Abstracts

Keynote Presentations

Robert J. Lang

From Flapping Birds to Space Telescopes: The Art and Science of Origami

The last decade of this past century has been witness to a revolution in the development and application of mathematical techniques to origami, the centuries-old Japanese art of paper-folding. The techniques used in mathematical origami design range from the abstruse to the highly approachable. In this talk, I will describe how geometric concepts led to the solution of a broad class of origami folding problems – specifically, the problem of efficiently folding a shape with an arbitrary number and arrangement of flaps, and along the way, enabled origami designs of mind-blowing complexity and realism, some of which you'll see, too. As often happens in mathematics, theory originally developed for its own sake has led to some surprising practical applications. The algorithms and theorems of origami design have shed light on long-standing mathematical questions and have solved practical engineering problems. I will discuss examples of how origami has enabled safer airbags, Brobdingnagian space telescopes, and more.

Erik Demaine

Mathematics Meets Origami

I like to blur the lines between art and mathematics, freely moving from proving theorems to designing sculpture and back again. Origami is a great setting for this approach, as it mixes a rich geometric structure with a beautiful art form. On the one hand, we are continually developing mathematical algorithms to design new sculptures or analyze existing sculptures. With Tomohiro Tachi, our new Origamizer algorithm finds an efficient folding of any 3D shape you desire (technically, any polyhedral surface). With Amanda Ghassaei, our new Origami Simulator software lets you test out a crease pattern and visualize its folding without having to pick up a piece of paper. On the other hand, we explore forms sculpturally to inform mathematics. For example, our explorations into curved creases started as sculpture (with pieces at MoMA and the Smithsonian's Renwick Gallery), which enabled us to grow our understanding of the underlying mathematics, which in turn has potential applications in robotics, deployable structures, manufacturing, and self-assembly. By integrating science and art, we constantly find new inspirations, problems, and ideas: proving that sculptures do or don't exist, or illustrating mathematical beauty through physical beauty. Collaboration, particularly with my father Martin Demaine, has been a powerful way for us to bridge these fields.

Research Presentations

Max Alekseyev
Enumeration of Payphone Permutations

People's desire for privacy drives many aspects of their social behavior. One such aspect can be seen at rows of payphones, where people often pick an available payphone most distant from already occupied ones.

Assuming that there are n payphones in a row and that n people pick payphones one after another as privately as possible, the resulting assignment of people to payphones defines a permutation, which we will refer to as a payphone permutation.

It can be easily seen that not every permutation can be obtained this way.

In the present study, we consider different variations of payphone permutations and enumerate them.

Jorge Rubén Ruvalcaba Álvarez
A Hilbertian Completion for the Origami Geometry

Because the origami geometry - derived from the Huizta-Hatori axioms - seems to be axiomatically dependent on the traditional Euclidean geometry and its concepts, I will show a modest attempt to formalize it completely, inspired by the ideas of David Hilbert and emphasizing the notions of order, congruence and parallelism.

Anar Amgalan
Automated Jigsaw Puzzle Solving

We describe an algorithmic solution to a large jigsaw puzzle of ∼32000 pieces. Our approach involves minimal human decision-making and requires only 3 interactions with each piece. Along the way, we overcome several issues in image processing (edge and corner detection) and combinatorial optimization (placement of next piece).

Walker Anderson
NP-Completeness of L Tetromino Tiling

We show that L Tetromino Tiling is an NP-Complete problem using a reduction from 1-in-4 SAT.

Robert Bosch
Recent Progress in Opt Art

My ongoing Opt Art project includes TSP Art (continuous line drawings produced by solving large-scale instances of the traveling salesman problem), domino portraits (mosaics made out of complete sets of dominos), and Game-of-Life mosaics. In this talk I will present numerous additional examples of Opt Art.

Donna Dietz
An Analysis of IQ-Link

This is a theoretical and computational strategy exploration of the visually attractive game IQ-Link. Not all games which are visually appealing are worthy of your time as a puzzlist. This analysis gives a would-be addict some idea of what type of game they are falling for.

