2015 MOVES
MATHEMATICS OF VARIOUS ENTERTAINING SUBJECTS
MOVES Conference events will be held August 2 - 4, 2015 at the following locations:

- The National Museum of Mathematics, 11 East 26th Street
- Baruch College, 24th and Lexington Floors 6, 8, 14, and Engelman Recital Hall
- Proshansky Auditorium, 5th Avenue between 34th and 35th
- The Graduate Center, CUNY

Welcome researchers, educators, and families to the 2015 MOVES Conference, hosted by the National Museum of Mathematics!

MoMath is pleased to acknowledge MOVES sponsor:

![TWO SIGMA](image)

**MOVES Conference Schedule of Programs and Activities**

**Sunday Evening**

**Open House and Dessert Reception at MoMath**

- **7:00** Museum opens for conference attendees only
- **7:45** Special Meet-n-Greet and book signing with John Conway and his biographer Siobhan Roberts, author of the new book *Genius at Play*.
- **8:15** Dessert reception, Wafels & Dinges

**Research Talks**

MoMath is pleased to host a full deck of 52 research talks over the course of the conference.

*For the research track, follow the blue listings in the program.*

**Mathematical Activities**

MoMath is happy to provide a change of pace with 20 guided mathematical activities.

*For the activity track, follow the yellow listings in the program.*
### Monday Morning

**Conference Kick-Off**  
Baruch Ballroom, 14-220  
9:00-9:30  Registration (coffee available)  
9:30-9:40  Opening remarks  
- Glen Whitney - President, Board of Trustees, MoMath  
- Cindy Lawrence - Executive Director, MoMath  
- John Overdeck - Co-Chairman, Two Sigma Investments

**Opening Keynotes**  
Baruch Ballroom, 14-220  
9:40-10:05  Three Sides of the  
10:05 Same Coin: the Intertwined  
Lives of Berlekamp, Conway, and Guy  
Siobhan Roberts  
10:15-11:00  How Turning Triangles  
Inside Out Helps Us Understand Their Geometry  
John Conway  
Princeton University  
11:10-11:55  A Triangle Has  
Eight Vertices  
Richard Guy  
University of Calgary

**Baruch, Room 8-210**  
Hosted by the Baruch Math Dept.  
9:45-10:15  Teacup Twists  
James Tanton  
MAA  
10:30-11:00  It’s KNOT fun!  
Christina Chestnut  
Stoked on STEAM  
All ages  
11:15-11:45  Conway’s ‘Game of Life’ for the 21st Century  
Caren Diefenderfer  
Hollins University  
All ages

**Monday Afternoon**

**Engelman Recital Hall, cont.**  
Baruch, 14-270  
1:40-1:55  Grundy Values of Fibonacci Nim  
Urban Larsson  
Dalhousie University  
2:00-2:15  Aperiodic Subtraction Games  
Nathan Fox  
Rutgers - The State University of New Jersey  
2:20-2:35  Waiting For the Empty Set  
Richard Nowakowski  
Dalhousie University  
3:00-3:15  My Combinatorial Games  
Jorge Nuno Silva  
University of Lisbon  
3:20-3:35  A New Twist on Wythoff’s Game  
Alex Meadows  
St. Mary’s College of Maryland

**Baruch, 14-285**  
3:40-4:05  Can You Always Win Khalou in Five Moves?  
Brian Hopkins  
Saint Peter’s University  
4:10-4:25  Left Center Right - A New Endgame  
Bruce Torrence  
Randolph-Macon College

**Baruch, Room 6-215**  
Hosted by the Baruch Math Dept.  
1:40-1:55  Morphing Algorithms and Animations For Escher-like Tessellations  
Kevin Lee  
Normandale Community College  
2:00-2:15  On Surrounding a Polygon  
Craig Kaplan  
University of Waterloo  
3:00-3:15  Hinge-elasticity’s shape-shifting into all five platonic solids and the tesseract  
Eleftherios Pavlides  
Roger Williams University  
3:20-3:35  Knots and Soap Film Minimal Surfaces  
Nathaniel Friedman  
SUNY-Albany  
4:10-4:25  Planar Tanglegrams  
Ron Taylor  
Berry College

**Engelman Recital Hall, cont.**  
Baruch, 14-210  
1:40-1:55  Games as Puzzles  
Peter Winkler  
Dartmouth College  
2:00-2:15  Counting Sets in SET and Flipping Coins  
Gary Gordon  
Lafayette College  
2:20-2:35  Coffee available outside Recital Hall  
3:00-3:15  The Mathematics of Tilt  
David Richeson  
Dickinson College  
continued on next page

**Baruch, Room 8-210**  
Hosted by the Baruch Math Dept.  
1:25-1:40  Map Coloring in a Faraway Land  
Skona Brittain  
SB Family School  
Middle school students  
2:00-2:15  Puzzles Make Math Less Puzzling Or How’d That Bunny Vanish?  
Stuart D. Moskowitz  
Humboldt State University  
All ages

