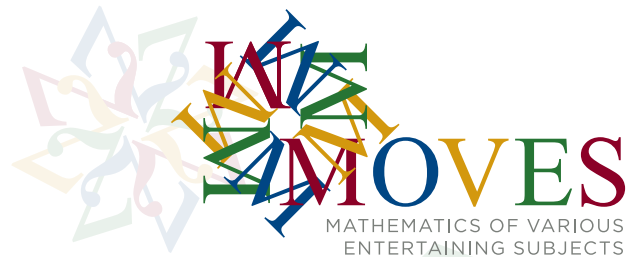


2015
MOVES

MATHEMATICS OF VARIOUS
ENTERTAINING SUBJECTS



Welcome researchers, educators,
and families to the 2015 MOVES Conference,
hosted by the National Museum of Mathematics!
MoMath is pleased to acknowledge MOVES sponsor:



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.

**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



Monday Morning

Conference Kick-Off Baruch Ballroom, 14-220

- 9:00-9:30** Registration
- 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-** *Three Sides of the Same Coin: the Intertwined Lives of Berlekamp, Conway, and Guy*
Siobhan Roberts
- 10:15-** *How Turning Triangles Inside Out Helps Us Understand Their Geometry*
John Conway
Princeton University
- 11:10-** *A Triangle Has Eight Vertices*
Richard Guy
University of Calgary

Baruch, Room 8-210 Hosted by the Baruch Math Dept.

- 9:45-** *Teacup Twists*
James Tanton
MAA
All ages
- 10:30-** *It's KNOT fun!*
- 11:00** Christina Chestnut
Stoked on STEAM
All ages
- 11:15-** *Conway's 'Game of Life' for the 21st Century*
Caren Diefenderfer
Hollins University
All ages

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

Monday Afternoon

Engelman Recital Hall

- 1:40-** *Games as Puzzles*
Peter Winkler
Dartmouth College
- 2:20-** *Counting Sets in SET and Flipping Coins*
Gary Gordon
Lafayette College
- 3:00-** *The Mathematics of Tilt*
David Richeson
Dickinson College

continued on next page

Baruch, Room 8-210

Hosted by the Baruch Math Dept.

- 1:25-** *Map Coloring in a Faraway Land*
Skona Brittan
SB Family School
Middle school students
- 2:20-** *Puzzles Make Math*
- 3:05** *Less Puzzling Or How'd That Bunny Vanish?*
Stuart D. Moskowitz
Humboldt State University
All ages

continued on next page

Monday Afternoon, continued

Engelman Recital Hall, cont.

- 3:40-** *Can You Always Win*
- 4:05** *Khalou in Five Moves?*
Brian Hopkins
Saint Peter's University
- 4:20-** *Left Center Right -*
- 4:45** *A New Endgame*
Bruce Torrence
Randolph-Macon College

Baruch, 14-270

- 1:40-** *Grundy Values of Fibonacci Nim*
Urban Larssen
Dalhousie University
- 2:20-** *Aperiodic Subtraction Games*
Nathan Fox
Rutgers - The State University of New Jersey
- 3:00-** *Waiting For the Empty Set*
Richard Nowakowski
Dalhousie University
- 3:40-** *My Combinatorial Games*
- 4:05** Jorge Nuno Silva
University of Lisbon
- 4:20-** *A New Twist on Wythoff's Game*
Alex Meadows
St. Mary's College of Maryland

Baruch, 14-285, cont.

- 4:20-** *Games of No*
- 4:45** *Strategy and Low-Grade Combinatorics*
James Propp
UMass Lowell

Baruch, Room 6-215

Hosted by the Baruch Math Dept.

- 1:40-** *Morphing Algorithms and Animations For Escher-like Tessellations*
Kevin Lee
Normandale Community College
- 2:20-** *On Surrounding a Polygon*
- 2:45** Craig Kaplan
University of Waterloo
- 3:00-** *Hinge-elasticity's shape-shifting into all five platonic solids and the tesseract*
Eleftherios Pavlides
Roger Williams University
- 3:40-** *Knots and Soap Film*
- 4:05** *Minimal Surfaces*
Nathaniel Friedman
SUNY-Albany
- 4:20-** *Planar Tanglegrams*
- 4:45** Ron Taylor
Berry College

Baruch, 14-285

- 1:40-** *From Silent Circles to Graph Circuits*
Max Alekseyev
George Washington University
- 2:20-** *Non-Transitive Dice and Directed Graphs*
Alex Schaefer
Binghamton University
- 3:00-** *Penney Roulette Games*
- 3:25** Robert Vallin
Lamar University
- 3:40-** *Who Wins When Playing Dreidel*
Stephen Lucas
James Madison University

Baruch, Room 8-210, cont.

