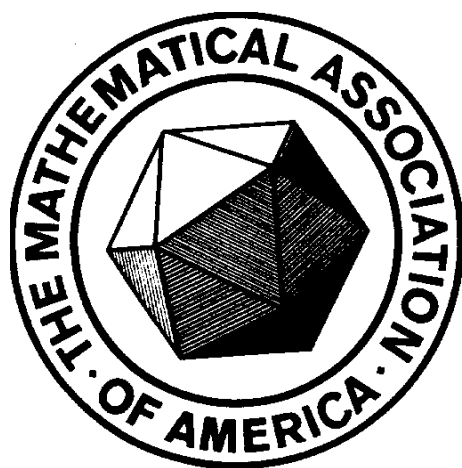


**The Mathematical Association of America  
New Jersey Section Meeting**  
**held in conjunction with MATYCNJ (Mathematics  
Association of Two-Year Colleges of New Jersey)**  
**and**  
**Garden State Undergraduate  
Mathematics Conference**



**Rowan College at Burlington County  
Mt. Laurel, NJ**

**Saturday, April 7, 2018**

## Abstracts and Biographies of Speakers

### What do Mathematical Models tell us about the Dynamics and Control of Emergent and Re-Emergent Diseases?

Carlos Castillo-Chavez, Pólya Lecturer, Arizona State University

In this lecture, I will revisit the roots and motivations behind the use of mathematical models in the study of epidemics. I will illustrate how research driven by the desire of some individuals to scale up what they know about disease transmission at the individual level could be modified to account for the impact of disease dynamics at higher levels of organization.

I will illustrate some approaches via their applications to the study of diseases such as tuberculosis, Ebola, or influenza. Modeling connections between the study of vector borne and sexually transmitted diseases will also be noted.

**Dr. Carlos Castillo-Chavez** is a mathematical epidemiologist and a Regents Professor of Mathematical Biology at Arizona State University. He has won awards by the American Association for the Advancement of Science (AAAS) Mentor Award and Fellow (2007), the Stanislaw M. Ulam Distinguished Scholar by the Center for Nonlinear Studies at Los Alamos National Laboratory (2003), the Society for Advancement of Chicanos and Native Americans in Science (SACNAS) Distinguished Scientist Award (2001), the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring (1997), and the Presidential Faculty Fellowship Award from the National Science Foundation and the Office of

the President of the United States (1992–1997). Carlos served from 2010–2015 on President Barack Obama’s national medal of science committee and is a fellow of SIAM, AMS and AAAS. Carlos is the executive director of the Mathematical and Theoretical Biology Institute and the Institute for Strengthening the Understanding of Mathematics and Science as well as



the founding director of the Mathematical, Computational and Modeling Sciences Center at ASU. He previously taught at Cornell for 18 years.

## **A Voting Theory Approach to Golf Scoring**

**Michael Jones**

Editor of Mathematical Reviews

A surprising result in voting theory is that an election outcome may depend on how votes are tallied after the ballots are cast. This election scenario is relevant to the outcome of golf tournaments because the Professional Golfer's Association (PGA) is the only professional sports league in the U.S. that changes the method of scoring depending on the event. The PGA's stroke play and modified Stableford scoring system are equivalent to using different voting vectors to tally an election. This equivalence is discussed and data from the Masters and International Tournaments are used to examine the effect of changing the scoring method on the results of the tournament.

By focusing on 3-candidate elections, I will show how elementary linear algebra and convexity can be used to explain the effect of changing the voting vector. Sometimes, regardless of the voting vector used, the same outcome would have occurred, as in the 1992 US Presidential election. Can this happen in golf? I answer this question and determine whether there exists a golf-scoring method in which Tiger Woods would not have won the 1997 Masters, as his performance is considered one of the best ever.

**Dr. Michael Jones** is an Associate Editor at Mathematical Reviews and editor of Mathematics Magazine. He earned his PhD in game theory from Northwestern University under the direction of Donald Saari. Mike was born in Camden, NJ and was a faculty member at Montclair State University from 1998-2008. He has also held faculty positions at the US Military Academy and Loyola University Chicago. Mathematically, he is interested in the application of mathematics to the social sciences.



