Bridges 2023 Program

The conference program will only be available online. If you would like to have a paper copy of any pages of the program you will need to print them yourself.

PDF of this schedule.

Please note that the conference takes place on the Sexton campus of Dalhousie University rather than the main campus. The morning plenary talks are in the Irving Auditorium in the Richard Murray Design Building at 5257 Morris Street. The afternoon sessions are in the Irving Auditorium and the B Building at 5260 DaCosta Row. The Art Exhibition is in the Exhibition Room on the main floor of the Ralph M. Medjuck Building, 5410 Spring Garden Road. Please visit our maps page for a campus map and visual guides to finding your way around.

All talk and workshop rooms have a projector, a desktop PC with Power Point and Acrobat Reader, HDMI and USB-C connections for personal laptops, and speakers for sound. If you can access your talk online or on a memory stick in a format compatible with Power Point or Acrobat Reader, you can use the desktop PC and do not need to bring your own laptop.

The last speaker in each paper session is marked (Chair) and is responsible for chairing that session. The chair must make sure talks begin at the precise time in the schedule. Short paper presenters have 10 minutes to speak and 2 minutes for questions. Regular paper presenters have 20 minutes to speak and 5 minutes for questions. The chair should introduce each speaker by name and give them a hand signal when they are 2, 1, and 0 minutes from the end of their allotted time.

Some Workshops have participation limits due to the supply of materials the presenter can provide or close supervision required for the activity. Please arrive early to be sure there is space for you to participate. It is not possible to sign up or reserve a place for a workshop. If you arrive to a full workshop you may observe the workshop without participating.

Clicking on an underlined talk title in the schedule below will take you to the corresponding paper in the Bridges Archive. JMA Papers Sessions are talks based on articles published recently in the *Journal of Mathematics and the Arts*. Taylor & Francis has generously provided access to these papers to Bridges participants until the end of August through this link. Once on that page you can

search for an article by author or title, or browse recent issues. For convenience, each of the JMA talk titles is linked to that same page, but you will still need to search for the particular article once on the JMA site.

Clicking on an underlined event title will take you to a page with more information on that event. If you are interested in performing at Informal Music Night, joining the Mathematical Theater troupe, or reading a mathematical poem during the open mic period of the Poetry Reading, please contact the organizers using the information on the page for each event. If you would like to be a runway model in the Math+Fashion Show please fill out this form.

Sessions and Events are color coded as follows:

Plenary Sessions, Irving Auditorium, conference registration required.

Regular and JMA Paper Sessions, Irving Auditorium and B Building, conference registration required.

Short Paper Sessions, B Building, conference registration required.

Workshop Sessions, B Building, conference registration required.

Social Events, conference or companion registration required.

Free Public Events, no registration required.

Optional Full Day Excursion, separate registration and additional fee required.

Wednesday, 26 July

09:00–18:00: Hand delivery of Art Exhibition pieces, Medjuck Building

14:00–18:00: Registration, Irving Auditorium Lobby, Design Building

Thursday, 27 July

08:30–12:00: Registration, Irving Auditorium Lobby

08:00–18:00: Art Exhibition open, Medjuck Building

09:00–12:00: Plenary Session 1, Irving Auditorium, Design Building

- 09:00–09:30: **Opening Remarks**
- 09:30–10:30: **Erik and Martin Demaine**: *Algorithmic Art with Curved Creases, Fonts, and Puzzles*
- 10:30–11:00: Coffee break
- 11:00–12:00: **John Macnab**: *The Compound Helical Cone as Kinematic Trace*

12:00–13:30: Lunch Break

13:30–15:00: Regular Papers Session 1, Irving Auditorium

- 13:30–14:00: **Stepan Paul**: *What Can We Learn from Non-Euclidean Paper?*
- 14:00–14:30: **Robert Fathauer**: *Ceramic Bells: Aural Performance and Geometric Design*
- 14:30–15:00: **Carlo Sequin** (Chair): *Easy-to-Understand Visualization Models of Complete Maps*