Benjamin DiLeonardo-Parker, Andrew Fisher, Matt Benet
The Multi-Axial Coordinate Notation for Pleat Intersection Analysis

Our presentation analyzes the approaches of pleats as well as their intersections on a plane, or molecules. Combining them into groups, we identify and analyze operations on those molecules. Through this, we seek a more refined understanding of the interactions of pleats on an unbroken plane.

Jenna Frye, Mary Reisenwitz
Extreme Sliceforms: Experiments in Scale, Material and Process

A sliceform is a 3d object that is constructed from radial or interlocked flat slices forming a grid-like skeleton of the form. Our research involves scaling sliceforms to large and small extremes, developing systems for autonomous motion and exploring material influences.

Nathan Gaby
Symmetric Circles in SET-Space

In this talk we define and give a classification of circles and spheres in the geometry of SET. Along with providing symmetric presentations of these objects, we discuss actions on SET planes and 3D SET-space that give these arrangements while preserving Sets.

Susan Goldstine
Color Swaps in Mosaic Knitting

A recently developed form of two-color knitting, mosaic knitting is easier to perform than other forms of color work. The price of this ease is an unusual set of restrictions on color placement, and the core of our work is classifying the color-swapping symmetries that are possible within these constraints.

Christopher Hanusa
Datamining Imaginary Maps

What can mathematics say about imaginary places? We explore a variety of statistical measures of sci-artist Emily Garfield's Imaginary Maps collection to ask and answer questions about the demographics, neighborhoods, and fractal nature of her imagined places. Our destination will surprise you. All aboard!

John Harris
Whodunnit? A Magical Mystery with Cards

In this talk we will present a fun magical/mentalism effect using "CLUE"-like cards. After the criminal and weapon are shockingly revealed by sharp detective analysis, we will use some mathematical analysis to investigate things further!

Christopher Jarvis
The Devil's Calculator: Creating a Math Puzzle for Lovers of Logic

In the Devil's Calculator, rather than a "solve for x" algebraic expression, the operators are unknown. An evil calculator had arithmetic operators replaced by obscure functions; by trial and error, you must recognize patterns and decipher their logic. This reversal of basic algebraic concepts creates a challenging and educational puzzle.

Tanya Khovanova
PRIMES STEP Studies Exploding Dots

I will cover interesting properties of base 3/2 (a 2-3 machine) as discovered by middle-school students under my mentorship. This includes properties of interesting sequences; different ways to represent the same number; and a mysterious connection to sequences that do not contain 3-term arithmetic progressions.

Brian Kronenthal
Counting Catan Configurations

Catan is a dynamic property-building and trading board game in which players build a new board every time they play. In this talk, we count the number of non-equivalent boards in two ways: one using a direct approach, the other utilizing techniques from abstract algebra.

Ed Lamagna

Sum Amusements with Fibonacci and Other Linear Recurrence Sequences

An algorithm is developed to express sums of linear recurrence sequences using the sequence name. For example, for the Fibonacci sum, $\sum_{k=0}^{n}(F[k]) = F[n+2] - 1$. Similarly, for the harmonic sum, $\sum_{k=1}^{n}(H[k]) = (n+1)H[n] - n$.

Stephen Lucas

Which Dice Win At Chutes & Ladders, or "Chuteless & Ladderless"

The average length of a game of chutes and ladders is minimized using a die with 15 sides. But we will show that if you are more interested in winning, then a die with 22 sides is the best choice. We also consider what happens with no chutes or ladders.

Joseph Malkevitch

Transforming and Realizing Polyhedra and Symmetrical Graphs

Interest in regular convex 3-dimensional polyhedra has roots in the works of Euclid, Archimedes, Kepler, Coxeter, Grünbaum and Norman Johnson (regular faced solids). Since plane 3-connected graphs can be realized by convex 3-dimensional polyhedra, here I investigate transforming polyhedral graphs into related symmetrical polyhedral graphs.