**Baruch, Room 8-210, cont.**  
1:40-1:55  A Sample of Mathematical Puzzles  
Nancy Blachman and Rebecca Mercuri  
Julia Robinson Math Festival  
All ages  
4:00-4:15  Rock, Paper, Math  
Elena Reiser and Michelle Barbaretti  
St. Joseph's College  
Middle school and up

**MoMath, 11 East 26th Street**  
2:00-2:15  Squabbling in the park  
Annette Lievaart  
Fontys University  
All ages

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**Monday Afternoon, continued**

12:00-1:00 Lunch in Baruch Ballroom (14-220) for those who pre-ordered.
### Monday Evening

**5:15** Conference Dinner – MoMath – 11 East 26th St - pre-registration required

### Monday Night MOVES: Math, Magic, Movement, and More!

**7:00** Proshansky Auditorium - 5th Avenue between 34th and 35th - pre-registration required

**Pythagorean Trio** Enjoy the highly physical, humorous, and engaging choreography of dancers Karl Schaffer, Saki, and Laurel Shastri, as they reveal the surprising connections between mathematics and dance using combinatoric and rhythmic play with boxes, bottles, vaudevilleian hats, and more!

**The End of Mathematics** If mathematics is finite, what will we do once it runs out? Join mathematician and humorist Colin Adams as he presents an original short play that pokes fun at mathematicians and the theorems they love to prove.

**Mathemagic with Mark!** Enter the dazzling world of Mark Mitton, whose high-energy performance will include astounding sleight-of-hand, hilarious humor, and plenty of magic inspired by MOVES conference honorees Conway, Berlekamp, and Guy.

### Tuesday Morning

#### Baruch, Room 9-210

**9:00** Mathemagic With a Deck of Cards
Colin Mulcahy
Spelman College
Middle school students and up

**9:45** Games On Graphs
Patrick Honner
Brooklyn Technical H.S.

**10:00** Disjoint Path Covers: All About Connecting The Dots!
Brian Kronenthal
Kutztown University of Pennsylvania
Middle school students and up

12:15-1:30 Lunch break on your own.
The Baruch Ballroom (14-220) will be available for take-out seating beginning at 12:30.

See list of nearby eateries included in the program.

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**Engelman Recital Hall**

**8:30** Coffee available outside Recital Hall

**9:00-9:25** On The Toroidal Crossing
Noam Elkies
Harvard University

**9:40-10:05** Perfect Polyominoes
Paul Salomon and Justin Lanier
John Burroughs School and Georgia Tech

**10:20-10:45** Hinged Dissections
Inspired By Ernest Freese’s Manuscript On Geometric Dissections
Greg Frederickson
Purdue University

**11:00-11:25** Chutes and Ladders
With Large Spinners
Darren Glass
Gettysburg College

**11:40-12:05** Cookie Monster Plays Games
Tanya Khovanova
MIT

**Baruch, Room 6-215**

**9:00** The Hardness of Clickomania
Aviv Adler
MIT

**9:25** The Parameterized Complexity of Ricochet Robots
Justin Kopinsky
MIT

**9:40-10:05** 1xN Edge-Matching/
Jigsaw Puzzles are NP-Complete
Jeffrey Bosboom
MIT

**10:20** Chess and Combinatorial Game Theory
Carlos Santos
CEAFEL, University of Lisbon

**10:45** A q-Queens Problem
Christopher Hanusa
Queens College, CUNY

**11:00** The Maximum Queens Problem on a Rectangular Board
Doug Chatham
Morehead State University

**12:00** A Math Trail In
Brigitte Bentele
Trinity School
All ages

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**Baruch, 14-285**

**9:00** A Cellular Automaton on a Hexagonal Grid
Alok Puranik
Westford Academy

**9:40** Periodic Integer Sequences
Vince Matsko
University of San Francisco

**11:00** Chords of an Ellipse, Fibonacci Numbers, and Cubic Equations
Ben Blum-Smith
Courant Institute of Mathematical Sciences / NYU

**11:40** On the Celebration of the 500th Birthday of Melancholia I and the Dürer Magic Square
Hossein Behforooz
Utica College
Tuesday Afternoon

Baruch Ballroom, 14-220
1:40-2:05  The History and Future Of Logic Puzzles
          Jason Rosenhouse
          James Madison University
2:20-2:45  Pondering Pirate
          Puzzles Purposefully
          Derek Smith
          Lafayette College
3:00-3:25  A Little Thought on Dots and Dashes
          James Tanton
          MAA
3:30  Coffee available outside Ballroom