13:30–15:00: Regular Papers Session 2, B227

- 13:30–14:00: **Severi Virolainen**: *Pattern Continuity in Polygon Tessellations*
- 14:00–14:30: **Reymond Akpanya, Tom Goertzen, Sebastian Wiesenhuetter, Alice C. Niemeyer, and Jörg Noennig**: *Topological Interlocking, Truchet Tiles and Self-Assemblies: A Construction-Kit for Civil Engineering Design*
- 14:30–15:00: **Pierre Gradit and Vincent Van Dongen** (Chair): *A Truchet Tiling Hidden in Ammann-Beenker Tiling*

13:30–15:00: JMA Papers Session 1, B228

- 13:30–14:00: **John Campbell**: *Artwork Based on Automatic Sequences*
- 14:00–14:30: **Rodrigo Trevino**: *Quasimusic: Tilings and Metre*
- 14:30–15:00: **Tatiana Bonch** (Chair): *Specific patterns in the number of lines of The Sumerian Temple Hymns*

13:30–14:45: Short Papers Session 1, B229

- ~~13:30–13:45: **Patricia Bentley**: *Weaving is a Way of Doing Math*~~ (cancelled)
- 13:45–14:00: **David Richeson**: *Residue Designs, String Art, and Number Theory*
- 14:00–14:15: **Emily Dennett**: *Stitching Superpermutations*
- 14:15–14:30: **Lewis Campbell, Kelly Delp, and Fatma Baytar**: *Flat Patterns from Curved Bodies*
- 14:30–14:45: **Barry Cipra** (Chair) **and Paul Zorn**: *Oh What a Complex Rug We Weave When First We Color Then Perceive*

13:30–15:00: Short Papers Session 2, B225

- 13:30–13:45: **Craig Lazarski, Kristi Ramey, and Cayce Lee**: *Integrating Statistical Data Analysis and Data Art Creation at the High School Level*
- 13:45–14:00: **Manish Jain**: *Sine Waveform Cars*
- 14:00–14:15: **Neha Garg and Manish Jain**: *Radix Sort and Story Cards*
- 14:15–14:30: **Joshua Holden**: *Between the Two Cultures: Teaching Math and Art to Engineers (and Scientists and Mathematicians)*
- 14:30–14:45: **Erika Balogh and Andras Balogh**: *Math + Design: Collaborative Posters*
- 14:45–15:00: **Felicia Tabing** (Chair): *Creativity in Writing Calculus Exams*

13:30–15:00: Workshop 1, B308

Andrea Hawksley: *Line-Art Flip Books*
*Workshop limited to 20 participants.

15:00–15:30: Coffee Break

15:30–17:00: Regular Papers Session 3, B227

- 15:30–16:00: **Rob Hocking**: *Three-Dimensional Diagonal Cross-Sections of Four-Dimensional Menger Sponges*
- 16:00–16:30: **Hideki Tsuiki**: *Constructing Sierpinski Tetrahedrons from Connector Pieces*
- 16:30–17:00: **Donald Plante and John Jungck** (Chair): *Self-Assembling Platonic and Archimedean Solids: Innovations and Advancements*

15:30–17:00: Regular Papers Session 4, B229

- 15:30–16:00: **George Hart**: *Curved, yet Straight: Stick Hyperboloids*
- 16:00–16:30: **Pari Riahi, Erica DeWitt, Cami Quinteros, Fey Thurber, Pieter Boersma,**

Adrian Carleton, and Yahya Modarres-Sadeghi: *Walking in the Wake: Exploring the Dynamics of Vortical Structures*
- 16:30–17:00: **Anton Bakker** (Chair) **and Tom Verhoeff**: *Domain-Specific Languages for Efficient Composition of Paths in 3D*