Jeanine Meyer

An Origami-Inspired Adventure in Number Theory and Limits

The dollar bill rosette, created by Paul Jackson and modified by Martin Kruskal, is significant mathematically. An iterative procedure divides the bill into eleven parts, improving an original estimate. The procedure works for a class of primes. We fold the model. I identify the class and provide a proof.

Charlene Morrow

Folding Small/Unfolding Large: Exercises to Increase Understanding of Packing Large Equipment for Use In Space

I will describe several student-oriented origami activities intended to bring insights about ways that large items needed in space (e.g., solar arrays) can be compactly packed using origami principles. This project is being done in collaboration with the NASA Chandra X-ray Observatory at the Harvard & Smithsonian Center for Astrophysics.

Colm Mulcahy

Wait Wait Don't Tell Me

A spectator selects a card from a shuffled deck, which is further jumbled with half of the cards face up. She looks through them and tells you how many she sees which match hers in suit, and how many match in value. From this information you tell her what her card was.

David Nacin

Padovan, Pascal, and Proofs Without Words

What happens when constructing the Fibonacci spiral with triangles instead of squares? The Padovan sequence. We discuss the history and best known constructions of these numbers. We then prove several identities without either words or numbers, by considering colorings corresponding to sums of entries on Pascal's triangle.

Jonathan Needleman

Lego Graphs

At MOVES 2013 Ted Welsh held an activity titled "Graph Theory on LEGO grids". This talk is research inspired by that activity, where we give combinatorial results about which planar graphs can be built with Legos. We will also talk about the relationship between constructing graphs with Lego and scheduling.

Uyen Nguyen
Folding Functions: Origami Corrugations from Equations

We present an algorithm for designing flat-foldable origami corrugations that approximate functions and other continuous curves. We discuss the types of curves for which our algorithm works and where it breaks down, giving reasons why and suggesting changes that can be made to rectify problematic functions.

Uyen Nguyen
Origami Explorations of Convex Uniform Tilings Through the Lens of Ron Resch's Linear Flower

We present a method of creating origami tessellations in the style of Ron Resch's Linear Flower that allows us to construct a crease pattern modeled after convex uniform tilings. We show how to calculate where folds on a crease pattern should be placed to get a desired result when folded.

Donald Plante
3D Printing Pre-Scored Origami Sheets

In this talk, I show how 3D printers can be used to create origami crease patterns that act as living hinges embedded in a sheet of plastic. These sheets can then be folded by anyone, regardless of skill level, to construct durable origami and kirigami models.

David Plaxco
Cubes Underscore Art: Alternative Solutions of the $n \times n \times n$ ***Rubik's Cube***

Cubes Underscore Art is a project exploring the possibilities of solving twisty puzzles like the Rubik's Cube to aesthetic states beyond the traditional solution. I will share several examples of my work and give insight into strategies and methods for generating algorithms to create such patterns on $n \times n \times n$ cubes.

Jim Propp
The Wall of Fire Theorem

MoMath's Wall of Fire exhibit shows the intersection of a cube and a plane outlined as a polygon. I'll show that if you pass a cube through a plane at uniform speed, the average number of sides of the polygon is exactly four, regardless of the orientation of the cube.

Jason Rosenhouse
A Guide to Some Literary Logic Puzzles

If "Science Fiction" refers to stories in which good science plays a central role, then I suggest coining "Logic Fiction" as a term for stories in which feats of logical deduction are the main appeal. Logic Fiction has a long history, and we will survey some of it in this talk.

Kim Roth
A Mathematician Knits an Afghan

While knitting a Hue Shift afghan, I began to wonder, how many possible afghans of this type are there? This led to more questions. What makes an afghan a Hue Shift? What should we count and how? These questions will be answered and other questions will be asked.

Adrienne Sack
Origami and Fashion: A Common Thread

The centuries' old technique of American smocking expresses many of the same geometric patterns on fabric as recently developed origami tessellations do on paper. While origami is made by folding creases, smocking is made by gathering vertices. Closed-back twists and flat folded tessellations are smockable, but some corrugations are not.