Baruch, Room 8-210
Hosted by the Baruch Math Dept.
1:40- 2:05  Computational Complexity of Arranging Music
          William Moses
          MIT
2:20- 2:45  Multinational War Is Hard
          Jonathan Weed
          MIT
3:00- 3:25  The Computational Complexity of Push-Pull Block Puzzles
          Jayson Lynch
          MIT

Activity Fair
MoMath, 11 East 26th Street
1:00-3:30
Hearing Shapes, Seeing Sounds: Exploring Musical Instruments
Bruce Bayly, University of Arizona
A Practical Workshop on Magic Squares
Hossein Behforooz, Utica College
Random Walk through a Comic Strip
Tim Chartier, Davidson College
Hands-on Geometry
Mircea Draghicescu, ITSPHUN LLC
Facto-Rail
Uttam Grandhi, Tisch School of the Arts
Paper Folding for Fun and for Learning
Ann Hanson, Columbia College Chicago
Spot it!!, and other diversions using projective geometry
Donna Dietz, American University
A Knotty Challenge
Lew Ludwig, Denison College
Fun with Coloring and Origami
Violeta Vasilevska, Utah Valley University

Baruch, Room 6-215
Hosted by the Baruch Math Dept.
1:40-2:05  The Colored Cubes Puzzle
          Ethan Berkove
          Lafayette College
2:20-2:45  Paired Many-to-Many Disjoint Path Covers of Cuboids
          Wing Hong Tony Wong
          Kutztown University of Pennsylvania
3:00-3:25  When Game Theory and Sportsmanship Collide: The 2012 Olympic Badminton Scandal
          Michael Daly-Jones
          Suffolk County Community College

Closing Keynote
Baruch Ballroom, 14-220
4:00-4:45  The Mathematics of Amazons
          Elwyn Berlekamp
          University of California, Berkeley

Concluding Remarks
Baruch, 14-220
4:45-5:00  Glen Whitney and Cindy Lawrence, MoMath

The National Museum of Mathematics wishes to thank the following MOVES supporters:

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**Recommended eateries near Baruch**

- **Blue Smoke**, 116 E 27th Street between Park and Lexington Aves
  Barbecue ($$

- **Franchia**, 12 Park Avenue between 34th and 35th Streets
  Asian vegan café ($$)

- **Le Pain Quotidien**, 931 Broadway between 21st and 22nd Streets
  Baked goods, soups, salads, quiches ($$), 10% off

- **Organique**, 110 East 23rd Street between Park and Lexington Aves
  Hamburgers, sandwiches ($), 10% off

- **Penelope's**, 3159 Lexington Avenue between 30th and 31st Streets
  Café, bakery, and bar ($$$)

- **Potbelly Sandwich Shop**, 333 Park Ave South between Park and Lexington Aves
  Counter-serve with made-to-order toasted sandwiches, salads, and baked goods. ($)

- **Pret A Manger**, 303 Park Avenue between 22nd and 23rd Streets
  Fresh, ready to eat sandwiches ($)

- **Saravanaa Bhavan**, 81 Lexington Avenue at 26th Street
  Indian ($$$)

- **Starbucks**, 50 Lexington Avenue between 24th and 25th Streets
  Coffee shop ($)

- **Vezzo**, 178 Lexington Avenue between 31st and 32nd Streets
  Thin crust pizza ($$$)

*Show your MOVES badge and receive a discount*

**Recommended eateries near MoMath**

- **Birch Coffee**, 5 East 27th Street between Fifth and Madison Aves
  Breakfast, sandwiches, and salads ($$$)

- **California Pizza Kitchen**, 440 Park Avenue South at 30th Street
  Innovative, hearth-baked pizza ($$$)

- **Eataly**, 200 Fifth Avenue between 23rd and 24th Streets
  Italian food market with various restaurants throughout
  - can be busy ($$$). Receive a complimentary glass of prosecco at the beginning of your meal, at any Eataly restaurant.

- **Essen**, 60 Madison Avenue at 27th Street
  Always-open delicatessen buffet ($), 10% off

- **Hill Country Kitchen**, 1123 Broadway at 25th Street
  Fried chicken and homemade pies ($$), 10% off

- **Hillstone**, 378 Park Avenue South at 27th Street
  Sushi, salads, burgers, and sandwiches; an extensive wine list ($$$)

- **Melt Shop**, 55 West 26th Street at 6th Avenue
  Gourmet grilled cheese ($$

- **Sarabeth's Park Avenue South**, 381 Park Ave South at 27th Street
  Classic American cooking and fresh, locally sourced ingredients ($$$)

- **Schnippers Quality Kitchen**, 23 East 23rd Street between
  Madison and Park Avenues
  Classics such as burgers and hot dogs, as well as special salads, tacos and shakes ($$), 10% off

*Show your MOVES badge and receive a discount*
Save the date!

August 6 - August 8, 2017