15:30–16:30: Regular Papers Session 5, B228

- 15:30–16:00: **David Kaufman**: *Polygonia Design Suite: Inspiration, Design, and Application*
- 16:00–16:30: **Jennifer Padilla** (Chair): *Multilevel Islamic Geometric Design for Local Symmetry in Substitution Tilings*

15:30–17:00: Short Papers Session 3, B225

- 15:30–15:45: **Ellie Baker and Eve Torrence**: *Fabric Models of Maximal Complete Maps on a Three-Holed Torus*
- 15:45–16:00: **Eve Torrence**: *How to Build an Origami Nine-Color Map on a Genus-Three Torus*
- 16:00–16:15: **Laureen Mahler**: *Symmetry Notation as a Multidisciplinary Method for the Design of Origami Tessellations*
- 16:15–16:30: **David Goncharov, Marcus Michelen, and Uyen Nguyen**: *Automatic Origami Crease Pattern Generation from k-uniform Tilings*
- 16:30–16:45: **Klara Mundilova, Erik D. Demaine, Robert Lang, and Tomohiro Tachi**: *Curved-Crease Origami Spirals Constructed from Reflected Cones*

15:30–17:00: Workshop 2, B308

Susan Gerofsky, S. Brackett Robertson, Karl Schaffer, and Ekaterina Zharinova: *Puppetry, Poetry, Dance, and Sound on the Bridges of Königsberg: Embodied Work with Euler Paths and Circuits*
*Workshop limited to 30 participants.

17:00–18:00: Art Exhibition Opening Reception, Medjuck Building

18:00–20:00: Dinner Break

20:00–21:30: Reza Sarhangi Memorial Public Lecture, Irving Auditorium

Craig Kaplan: *An Aperiodic Monotile*

Friday, 28 July

08:30–12:00: Registration, Irving Auditorium Lobby

08:30–17:00: Art Exhibition open, Medjuck Building

09:00–12:00: Plenary Session 2, Irving Auditorium

- 09:00–09:30: **Announcements**
- 09:30–10:30: **Colin Adams**: *Math Coming Alive Through Theater, Art, and Exposition*
- 10:30–11:00: Coffee break
- 11:00–12:00: **Jason Brown**: *A Hard Day's Math: Connections Between Mathematics and Music*

12:00–14:00: Lunch Break

14:00–15:30: Regular Papers Session 6, Irving Auditorium

- 14:00–14:30: **Robert Bosch and Izzy Snyder**: *A New Tile-Based Method for Constructing Single-Line Drawings*
- 14:30–15:00: **Hanan Tanasra, Gershon Elber, and Yoav Sterman**: *3D Dice Mosaics: A Multidirectional Dithering System*
- 15:00–15:30: **Doug McKenna** (Chair): *Are Maximally Unbalanced Hilbert-Style Square-Filling Curve Motifs a Drawing Medium?*

14:00–15:30: Regular Papers Session 7, B227

- 14:00–14:30: **Phil Webster**: *Polar Zonohedral Helices and Clusters*
- 14:30–15:00: **Cameron Browne**: *Drawing Knots with Tutte Embedding*
- 15:00–15:30: **Paul Gailiunas** (Chair): *Kagome from Deltahedra*

14:00–15:30: Regular Papers Session 8, B228

- 14:00–14:30: **Etienne Boulais**: *Illustrating Transport Theory Through Geometric Tiles*
- 14:30–15:00: **Benjamin Trube**: *Surface Toppling on Cylindrical and Polyhedral Sandpiles*
- 15:00–15:30: **Robert Hearn** (Chair), **William Kretschmer, Tomas Rokicki, Benjamin Streeter, and Eric Vergo**: *Two-Disk Compound Symmetry Groups*