Karl Schaffer
Edgy Puzzles

Countless puzzles involve decomposing areas or volumes of two or three dimensional figures. We will examine puzzles in which the edges of various symmetric figures like polyhedra are decomposed into multiple copies of smaller graphs, and see their relationship to representations by props or body parts in dance performance.

Ann Schwartz
Triangle Rotation in Straight-strip Hexaflexagons

Everyone familiar with these objects knows that the hexagon's six triangles rotate during flexing. But few know that rotations can increase when more faces are added, making hexaflexagon puzzles more challenging. This talk explores hexaflexagons with six, nine, twelve, fifteen, and twenty-four faces, and the puzzles that can be created.

Sophie Usherwood
Mathematical Analysis of An Origami Spring Structure

Origami spring structures are useful in robotics as their length can vary, while maintaining structural rigidity. Mathematical methods were used to predict maximum height, the relationship between the angle of rotation and the height, and to obtain a Poisson's ratio for the spring structure.

Robert Vallin
Penney's Game with a Weighted Coin

Penney's Game involves choosing a three-outcome sequence of flips using a fair coin. The game is non-transitive (no matter what Player 1's choice of outcome is, Player 2 can put the odds in her favor). Here we look at what happens when the coin is not a fair coin.

Sunita Vatuk
Are there rules? Mathematical Thinking Among Experts in Kolam

Kolams, designs made by women in South India, have an astonishingly wide variety of connections to different branches of advanced mathematics. Dr. Vatuk will discuss how women, many with little formal education, do (and don't) think like mathematicians as they learn, categorize, remember, make variations on, and transmit these designs.

Tovi Wen
Circle-Packing & Externally Tangent Circles in Origami

Modern super-complex origami, used for really elaborate models, requires multiple paper flaps. This is achieved by a process called circle-packing, which derives from plane geometry involving circles. Looking at examples drawn from origami and mathematics, we examine the process by which origamists use geometric ideas to design their models.

Peter Winkler
Journey into Space

Plane geometry and solid geometry are often thought of as distinct subjects, each with its own methods (solid geometry being the more difficult of the two). But sometimes it happens that a problem on the plane, or even a problem that doesn't seem geometric at all, benefits from a trip into the third dimension.

We'll present several examples, one of which has a famous but incorrect proof (still up on Wikipedia).

Wing Hong Tony Wong
On a Mathematical Riddle by John Conway

This project is motivated by Conway's wizard puzzle from the 1960s. For each fixed positive integer s, we determine all corresponding n such that there are two different ways to partition s into n positive integers with the same product. Similarly, we also fix a product and consider its factorizations.

Pei-Duo Yu, Chee Wei Tan

Divide and Conquer Algorithm for Algebra Game

Algebra Game is a mathematics game invented by Terence Tao in 2012. We first connect a subproblem of Algebra Game to solving a linear Diophantine Equation. Then from a number theoretic perspective, we present an algorithm based on divide and conquer idea and dynamic programming to solve the game efficiently.

Family Activities

Hossein Behforooz
A Practical Workshop on Magic Squares

In this workshop, we will introduce you a very fun part of recreational mathematics. It is called Magic Squares. Yes it is magic and it is FYE. Which means "for your Mathematical Entertainment and Adventure". After this display and workshop, you will go home with many tables with numbers. Most of these magic squares have many interesting and amazing properties and that is why it is called MAGIC SQUARE. This workshop is open to any grade from elementary school to college students and also parents. Come and join us and have fun. You will love it! Math is FUN.

Sergio Belmonte, Guido Ramellini
Math Experiences

The Museum of Mathematics of Catalonia will present some of its family activities, original puzzles and enigmas for children and parents alike. Come for a really joyful time; enjoying maths like you never have before. Intended for all ages. It's forbidden NOT to touch!

