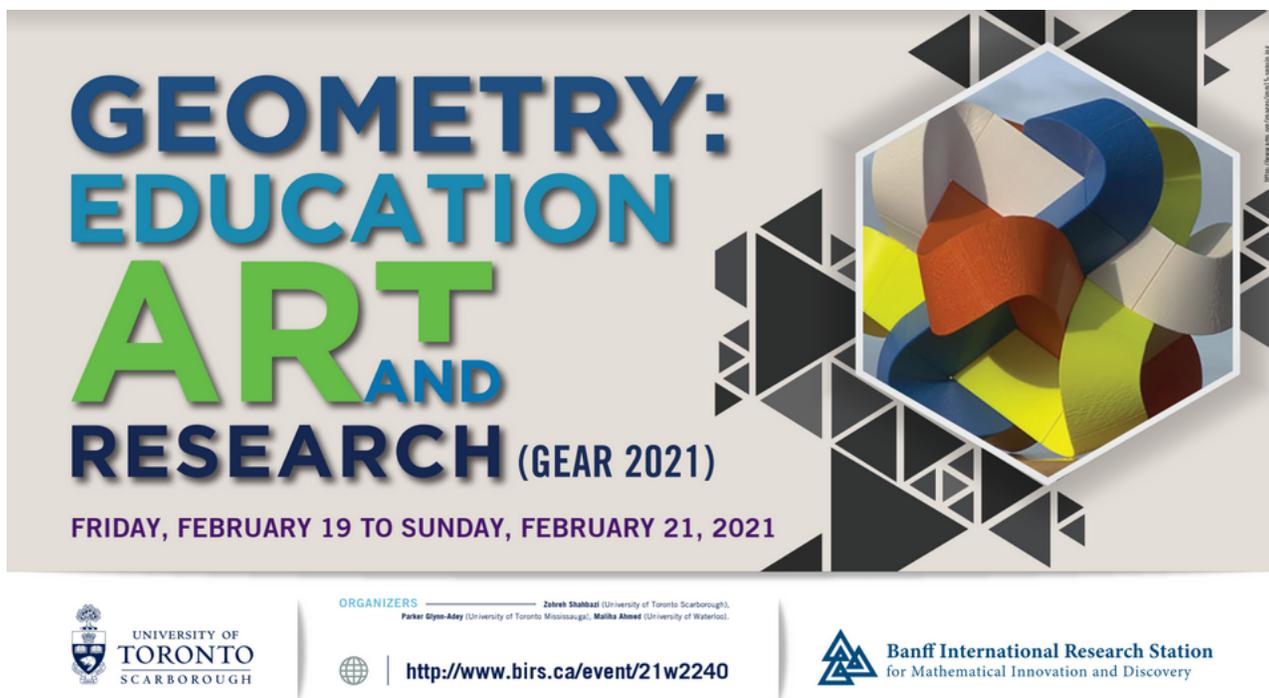


21w2240: Geometry: Education, Art, and Research

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February 19–21st 2021



Our goal for the Geometry: Education, Art, and Research online conference (GEAR2021) was to create a dialogue between researchers, educators, and artists. We aimed to provide a platform to present recent discoveries in geometry to the researchers, educators, artists, and the public via the arts and modern pedagogical approaches.

During the opening program on February 19th, each of the presenters and speakers took a few minutes to introduce themselves and briefly explained what they planned to present during their sessions. The format of the opening provided participants with the opportunity to learn more about each other's work and helped to foster future collaboration. There were 66 confirmed participants in total from various international institutes and organizations.

- The online format of the conference enabled participants from all over the world to easily attend. All sessions were recorded and the videos are available from BIRS website.
- We used a Slack channel to encourage participants to engage in ongoing discussions. Participants actively used the Slack channel and provided each other with interesting perspectives and additional information.
- Two graduate students presented their posters in breakout rooms on Zoom. Maliha Ahmed, one of the GEAR 2021 organizers, is currently a graduate student.
- We used a Google Jamboard to collect participants' creative work in research and geometry teaching. We used this material to create an art poster summarizing the conference. The poster is attached to this report.

GEAR2021 included seven parallel 50-minute workshops and two mini-courses. Each course included two 90-minute parts. In addition, we had eight 20-minute parallel talks, each with a 10-minute follow up question and answer period. In total, we had 17 hours of workshops, mini-courses, and talks. Video footage of the event is available on the BIRS website. The workshops and mini-courses were presented by artists, researchers and educators who work in the field of geometry from various public and private organizations and institutes. The topics covered included: Islamic geometric patterns [3], visualizing geometric spaces [1], origami [4], visual data analysis, dance and rotation groups [5], and wallpaper patterns [2]. As a result, presenters created an engaging and interesting experience which allowed us to identify common interests for exciting collaborations in the future. Presenters encouraged participants to publish in pedagogy and arts journals such as the *Journal of Mathematics and the Arts* and *For the Learning of Mathematics*. A review of GEAR2021 will be published in the *Journal of Mathematics and Arts*.