14:00–15:30: Short Papers Session 4, B229

- 14:00–14:15: **Henriette-Sophie Lipschuetz, Ulrich Reitebuch, and Konrad Polthier**: *Visualizing the Kolakoski Sequence*
- 14:15–14:30: **Ulrich Reitebuch, Martin Skrodzki, Henriette-Sophie Lipschuetz, and Konrad Polthier**: *Whirling Tiles*
- 14:30–14:45: **John Nicholson**: *(Circle + Square)/Triangle: Using Shape-Based Expressions for Image Creation and Exploration*
- 14:45–15:00: **Sarah Chen and Manil Suri**: *A Hyperbolic Variant of Tic-Tac-Toe*
- 15:00–15:15: **Stephen Gagola**: *An Orthogonal Mate for a Latin Square Based on an Asymmetric Tile*
- 15:15–15:30: **D. Jacob Wildstrom** (Chair): *An Integer Square Variant of the Harriss Spiral*

14:00–15:15: Short Papers Session 5, B225

- 14:00–14:15: **Kodai Nakagawa and Tomohiro Tachi**: *Wire Construction of the Costa Surface and a Torus*
- 14:15–14:30: **Manuel Estévez, Erika Roldán, and Henry Segerman**: *Surfaces in the Tesseract*
- 14:30–14:45: **Adam Rowe**: *Surface-Tiling Curves*
- 14:45–15:00: **Jared Pincus**: *Developing a Sculpture of the Trihelical Square Tiling*
- 15:00–15:15: **Loe Feijs** (Chair): *Implementing Textile Borromean Seifert Surfaces*
- 15:15–15:30: **Douglas Dunham and Lisa Shier**: *A Papercrafted Fish Pattern on a Triply Periodic Polyhedron*

14:00–15:30: Workshop 3, B308

Neel Shrestha: *Using Origami to Make Abstract Elevations of Polyhedra*

15:30–16:00: Coffee Break

16:00–17:00: Regular Papers Session 9, Irving Auditorium

- 16:00–16:30: **Xinya Zhang, Paul Kry, and Etienne Vouga**: *On Understanding Disentanglement Puzzles*
- 16:30–17:00: **Karl Schaffer** (Chair): *Dancing with Dienes*

16:00–17:00: Regular Papers Session 10, B227

- 16:00–16:30: **Craig Kaplan**: *Dichromatic Steganography*

- 16:30–17:00: **José Ezequiel Soto Sánchez** (Chair): *Parametric Curves in Color Space*

16:00–17:30: JMA Papers Session 2, B228

- 16:00–16:30: **Tamira Elul**: *Quantifying Patterns in Art and Nature*
- 16:30–17:00: **Shuchang Xu**: *Searching for Rigidity in Algebraic Starscapes*
- 17:00–17:30: **Henriette-Sophie Lipschuetz**, **Ulrich Reitebuch**, **Martin Skrodzki** (Chair): *Weaving Patterns Inspired by the Pentagon Snub Subdivision Scheme*

16:00–17:30: Short Papers Session 6, B229

- 16:00–16:15: **David Reimann**: *Connections between Hitomezashi Patterns and Truchet Tiling*
- 16:15–16:30: **Amy Wendt**: *Pattern Gradients with Generalized Duotone Truchet Tiles*
- 16:30–16:45: **Rashmi Sunder-Raj**: *Physical Representations of Polygon, Wedge, and Arc Squiggles*
- 16:45–17:00: **Anna Chupa and Michael Chupa**: *Second-Order Cellular Automata as Textile Design Elements*
- 17:00–17:15: **Alda Carvalho, Carlos Santos, Jorge Silva, and Ricardo Teixeira**: *Sidewalks of Lisbon and Azores*
- 17:15–17:30: **Helena Verrill** (Chair): *Space Filling Truchet Variations*

16:00–17:30: Workshop 4, B225

Sylvie Benzoni-Gavage: *The Rulpidon and 9-Color Maps*
*Workshop limited to 24 participants.