## What Can I do with a Math Degree?

(or what I've done with math degrees)

Amy Langville, College of Charleston

My studies (degrees in both Mathematics and Operations Research) have led to interesting problems, projects, and consulting with groups such as the Olympic Committee, National Security Agency, SAS statistical software, and lawsuits against Google and Facebook. In this talk, I will discuss a handful of diverse research and consulting projects, ranging from text mining to ranking UFC fighters.

**Dr. Amy Langville** is a Professor of Mathematics at the College of Charleston. Her



award-winning book, *Google's PageRank and Beyond: The Science of Search Engine Rankings*, coauthored with Carl Meyer, explains and analyzes several popular methods for ranking webpages. Her second book, *Who's #1?: The Science of Rating and Ranking*, deals with ranking and clustering items using matrix decompositions. Her primary research areas are numerical linear algebra, computational algorithms, and mathematical modeling and programming.

## Teaching Through Networks Educating by Connecting Knowledge

Lt. Col. Jonathan Roginski  
West Point Military Academy

As in the 20th century, many (not all) classrooms use linear thinking in our education system even though we live in a non-linear world. This workshop will explore how our environment may be characterized by networks and connectivity and bringing that viewpoint into our classroom. We will also provide examples of how teachers may expose their students to network thinking, and use network elements to make curriculum development and delivery easier and more successful. How? Come see! This work is an extension of the NiCE (Networks in

Classroom Education) Teacher Workshops.

**Lieutenant Colonel Jonathan W. Roginski** (Jon) is the Director of the West Point Network Science Center, a research organization that annually manages approximately \$1M of reimbursable research supporting a diverse portfolio of United States Department of Defense decision makers. He is also an Assistant Professor of Mathematical Sciences at the United States Military Academy at West Point, Course Director for the Academy's Fundamentals of Network Science course, and the program manager for the Academy's Network Science minor. His research interests build from the experience of using quantitative and qualitative data science methods to assess the operational progress of military units against their goals in combat and home station, supporting the 10th Mountain Division (Light Infantry). This service highlighted the quality of irreducibility in military problem solving and the necessity of methods that "embraced the complexity" of the modern world, rather than assuming it away. Jon's personal research leverages the implications of graph comparison techniques toward Department of Defense decision making in attack, defense, and stability scenarios by accounting for operational complexity through network modeling.

### **Abstracts of MAA-NJ Contributed Paper Sessions**

#### **Session 1: Recreational Mathematics**

Votta 148. Organizer and Presider: David Nacin, [nacind@wpunj.edu](mailto:nacind@wpunj.edu)

#### **2:00—2:15: Primes and Divisibility Patterns in the Repunit Sequence 1, 31, 331, 3331, 33331, etc. Featured In Prime Curio**

Jay L. Schiffman, Rowan University

**Abstract:** The modified repunit (repeated digit) sequence consisting of all threes with terminating digit one is featured on the website Prime Curios and is one of the most appealing integer sequences. In this talk, 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, I display the complete factorizations for the initial eighty-five terms in the sequence as well as determine which primes less than 1000 never enter the sequence as factors.

### 2:20—2:35: **Graphs and Puzzles**

David Nacin, William Paterson University

**Abstract:** We examine a class of puzzles over the cyclic group of order four, and show that the problem of counting solutions can be reduced to a question involving graphs that arise based on the parity possibilities of each of the cells. These graphs decompose into cycles, and we show how the number of cycles, together with the way that they land, can be used to find an upper bound for the number of solutions.

### 2:40—2:55: **No X Points on a Y: A Class of Discrete Geometry Problems**

Richard Voepel, Rutgers University

**Abstract:** First introduced in 1917 by Henry Dudeney, the No-Three-In-Line problem asks for the maximum number of points that can be placed in an  $N$  by  $N$  grid such that no three are collinear. While there have been results concerning lower bounds for this number, non-trivial upper bounds remain largely conjectural. But this is not the only problem of this form to receive attention; one may consider generalizations to higher dimensions, asking for no three points to be collinear in an  $N$  by  $N$  by  $N$  grid, or for no four points to be coplanar. We present select results for these problems, and propose further cases to study.