- 3:15-** *A Sample of Mathematical Puzzles*
Nancy Blachman and Rebecca Mercuri
Julia Robinson Math Festival
All ages
- 4:10-** *Rock, Paper, Math*
- 4:55** Elana Reiser and Michelle Barbaretti
St. Joseph's College
Middle school and up

MoMath, 11 East 26th Street

- 2:00-** *Squabbling in the park*
- 3:30** Annette Lievaart
All ages

Monday Evening

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

5:00 Dinner – MoMath – 11 East 26th Street - *pre-registration required*

6:30 Entertainment - *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, vaudevillian 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

Engelman Recital Hall

9:00- *On The Toroidal Crossing*

9:25 *Number of the Complete Graph*
Noam Elkies
Harvard University

9:40- *Perfect Polyominoes*

10:05 Paul Salomon and Justin Lanier
John Burroughs School
and Georgia Tech

10:20- *Hinged Dissections*

10:45 *Inspired By Ernest Freese's Manuscript On Geometric Dissections*
Greg Frederickson
Purdue University

11:00- *Chutes and Ladders*

11:25 *With Large Spinners*
Darren Glass
Gettysburg College

11:40- *Cookie Monster Plays Games*

12:05 Tanya Khovanova
MIT

Baruch, Room 8-210

Hosted by the Baruch Math Dept.

9:00- *Mathemagic With*

9:45 *a Deck of Cards*
Colm Mulcahy
Spelman College
Middle school students and up

10:00- *Games On Graphs*

10:45 Patrick Honner
Brooklyn Technical H.S.
Ages 10 and up

11:00- *Disjoint Path Covers: All*

11:45 *About Connecting The Dots!*
Brian Kronenthal
Kutztown University of
Pennsylvania
Middle school students and up

MoMath, 11 East 26th Street

10:00- *A Math Trail In*

12:00 *Madison Square Park*
Brigitte Bentele
Trinity School
All ages

Tuesday Morning, continued

Baruch, 14-270

9:00- *The Hardness of Clickomania*

9:25 Aviv Adler
MIT

9:40- *The Parameterized*

10:05 *Complexity of Ricochet Robots*
Justin Kopinsky
MIT

10:20- *1xN Edge-Matching/*

10:45 *Jigsaw Puzzles are NP-Complete*
Jeffery Bosboom
MIT

11:00- *Red-Blue Chomp*

11:25 Tim Hsu
San Jose State University

11:40- *Upset-Downset*

12:05 Charles Peterson
University of California
Santa Cruz

Baruch, 14-285

9:00- *A Cellular Automaton*

9:25 *on a Hexagonal Grid*
Alok Puranik
Westford Academy

9:40- *Periodic Integer Sequences*

10:05 Vince Matsko
University of San Francisco

11:00- *Chords of an Ellipse,*

11:25 *Fibonacci Numbers, and Cubic Equations*
Ben Blum-Smith
Courant Institute of
Mathematical Sciences / NYU

11:40- *On the Celebration*

12:05 *of the 500th Birthday of Melancholia I and the Durer Magic Square*
Hossein Behforooz
Utica College

Baruch, Room 6-215

Hosted by the Baruch Math Dept.

9:00- *Chess and Combinatorial*

9:25 *Game Theory*
Carlos Santos
CEAFEL, University of Lisbon

9:40- *A q-Queens Problem*

10:05 Christopher Hanusa
Queens College, CUNY

10:20- *The Maximum Queens*

10:45 *Problem on a Rectangular Board*
Doug Chatham
Morehead State University

continued in next column

Baruch, Room 6-215, cont.

11:00- *Variations of the Tower*

11:25 *of Hanoi and Visualization of Their State Spaces*
Yoshiyuki Kotani
Tokyo University of A&T

11:40- *Square-Grid*

12:05 *Connection Games*
David Molnar
Rutgers University

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.

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

Baruch, Room 8-210

Hosted by the Baruch Math Dept.

- 1:40- 2:05** *Computational Complexity of Push-Pull Block Puzzles*
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

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 Game of Amazons*
Elwyn Berlekamp
University of California, Berkeley

Concluding Remarks

Baruch, 14-220

4:45-5:00

Glen Whitney and Cindy Lawrence,
MoMath

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

The National Museum of Mathematics
wishes to thank the following
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 **TWO SIGMA**

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Anna Weltman, University of California - Berkeley
Lamar Widmer, Messiah College

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 (\$\$)
- 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 (\$\$\$). *Show your conference badge at any Eataly
restaurant to receive a complimentary glass of prosecco at the
beginning of your meal.*
- Essen**, 60 Madison Avenue at 27th Street
Always-open delicatessen buffet (\$)
- Hill Country Kitchen**, 1123 Broadway at 25th Street
Fried chicken and homemade pies (\$\$)
- 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*

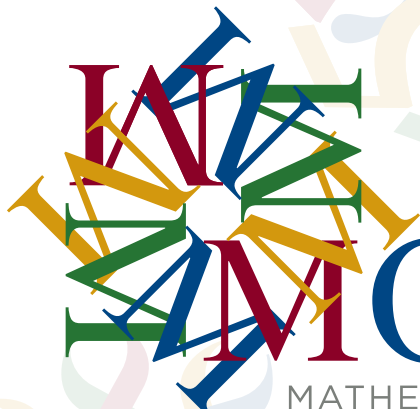
**Show your MOVES badge and receive a discount*



**The coolest
thing that ever
happened to math.**



Save the date!



MOMOVES 2017

MATHEMATICS OF VARIOUS
ENTERTAINING SUBJECTS

moves.momath.org

August 6 - August 8, 2017

