles of options and explanation of the terminology associated with options and the associated models. The example used is on Alphabet (Google) in an assessment to price what a European call options would theoretically be worth two weeks from that day, and what the pricing of an American option would be over the course of the two weeks (every 2 days).

Finite Subdivision Rule and Rational Map with Parabolic Orbifold

Jiafeng Chen, LaGuardia Community College

Xiafen Chen, LaGuardia Community College

In mathematics, a finite subdivision rule is a recursive way of dividing a polygon into smaller and smaller pieces. Subdivision rules in a sense are generalizations of fractals. Instead of repeating exactly the same design over and over, they have slight variations in each stage, allowing a richer structure while maintaining the original state of fractals. The goal of this mathematical research is to introduce the theory of finite subdivision and to apply the theory in the rational map with parabolic orbifold. Any rational map has finite critical points, where the derivative is zero. Dependent on the local degree of the critical points, the signature of the post critical is defined if the post-critical set is finite. The sphere with signatures is called an orbifold following Thurston and the Euler characteristic of any rational map is negative or equal to zero, called hyperbolic and parabolic, respectively. Bonk and Meyer proved that any rational with hyperbolic orbifold has a subdivision rule. In this mathematical project, the subdivision rule is found for rational maps with parabolic orbifold.

VENDOR PRESENTATION/PEARSON — Location: C351

Stephanie Palmer, John Mufti

4:10 p.m. Pearson for Mathematics and MyMathLab

The talk will focus on how Pearson's online learning and homework platforms MyMathLab (MML), MyStatLab (MSL), and MathXL meet the needs of all courses, including Developmental Math, Pre-Algebra, Algebra, Calculus, Advanced Mathematics, and Liberal Arts Mathematics. The speakers will discuss Pearson's latest features in MML, such as SkillBuilder and WorkSpace. The speakers will talk about how Pearson can address any curriculum model, such as Pathways, co-requirement and emporium style. Through this talk you will see how Pearson is continually innovating and building its products around students' needs.

METROPOLITAN NEW YORK SECTION OF THE MAA
TREASURER'S REPORT
April 29, 2017

ASSETS	BALANCE	BALANCE
	05/02/16	**04/29/17**
Chase Business Classic	$6,795.04	$8,640.21
Chase Business Select High Yield Savings	$15,074.34	$15,078.37
Miscellaneous	$425.00	$425.00
NY Metro Section Total Assets	**$22,294.38**	**$24,143.58**

CHASE BUSINESS SELECT HIGH YIELD SAVINGS (0366)

Credits

Date	Description	Amount
05/02/16-04/29/17	Interest	$4.03
Total Credits		**$4.03**

CHASE BUSINESS CLASSIC (0365)

Deposits/Credits

Check #	Date	Description	Amount
	05/17/16	Registration cash (MAA Meeting)	$600.00
	05/18/16	Registration checks (MAA Meeting with $5 cash)	$630.00
	05/18/16	Registration checks (MAA Meeting)	$620.00
	05/18/16	Registration checks (MAA Meeting)	$315.00
	06/06/16	Registration checks (GTD 71)	$420.00
	06/06/16	Registration cash (GTD 71)	$360.00
	06/06/16	Pearson $100 check, registration $45 cash (MAA Meeting	$145.00
	06/10/16	Registration cash (MAA Meeting)	$65.00
	06/27/16	NCC Foundation transfer (GTD 71)	$151.65
	08/15/16	Registration cash (MAA Meeting adjustment)	$65.00
	08/17/16	Registration donation check (GTD 69)	$95.00
	09/23/16	2016 subvention	$1,140.43
	11/25/16	Registration donation cash (GTD 72)	$65.00
	03/06/17	Fordham University (advertisement in Newsletter)	$100.00
	04/10/17	Bard College (advertisement in Newsletter)	$100.00
Total Credits			**$4,872.08**

CHASE BUSINESS CLASSIC (0365)