16:00–17:30: Workshop 5, B308

Lisa Lajeunesse and Carol Dorf: *Sestinas and Golden Shovels*
*Workshop limited to 30 participants

17:30–19:30: Dinner Break

19:30–21:00: Math+Fashion Show, McInnes Room, Dalhousie Student Union, 6136 University Avenue. Preview the show.
The Student Union is a 20-minute walk west of the Design Building along Morris Street which becomes University Avenue.

Saturday, 29 July

09:00–17:00: <u>Art Exhibition</u> open, Medjuck Building

09:15–12:00: Plenary Session 3, Irving Auditorium

- 09:15–09:30: **Announcements**
- 09:30–10:30: **Lisa Borden**: *<u>It All Began with a Quill Box: Reflections on Show Me Your Math</u>*
- 10:30–11:00: Coffee break
- 11:00–12:00: **Sarah Hart**: *<u>A Mathematical Journey Through Literature</u>*

12:00–14:00: Lunch Break

14:00–15:30: Regular Papers Session 11, Irving Auditorium

- 14:00–14:30: **André R. S. Marcal**: *<u>CollageBild: A System to Create Image Mosaics</u>*
- 14:30–15:00: **Douglas Dwyer**: *<u>Drawing with Statistics</u>*
- 15:00–15:30: **Lena Polke** (Chair): *<u>Parallelized Pixel Averaging for a Real-time Ornamental Pen</u>*

14:00–15:30: Regular Papers Session 12, B227

- 14:00–14:30: **Chamberlain Fong and Douglas Dunham**: *<u>Hyperbolic Flyby into a Schwarzian Expanse</u>*
- 14:30–15:00: **Vera Viana**: *<u>Materializing Daniele Barbaro's Creativity with 3D Printing</u>*
- 15:00–15:30: **Rinus Roelofs** (Chair): *<u>What if Albrecht Dürer had Unfolded Leonardo da Vinci's Elevated Polyhedra?</u>*

14:00–15:00: JMA Papers Session 3, B228

- 14:00–14:30: **Carolyn Yackel**: *<u>Representing Catalan Solids in Temari</u>*
- 14:30–15:00: **Susan Goldstine** (Chair) **and Carolyn Yackel**: *<u>A Mathematical Analysis of Mosaic Knitting: Constraints, Combinatorics, and Colour-Swapping Symmetries</u>*

14:00–15:30: Short Papers Session 7, B229

- 14:00–14:15: **Justin Dimmel, Eric Pandiscio, Gregory Ondo, and Samuel Hoey**: *<u>The Sun-Rule: An Interactive Mathematical Sculpture</u>*
- 14:15–14:30: **Paz Amsellem and Shai Gul**: *<u>Dynamical Tilings in Industrial Design</u>*

- 14:30–14:45: **Lingguo Bu**: *The Oloid and the Evertible Cube: 3D Design and Printing*
- 14:45–15:00: **Timea Tihanyi**: *Pathfinder: 3D Printing Data with Trigonometry and Chance*
- 15:00–15:15: **Nicholas Phillips**
  Realizing the Borromean Rings with Yosegi Zaiku
- 15:15–15:30: **Tom Verhoeff** (Chair): *The Looping Theorem in 2D and 3D Turtle Geometry*

14:00–15:30: Workshop 6, B225

Shiying Dong: *Sculpting Mapping Cylinders: Seamless Crochet of Topological Surfaces*
*Workshop limited to 24 participants. Experience with basic crochet is required. If you want to attend this workshop please learn and practice basic crochet before the conference. If you do not have experience with crochet, you are welcome to attend as an observer.