### 3:00—3:15: **Wiggly Games and Burnside's Lemma**

David Molnar, Rutgers University

**Abstract:** A genre of board games features collections of tiles with arcs on them, which are placed together to form paths. We refer to these as wiggly games. Tsuru is a well-known example. I will show how to calculate the total number of tiles possible in such a game, modulo symmetry. This is a routine application of a well-known result. Expectations should be lowered accordingly.

### **Session 2: My Favorite Classroom Activity**

Votta 144. Organizers and Presiders: Jonathan Weisbrod, Rowan College at Burlington County, [jweisbrod@rcbc.edu](mailto:jweisbrod@rcbc.edu); William Whitfield, Rowan College at Burlington County, [wwhitfield@rcbc.edu](mailto:wwhitfield@rcbc.edu)

### 2:00–2:15: **Introducing the Topic of Probability Using the Monte Hall Problem**

Jennifer Hoxworth, Rowan College at Gloucester County

**Abstract:** One of my favorite classroom activities is using the Monty Hall problem to introduce students to the topic of probability in an engaging manner. It can be used in a variety of courses that cover probability and helps with explaining different probability concepts, such as the two classifications of probability and the law of large numbers. I currently use this classic math problem in Discrete Mathematics and in Concepts of Mathematics (for liberal arts majors). My students find this problem interesting and they enjoy “playing” the game show in class.

### 2:20—2:35: **Math Races**

David DiMarco, Neumann University

**Abstract:** Dr. David DiMarco likes to split his classes into teams and have competitive math races approximately once a week. These in-class activities are greatly enjoyed by his students.

### 2:40—2:55: **Jeopardy Games**

Ryan Savitz, Neumann University

**Abstract:** Dr. Ryan Savitz utilizes games of mathematical Jeopardy as both fun ways to review material as well as for purposes of formative assessment. These in-class activities are greatly enjoyed by his students.

**MAA-NJ and MATYCNJ  
Spring 2018 Meeting Program**

8:30 – 9:15	<b>Registration and Coffee;</b> Votta Hallway
8:30 – 1:30	<b>Book Exhibits;</b> Votta Hallway
9:15 – 9:30	<b>Welcome by Michael Cioce,</b> Acting President, Rowan College at Burlington County, Votta Auditorium
9:30 – 10:20	<b>What do Mathematical Models tell us about the Dynamics and Control of Emergent and Re-Emergent Diseases?</b> Carlos Castillo-Chavez, Pólya Lecturer, Arizona State University. Presider: Sarita Nemani, Georgian Court University; Votta Auditorium
10:30 – 10:55	<b>MAA-NJ Business Meeting;</b> Votta Auditorium <b>MATYCNJ Business meeting;</b> Votta 131
11:00 – 11:50	<b>A Voting Theory Approach to Golf Scoring;</b> Michael Jones, Editor of Mathematical Reviews. Presider: Elizabeth Uptegrove, Felician University; Votta Auditorium <b>Panel Discussion: Undergraduate Math Placement.</b> Votta 131
12:00 – 1:30	<b>Lunch;</b> Student Success Center
1:00 – 2:00	<b>Student Poster Sessions;</b> Votta Hallway
2:00 – 3:15	<b>Workshop: Teaching Through Networks,</b> Lt. Col. Jonathan Roginski; Votta 135 <b>Contributed Paper Sessions;</b> Votta 144 & 148 <b>Student Talks;</b> Votta 225 & 236
3:15 – 3:45	<b>Break;</b> Votta Hallway 3:30 is the deadline for door prize/silent auction entries
3:45 – 4:35	<b>What Can I Do with a Math Degree? (or what I've done with math degrees);</b> Amy Langville, College of Charleston. Presider: Robert Roach, Rowan College at Burlington County; Votta Auditorium
4:35 – 5:00	<b>Prizes and Awards;</b> GSUMC awards, door prizes, and silent auction winners (must be present to win); Votta Auditorium
5:30	<b>Dinner Honoring Speakers at Carlucci's Waterfront Restaurant</b>