Checks Paid/Debits

#	Date	Description	Amount
889	05/02/16	David Seppala-Holtzman (guests', officers' dinner)	$328.52
890	05/11/16	Top Flight (GTD 71 catering)	$616.90
	05/19/16	MAA Meeting registration returned check	$40.00
891	05/30/16	Michael Starbird (MAA Meeting guest speaker)	$678.94
892	05/30/16	Gilbert Strang (MAA Meeting guest speaker)	$762.70
893	06/06/16	Armen Baderian (MAA Meeting badges)	$33.74
894	06/27/16	Armen Baderian (GTD 71 badges)	$33.74
895	06/27/16	Armen Baderian (GTD 71 guest's, organizers' dinner)	$115.80
896	06/27/16	Armen Baderian (MAA Meeting cash overpayment)	$35.00
898	10/25/16	Farley Moyer (food for Delegate Assembly)	$168.00
899	10/24/16	Elena Goloubeva (food for Delegate Assembly)	$54.32
900	01/17/17	Florin Catrina (Putnam mugs)	$159.25
Total Debits			**$3,026.91**

GRAPH THEORY DAY FUND (CONTAINED WITHIN 0365)

Deposits/Credits

Check #	Date	Description	Amount
	6/7/16	Graph Theory Day 71 donation	$280.00
	6/27/16	NCC Foundation Graph Theory Day transfer	$45.21
	8/17/16	Graph Theory Day 69 donation	$95.00
	11/25/16	Graph Theory Day 72 donation	$65.00
Total Credits			**$325.21**

Checks Paid/Debits

Check #	Date	Description	Amount
Total Debits			**$0.00**

	BALANCE	BALANCE
	05/02/16	**04/29/17**
Graph Theory Day Fund	**$885.50**	**$1,210.71**