Nancy Blachman
Fold and Cut Challenge

Here's your challenge: What shapes can you make out of a single piece of paper, folded in whatever way you choose, and then clipped with a single straight cut?

Norma Boakes
Modular Origami for Math and Amusement

Modular Origami consists of multiple folded units that are connected together to create 2-D or 3-D Origami models. Once you learn a simple "unit" you'll be amazed at what you can make. In this session, you'll make your very own Modular Origami model and explore the math behind it.

Sarah Brewer
Drawing Traditional Patterns with Ruler and Compass

Participants will learn how to use a ruler and compass to construct a traditional Islamic geometric design, such as those found in Moroccan tiling patterns.

Skona Brittain
Pascal's Triangle and Origami

Participants will first create their own Pascal's Triangles. Then we will explore finding patterns in Pascal's Triangle, in a variety of different ways. Finally, we will make origami units that can be assembled into Pascal's Triangle, with the colors of the origami paper illustrating the participant's favorite pattern.

Bronna Butler, Michael Ribick
Persistence/Teamwork

A glass, stainless steel, computerized interactive puzzle, "Persistence/Teamwork", will generate three sets of streaming numbers and clues regarding a date. The puzzle cannot be solved by one individual – three participants must work together, at the same time, using three sets of dials. The date is historically significant.

Bob Coulter, Bek Handzik-Smith, Kei Handzik-Smith
Equations: The Game of Creative Mathematics

Come join other participants in Equations, a cube-based game where you will create and re-create equations based on each player's moves. Challenge yourself to make intricate equations, but be careful not to flub!

Philip Dituri

21 or Broke: Blackjack and the Stock Market

Learn how variants on the game of blackjack pose the same decision problems as investing in the stock market. This requires paying attention to both calculations of probability and the pitfalls of going bust. Play the game and see how math can help you win!

Yossi Elran

"All you Need is Paper" Puzzles!

It's amazing how much math you can do with nothing but a sheet of paper. In this family event we will challenge you to create impossible paper objects, fold maximum-area shapes, perform fold-and-cut magic, and solve many intriguing puzzles – all with just a single sheet of paper!

Uttam Grandhi

PlayGAMI – Augmented Reality Origami Creativity Platform

PlayGAMI is an augmented reality origami creativity platform. It has the fun of coloring, folding origami and the magic of AR all at once! At the current moment, our platform lets a user draw on real origami paper and turn their creation into a virtual origami action figure/game character!

Rona Gurkewitz

Folding a Simple Modular Origami Book and Three Theorems, Accessible to Children, Used in Designing It

Folding the book model will be done pointing out and discussing three theorems, or mathematical design ideas, accessible to children, used in designing the model.

Yu Xuan Hong

How to Unfold a Box into a Star: An Interactive Demo of the Star Unfolding of Boxes

Would you like to learn how to unfold your favorite box into a funky-looking star? We present an interactive application that visualizes the star unfolding of a box, such that its dimensions and source point locations can be continuously toggled by the user.

Asher Hurowitz

Polyhedral Paradise: Crafting Three Dimensional Models

Learn how to fold, cut, and glue together the wonderful regular 3D shapes that surround us in every day life and in the world of mathematics. From the Tetrahedron to Icosahedron, Asher Hurowitz will teach you the process step by step and history behind the beautiful and important Platonic Solids.

Rebecca Klemm

Turning Two Circles Into A Square Selfie Frame

Armed with strips of paper, tape and scissors, we begin with two circles (rings) and when taped perpendicularly and cut down the middle lengths of each circle, the result is a square suitable as a selfie frame. Then we can use the scientific method to enhance the activity with hypothesis when we change angles and use moebius strips instead of circles (rings).

Paula Krieg

Origami Chinese Thread Book

Chinese Thread Books are a traditional folded-paper folk art. Closed, a thread book resembles a flat folder. Upon opening, 3D boxes are revealed. Families will make three-section origami Chinese thread books using papers that are colorfully decorated with graphs of functions that are scaled to complement the folds.