**Garden State Undergraduate Math Conference  
Spring 2018 Program**

8:30 – 9:15	<b>Team Registration, Student Check-in, and Breakfast;</b> Votta Hallway
9:20 – 9:30	<b>Welcome by Dr. David Spang,</b> Senior Vice President & Provost, Rowan College at Burlington County; Votta 135 <b>Announcements</b> regarding Math Competition; Votta 135
9:30 – 10:30	<b>New Jersey Undergraduate Math Competition;</b> Individual part, Votta 135
10:30 – 12:00	<b>New Jersey Undergraduate Math Competition;</b> Team part, rooms to be announced during the individual part
12:00 – 1:00	<b>Lunch;</b> Student Success Center
1:00 – 2:00	<b>Student Poster Sessions;</b> Votta Hallway
2:00 – 3:15	<b>Student Talks;</b> Votta 225 & 236
3:15 – 3:45	<b>Break;</b> Votta Hallway 3:30 is the deadline for door prize/silent auction entries
3:45 – 4:35	<b>What Can I do with a Math Degree? (or what I've done with math degrees);</b> Amy Langville, College of Charleston. Presider: Robert Roach, Rowan College at Burlington County; Votta Auditorium
4:35 – 5:00	<b>Prizes and Awards;</b> GSUMC awards, door prizes, and silent auction winners (must be present to win); Votta Auditorium

**Dinner Honoring the Invited Speakers and Award Recipients**

The Section will honor the invited speakers and award recipients at dinner at Carlucci's Waterfront Restaurant following the meeting. Everyone is cordially invited.

## **Lunch Discussion Tables**

Organized by Theresa C. Michnowicz, New Jersey City University.

There will be six discussion tables at lunch:

1. *How to build sustainable REU programs that also expand individual faculty research programs*, led by Carlos Castillo-Chavez, Arizona State University, ccchavez@asu.edu
2. *Publishing expository mathematics in MAA journals*, led by Michael A. Jones, Mathematical Reviews, maj@ams.org
3. *Mathematical Mindsets*, (borrowing the title of Jo Boaler's excellent new book), led by Amy N. Langville, College of Charleston, LangvilleA@cofc.edu
4. *The move to OER in the math classroom*, led by Susan Monroe, Brookdale Community College, smonroe@brookdalecc.edu
5. *The role of the graphing calculator in an age of desmos and other online calculators*, led by Samantha Doluweera, Brookdale Community College, sdoluweera@brookdalecc.edu
6. *Motivating Math Electives Through Student Interests*, led by Jonathan W. Roginski, USMA, Jonathan.Roginski@usma.edu

## **Announcements**

### **Call for Contributed Papers and Lunch Discussion Leaders for the Fall MAA-NJ 2018 Meeting**

There will be one general contributed paper session at the Fall 2018 meeting. Please submit title, 3-4 line summary, and a one-paragraph abstract in Word to Kathy Turrisi, Centenary University, Kathy.Turrisi@CentenaryUniversity.edu, by September 6, 2018.

MAA members interested in leading a lunch table discussion at the Fall 2018 meeting are asked to submit their proposed topic to Theresa C. Michnowicz, New Jersey City University, tmichnowicz@njcu.edu, by September 6, 2018.

**Call for Special Contributed Paper Session Organizers  
for the Spring 2019 MAA-NJ Meeting**

Those interested in organizing a special contributed paper session for the Spring 2019 meeting should submit the proposed topic to Theresa C. Michnowicz, New Jersey City University, [tmichnowicz@njcu.edu](mailto:tmichnowicz@njcu.edu), by September 6, 2019.

**NJ Section Representative Report from JMM 2018 (San Diego, CA)**  
Meeting of MAA Congress – January 9, 2018

The MAA announced a publishing partnership with Taylor and Francis. Starting in 2018 Taylor and Francis will publish all three of MAA's journals (The American Mathematical Monthly, College Mathematics Journal, and Mathematics Magazine) and its magazine Math Horizons. The MAA also introduced a new interface for members to browse its journals.

MAA President Deanna Haunsperger described her priorities during her tenure. She plans to focus on increasing membership among graduate students, promoting inclusivity among women and minorities through outreach, and rethinking how to streamline MAA's operations to make it more cost-efficient.

To support its mission and help define its culture, the MAA is developing a statement of its core values to affirm to its membership (and potential new members) the principles and beliefs that it stands for.

Colleges and universities with MAA department memberships are encouraged to nominate its math students for free MAA student memberships, which gives them access to its journals. Of the almost 300 institutions that have these memberships, over 100 still have not nominated any students. The MAA offers many resources to help students, including its Career Resource Center (<http://mathcareers.maa.org/>), so please spread the word.