MAA METRO NEW YORK SECTION OFFICERS

Section Governor **(2014 – 2017)**	**Abraham S. Mantell** Nassau Community College (SUNY)	(516) 572-7383 x 26841 mantell@ncc.edu
Chair **(2015 –2018)**	**Elena Goloubeva** Webb Institute	(516) 671-2215 x111 egoloubeva@gmail.com
Chair-Elect **(2015 –2018)**	**Janet Liou-Mark** NYC College of Technology (CUNY)	(718) 254-8668 jliou-mark@citytech.cuny.edu
Secretary **(2015 – 2018)**	**Satyanand Singh** NYC College of Technology (CUNY)	(718) 260-5926 ssingh@citytech.cuny.edu
Treasurer **(2015 – 2018)**	**Armen Baderian** Nassau Community College (SUNY)	(516) 572-7394 armen.baderian@ncc.edu
Vice-Chair for Four-Year Colleges **(2015 – 2018)**	**Johanna Franklin** Hofstra University	(516) 463-5739 johanna.n.franklin@hofstra.edu
Vice-Chair for Two-Year Colleges **(2015 – 2018)**	**Ida Klikovac** Nassau Community College (SUNY)	(516) 572-7383 x 26854 ida.klikovac@ncc.edu
Vice-Chair for High Schools **(2015 – 2018)**	**Florin Catrina** St. John's University	718-990-5372 catrinaf@stjohns.edu
Math Fair Chair – NYC	**Randy J. Asher** Brooklyn Technical High School	(718) 804–6500 rasher@schools.nyc.gov
Math Fair Chair – Long Island	**Joseph Quartararo** Northport-East Northport Public Schools	(631) 584-2016 cmleague@optonline.net
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Public Relations Chair	**David Seppala-Holtzman** St. Joseph's College	(718) 636-7254 dholtzman@sjcny.edu
Book Exhibit Coordinator	**Nadia Benakli** NYC College of Technology (CUNY)	(718) 260-5925 nbenakli@citytech.cuny.edu
Liaison Coordinators	**Raymond N. Greenwell** Hofstra University Elena Goloubeva, Webb Institute	(516) 463-5573 matrng@hofstra.edu (516) 403-5925 egoloubeva@webb.edu
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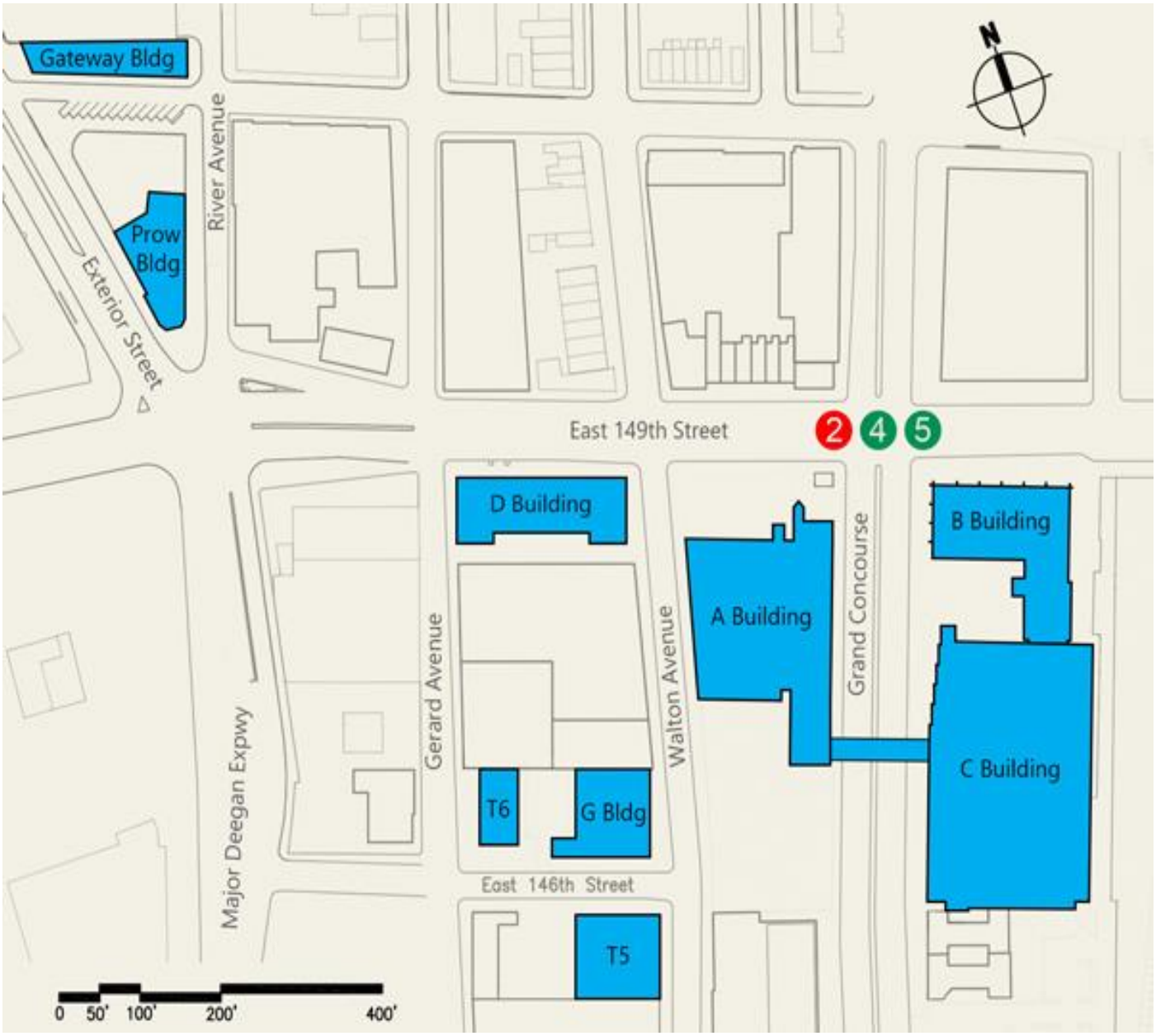
PROGRAM COVER DESIGNER

Mandy Mei, New York City College of Technology

Hostos Community College

500 Grand Concourse, Bronx, New York 10451

Area Map



NOTE: The event will take place in the B and C buildings.