14:00–15:30: Workshop 7, B308

E. R. Lutken: *Subject, Structure, and Metaphor in Mathematical Poetry*
*Workshop limited to 20 participants.

15:30–16:00: Coffee Break

16:00–17:30: Regular Papers Session 13, B227

- 16:00–16:30: **Tara Taylor**: *Using Triangle Sierpinski Relatives to Visualize Subgroups of the Symmetries of the Square*
- 16:30–17:00: **Madonna Yoder**: *Design Equations for Grid-Based Origami Tessellations*
- 17:00–17:30: **Rachel Quinlan** (Chair): *Interchangeable Origami Wallpaper Patterns*

16:00–17:30: Regular Papers Session 14, B228

- 16:00–16:30: **Matt Zucker**: *A Foray Into Computer-Assisted Quilting*
- 16:30–17:00: **Megan Martinez and Amanda Taylor Lipnicki**: *Automating Crochet Patterns for Surfaces of Revolution*
- 17:00–17:30: **Amanda Lipnicki and Megan Martinez** (Chair): *Hooked on Calculus: Crocheting Quadric Surfaces*

16:00–17:00: Regular Papers Session 15, B229

- 16:00–16:30: **Martin Skrodzki** and **Henriette Lipschuetz**: *Graph Theory and Arts: A Course Retrospective*

- 16:30–17:00: **Andrew Simoson** (Chair): *Embroidery-Hooping toward the Hyperbolic Trochoid*

16:00–17:30: Short Papers Session 8, B225

- 16:00–16:15: **Stephen Abbott**: *The Turing Test on the Human Stage*
- 16:15–16:30: **Steve Pomerantz**: *Cosmatesque Mosaic and Conformal Mapping*
- 16:30–16:45: **Ben Gould and Jacob Gould**: *Designing and Building a Wearable 3×3×3 Puzzle Cube*
- 16:45–17:00: **Robert Bosch and Ilana McNamara**: *All (!) Three-Part Variations on Three Different Kinds of Cubes*
- 17:00–17:15: **Emanuel Jannasch**: *One and One Rarely Make Two: The Arithmetic of Compositional Emergence*
- 17:15–17:30: **Donald Spector** (Chair): *Sonifying Letter Frequencies: Generating Chord Sequences from Text*

16:00–17:30: Workshop 8, B308

Mircea Draghicescu: *Kinetic Knots*

17:30–18:30: The Centre Holds – John Macnab Exhibition Opening Reception, Studio 21 Fine Art, 5431 Doyle Street (one block north of the Medjuck Building)

18:30–20:00: Dinner Break

20:00–22:00: Formal Music Night, Irving Auditorium

Sageev Oore and Dani Oore: Disconnecting and Reconnecting Music and Math

Sunday, 30 July

09:00–15:00: Art Exhibition open, Medjuck Building

09:15–12:00: Plenary Session 4, Irving Auditorium

- 09:15–09:30: **Announcements**

- 09:30–10:30: **Laura Taalman**: Mathematical Technocraft
- 10:30–11:00: Coffee break
- 11:00–12:00: **Mathematical Theater**

12:00–14:00: Lunch Break

13:00–17:30: Family Day – **Halifax Central Library**

Lindsay Children's Room (second floor):
13:00–15:00 **Short Film Festival and Q&A with Creators**
15:30–17:30: **Poetry Reading**

O'Regan Hall (first floor):
13:00–17:00: **Hands-on workshops**

Medjuck Hall:
13:00–15:00: **Art Exhibition open to the public**

15:00: Art Exhibition Closes
15:00–17:00: Art Exhibition Break Down (exhibitors must remove pieces by 17:00)

17:00–20:00: Dinner Break

20:00–23:00: Informal Music Night, Irving Auditorium

Monday, 31 July

9:00–17:00: Optional Full Day Excursion to Mahone Bay, Lunenburg, and Peggy's Cove.

The excursion is not included in registration. ~~*All tickets for the excursion have been sold*~~. ***We have a few more tickets available for the Excursion!*** *If you are interested in purchasing excursion tickets, please fill out the* *waitlist form* *immediately. We expect these last few tickets will sell out quickly. For more information on the excursion see the* *Optional Excursion page*.