This report is my last as your Section Representative. It has been an honor and pleasure to serve the wonderful members of the NJ Section.

Respectfully submitted,

Hieu Nguyen  
MAA Congress Representative  
New Jersey Section

## **Book Sales at the Meeting**

Now that AMS handles MAA books, there is a new procedure for book sales. There is a 40% discount for MAA and AMS members and a 25% discount for non-members. We still have new books on display but you are not able to order books at the meeting. If you are not an AMS member, you have to call (800) 321-4267 with code MT240, before April 20. If you are a member of AMS, you can use code MT240 either when you call or when you order through the online bookstore.

## **Future MAA Meetings**

**MAA-NJ.** The Fall 2018 MAA-NJ meeting will be held at Montclair State University on Saturday, October 27, 2018. The Spring 2019 MAA-NJ meeting will be held at Raritan Valley Community College on Saturday April 13, 2019.

**MathFest.** The MAA will hold its annual MathFest in Denver on August 1 – 4, 2018. For further information, refer to <http://www.maa.org/mathfest/>

**Joint Mathematics Meeting.** The 2019 JMM will be in Baltimore, January 16 – 19.

## **Future AMATYC Meetings**

**MATYCNJ.** The Fall 2018 MATYCNJ meeting will be held at Bergen Community College on Saturday, October 6, 2018.

**AMATYC.** The 2018 AMATYC annual meeting will be held in Orlando, FL on November 15 – 18, 2018. For further information, refer to <http://www.amatyc.org>

## **NJAMTE Annual Meeting**

The New Jersey Association of Mathematics Teacher Educators will hold its 12<sup>th</sup> annual conference at The College of New Jersey on Friday, June 1. All mathematicians involved in the mathematical education of teachers at any level are invited and encouraged to join NJAMTE. For further information, contact Erin Krupa at [krupae@mail.montclair.edu](mailto:krupae@mail.montclair.edu).

**25/50-year Members of the MAA:** The section congratulates Daryl L. Ezzo, Cathy S. Liebars, Maria-Cecilia Rozak, and John T. Saccoman for their 25 years of MAA membership. We congratulate Corrado D. Quintiliani for 50 years of membership.

### **MAA-NJ Committees**

**Awards Committee:** Karen Clark, The College of New Jersey; Amy Cohen, Rutgers University; Thomas Hagedorn (chair), The College of New Jersey; Aihua Li (ex-officio), Montclair State University; Theresa Michnowicz, New Jersey City University.

**Nominating Committee:** Karen Clark, The College of New Jersey; Aihua Li (ex-officio), Montclair State University; Hieu Nguyen (chair), Rowan University; Jonathan Weisbrod, Rowan College at Burlington County.

**Teaching Award Committee:** Karen Clark (chair), The College of New Jersey; Aihua Li (ex-officio), Montclair State University; Sarita Nemani, Georgian Court University; Dirck Uptegrove, Nokia.

**Committee for Contributed Papers:** Grace Cook, Bloomfield College; Theresa Michnowicz (ex-officio), New Jersey City University; Kathy Turrisi (chair), Centenary University.

**Organizing Committee:** Amanda Beecher, Ramapo College; Zhixiong Chen, New Jersey City University; Karen Clark, The College of New Jersey; Grace Cook, Bloomfield College; Jana Gevertz, The College of New Jersey; Zachary Kudlak, Monmouth University; Ik Jae Lee, Rowan University; Aihua Li, Montclair State University; Theresa C. Michnowicz, New Jersey City University; Sarita Nemani, Georgian Court University; Hieu Nguyen, Rowan University; Linda Ritchie, Centenary University; A. David Trubatch, Montclair State University; Kathy Turrisi, Centenary University; Dirck Uptegrove, Nokia; Elizabeth Uptegrove, Felician University; Paul von Dohlen, William Paterson University; Jonathan Weisbrod, Rowan College at Burlington County.

**Section History Committee:** Grace Cook, Bloomfield College; Thomas Hagedorn (chair), The College of New Jersey; Aihua Li, Montclair State University; Theresa C. Michnowicz, New Jersey City University.

**Hosting Committee:** Crystal Bourne, Jianene Meola, Priti Mihalik, Robert Roach, Diane Veneziale, Jonathan Weisbrod (chair), William Whitfield, Rowan College at Burlington County.