Linda Kwok

24 - Sharpening Math Skills with a Deck of Cards

Sharpening your arithmetic skills with a deck of cars. Using number cards, 4 of them, once and only once, to create 24. For example - 4, 6, 1, 8. You will say (6 - 4 + 1) x 8 = 24.

Ed Lamagna

A Shuffle to Buffalo

Several "self-working" card tricks based on the Gilbreath shuffle are presented. This shuffle preserves many properties of the deck, and serves as the basis for numerous surprising magical effects. Participants learn not only how to perform the tricks, but why they work as the mathematics behind them is explored.

Ron Lancaster

A Mathematical Walk in Madison Square Park

Join Ron Lancaster for a walk in the park where we will put on a pair of mathematical glasses to view the surroundings through a mathematical lens. We will answer mathematical questions and solve puzzles related to our encounters in the park. Print and e-copies will be provided.

Georgia Maragkou

Our own Racing to the Edge of Knowledge

Being aware of the research education community's effort to mitigate the relationship between Math and Art and as Geometry offers the students the chance to acquire the capacity of understanding the space and provide empirical procedures, I founded a MATH LAB at the 1st High School of Skala Oropou, Greece.

Jeanine Meyer

First Lesson: Frog Jumping into a Box

We fold the magazine cover box and the business card frog. Time permitting, we will make the frog with different types and dimensions of paper and develop theories on what works best. I will show other frog models and other boxes.

Jeannine Mosely

Macroscopic Origami Voxel Engineered Structures

This workshop will teach you how to quickly and easily build voxel based structures out of modular origami cubes folded from business cards. Voxels are the 3d equivalent of pixels and are the foundation of 3d printing. While they are usually relatively small, they can be any size you want.

Keith Nabb

Origamics for All Ages

Traditional origami follows a sequence of steps to arrive at a finished product. This session puts users of all ages in control as they decide what creases can answer specific questions. Investigations will include elementary examples of Haga's origamics, including two turned-up-point (TUP) activities and Mother and Baby Lines.

Brian Palacios

Sidewalk Math

Public displays of mathematics are uncommon. This MOVES activity aims to fight this through Sidewalk Math: public displays of engaging, fun, and accessible mathematics that lives on sidewalks. Using sidewalk chalk, authors of sidewalk math create problems, diagrams, and tasks that a local community interacts with.

Jim Propp
Hexaflexagon Secrets Revealed

A hexaflexagon is "just" a Mobius band with three twists; cutting away part of the hexaflexagon can make it easier to see what's going on. Likewise, adding extra creases makes the structure more flexible, allowing it to imitate the pattern of motion of Escher's fishes.

Elana Reiser
Having Fun with Game Theory

Want to find out how to get your favorite Halloween candy, how to win at Rock, Paper, Scissors, or how to fairly divide a cake? Get a basic introduction to Game Theory through some fun games.

Lauren Rose
Domino Circles

In this hands-on session, participants will determine if a set of double 6 dominoes can connect to form a circle. They will do the same for "double n" dominoes, $n < 6$, and look for patterns. We will introduce graph theory to model this problem for any n.

Karl Schaffer
Polyhedra on a Shoe String: String and Finger Geometry

String figures, the imaginative designs created with simple loops of string, are found among the world's most ancient cultures, but these loops may also be used to create remarkable polyhedral structures. We will use large loops of rope and string to form polyhedra and other geometric designs.

Doris Schattschneider
Make your own Kaleidocycle

The author coined the name "Kaleidocycle" 35 years ago for a 3-d form of linked tetrahedra that can be folded from a 2-d grid of triangles. An infinite family of these forms exists, and one form is easy to construct and make yourself.

Ann Schwartz
Flexagon Fun

This family activity will teach children and adults how to make two hexaflexagons and two square 8-flexagons. If time permits, an exciting flexagon discovery will be taught to the group.