### **GSUMC Committees**

**Organizing Committee:** Lee Collins, County College of Morris; Katarzyna Kowal, Ramapo College of New Jersey; Giancarlo Labruna, Montclair State University; Marek Slaby, Fairleigh Dickinson University at Florham Campus; A. David Trubatch, Montclair State University (Director).

**New Jersey Undergraduate Mathematics Competition Organizing Committee:** Katarzyna Kowal (Co-Director), Ramapo College of New Jersey; Tom Leong, University of Scranton; David Molnar, Rutgers University at New Brunswick; Emanuel Palsu-Andriescu, Monmouth University; Marek Slaby (Co-Director), Fairleigh Dickinson University at Florham Campus.

**New Jersey Undergraduate Mathematics Competition Proctors and Graders:** Deepak Bal, Montclair State University; Michael Beals, Rutgers University; Norman Beil, Rowan University; David Buhanan, Centenary University; Carlos Castillo, Essex County College; Andrew Clifford, The College of New Jersey; Benjamin Daniels, Rowan University; Abdul Hassen, Rowan University; Robert Mayans, Fairleigh Dickinson University at Florham Campus; Priti Mihalik, Rowan College at Burlington County; David Molnar, Rutgers University; Emanuel Palsu-Andriescu, Monmouth University; Robert Roach, Rowan College at Burlington County; Mamta Vyas, Essex County College.

**Student Presentations:** Lee Collins, County College of Morris (Coordinator); Eric Jones, Rowan College at Gloucester County.

## Acknowledgments

The New Jersey Section thanks Rowan College at Burlington County for their kind hospitality in hosting the meeting. They also thank Princeton University Press, World Scientific Publishers, Pearson Education, The Johns-Hopkins University Press, Dr. Castillo-Chavez, and Jacqueline Bakal (Felician University) for donations for the silent auction, door prizes, and GSUMC prizes.

The New Jersey Section offers congratulations to the GSUMC for fifteen years of successful undergraduate math conferences.

The 2018 GSUMC is supported by Nokia Bell Labs and the NJ section of the MAA. The GSUMC thanks Rowan College at Burlington County for their kind hospitality in hosting the meeting.

## Social Media Information

Check us out! Email: [maanj.socialmedia@gmail.com](mailto:maanj.socialmedia@gmail.com)  
Facebook: <https://www.facebook.com/maanewjersey>  
<https://www.facebook.com/matycnj>  
Instagram: <https://instagram.com/maanewjersey>  
Twitter: <https://twitter.com/maanewjersey>

## MATYCNJ Officers

<b>President</b>	Sally Mulvey, Brookdale Community College
<b>President-Elect</b>	Sue Monroe, Brookdale Community College
<b>Past President</b>	Gabriela Sprague, Brookdale Community College
<b>Vice President North</b>	Palma Benko, Passaic County Community College
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<b>Treasurer</b>	Lenore Lerer, Bergen Community College
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<b>Newsletter Editor / Historian</b>	Meimee Persau, County College of Morris

**Join AMATYC!** <http://www.amatyc.org/?page=Membership>

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<b>Treasurer</b>	Paul von Dohlen, William Paterson University
<b>Vice-Chair for Fall Meetings</b>	Sarita Nemani, Georgian Court University
<b>Vice-Chair for Speakers</b>	Amanda Beecher, Ramapo College
<b>Vice-Chair for Spring Meetings</b>	Elizabeth Uptegrove, Felician University
<b>Vice-Chair for Student Activities and GSUMC Director</b>	A. David Trubatch, Montclair State University
<b>Vice-Chair for Two-Year Colleges</b>	Jonathan Weisbrod, Rowan College at Burlington County
<b>Book Sale Coordinators</b>	Dirck Uptegrove, Nokia; Elizabeth Uptegrove, Felician University
<b>Contributed Paper Organizer and Lunch Discussion Organizer</b>	Theresa C. Michnowicz, New Jersey City University
<b>Door Prize Coordinator</b>	Linda Ritchie, Centenary University
<b>Liaison Coordinator</b>	Ik Jae Lee, Rowan University
<b>Program Editors</b>	Kathy Turrisi, Centenary University; Elizabeth Uptegrove, Felician University
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