Lauren Siegel, John Goodwin
Math and Texas History

"Why should I care to know this math?" Well, why did anyone care to invent and use this math? In partnership with the Texas State History museum MathHappens have leveraged two historical contexts: Navigation in the 1600s, and land surveying in the 1800s to teach a variety of math concepts.

Melissa Silk, Annette Mauer
Hungry Birds - a STEAM Experience

Paper engineering meets mechatronics in this unique workshop. Hungry Birds is a math-making experience uniting the complexity, beauty and elegance of the hyperbolic paraboloid with sensor activated art. Explore how "flat to form" creativity permits your thinking hands to transform paper into a flock of hungry birds! It's playful and connected learning.

Melissa Silk, Lisa Giles, Annette Mauer
Miura Sectors

In this workshop participants will use a Miura fold to create a defined set of paper circle quadrants. Subsequent iterating and combining the quadrant sectors affords the creation of a sculptural form visualising exponential growth, and resembling ammonites from the Jurassic and Cretaceous periods. The aesthetic forms transform learning from geometry into body adornment and art practice, requiring participants to indulge in the challenge and joy of making. The activity provides opportunities for investigation and discussion of numerous mathematical and STEM concepts, simultaneously reinforcing the value of art and design in trans-disciplinary knowledge building (STEAM).

Melissa Silk, Corey Stewart, Annette Mauer
Lumifold

Lumifold is a STEAM experience for learners and enthusiasts interested in trans-disciplinary practice. Focussed on geometry and the hand made, Lumifold lamp making integrates art and design with STEM concepts. It promotes ideas related to biomimicry, elementary symmetries, iteration and illumination while learning about structure, strength, stability, and translations.

Barney Sperlin
Imagining the Fourth Dimension

Optical illusions and magic tricks may help us imagine life in four dimensions.

Suzanne Sumner, Marie Sheckels
Birds of a Feather: Folding Paper and Weaving Ribbon

We demonstrate two crafts: folding origami birds and weaving ribbon birds. Each year UMW faculty make crafts to experience learning something unfamiliar, what we often ask our students to do. These exercises teach faculty lessons about themselves as learners and as teachers.

Chee Wei Tan, Ling Lin
Math Games of Asia: JRMF in Hong Kong

The novelty of Julia Robinson Mathematics Festival Hong Kong lies in the aid of mobile devices that enrich the participants' experience. Classic mathematics games and puzzles are digitized and will be played during this activity. In particular, a well-known Nim game and its variant are embedded in a messenger Chatbot.

Sophie Usherwood
Discovering the Mysteries of Hexaflexagons and Flat Folded Origami

It is difficult to visualize objects with more than three dimensions. Flat folded origami models make this concept relatable as they can be folded with 3, 6 or more sides. By folding models, and through demonstration, students will be introduced to complex geometry and topology concepts in an accessible way.

Helena Verrill
Modular Origami Unit for Polyhedra with Vertex Degree 4

I will show how to make a unit for making polyhedra of vertex degree 4, and triangular or square faces.

Tom Walsh
Amazing Geogami: Origami to Construct Geometric Figures

Origami is the oriental art of paper folding. In this make and take workshop, we will be using Origami to create Geometric figures. Also, we will be exploring the characteristics of several Geometric figures.

Kristal Webb
The Art of Folding Regular Polygons

A regular polygon is a geometric shape that has equal sides and interior angles. This workshop will teach you how to fold regular triangles, quadrilaterals, pentagons, hexagons, and octagons. We will calculate interior angles of regular polygons and demonstrate how educators can inspire students in hands-on learning.

Elena Yakubovskaya, Anar Amgalan
How Objects can Trick you with their Projections

During this workshop we will play with simple shapes and their projections, and see how confusing they can be. We will have side, front and top views of some constructions made out of different shapes. Our task is to deduce the set of shapes that produced the projections and build it.

Debbie Yuster
Tower of Hanoi

In this activity, we will play the Tower of Hanoi game, moving a stack of discs from one pole to another, according to the rules of the game. We'll discover a formula for the minimum number of moves needed, and will explore the mathematics behind the game.