Additionally, two GEAR2021 presenters (Henry Segerman and Jayadev Athreya) are organizing a week-long graduate workshop for the summer of 2021. The *Illustrating Mathematics* workshop at the Park City Math Institute (PCMI) graduate summer school aims to bridge research and outreach in mathematics. GEAR2021 participants were encouraged to contribute to this event.

Our event concluded with a panel discussion with three panelists: Henry Segerman (Associate Professor of Mathematics at Oklahoma State University), Brian P. Katz (Professor of Mathematics Education at the California State University Long Beach), and Susan Gerofsky (Associate Professor of Curriculum and Pedagogy at the University of British Columbia).

The panelists shared their experiences using research and/or art to provide accessible and interesting content in their geometry courses. Participants discussed their approaches to bring research and teaching together using educational and artistic tools or models, differences that they recognized in their students' learning and attitudes when they teach concepts in an illustrative way by employing physical or artistic tools, and actions that they take to elevate public understanding and interest in mathematical developments.

The GEAR 2021 organizers are grateful for the opportunity to host such an exciting and interdisciplinary event at BIRS. We look forward to future collaborations, and an in-person meeting at BIRS sometime in the future.

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GEOOMETRY: EDUCATION ART AND RESEARCH

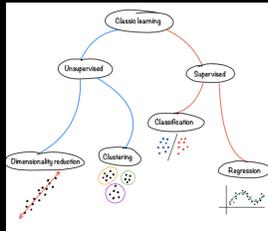
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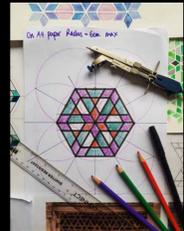
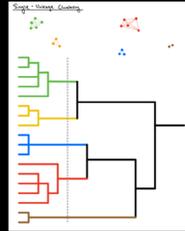
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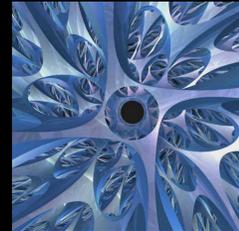
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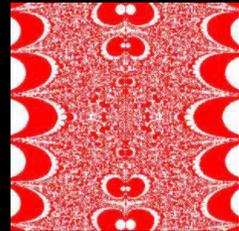
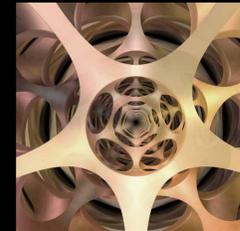
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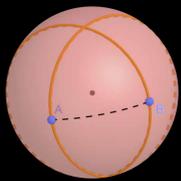
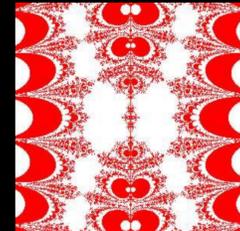
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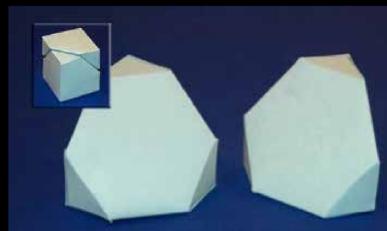
RÉMI COULON, SABETTA MATSUMOTO, HENRY SEGERMAN, AND STEVE TRETTEL



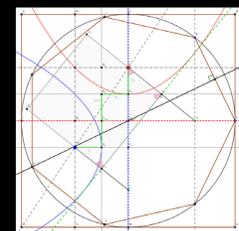
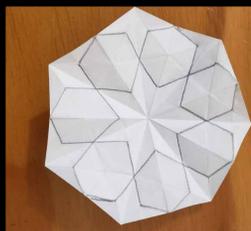
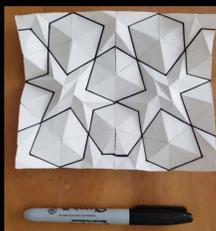
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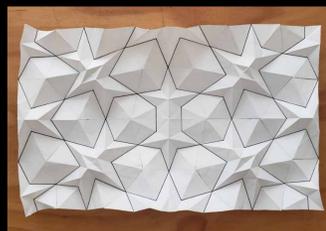
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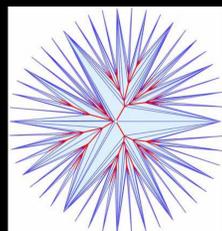
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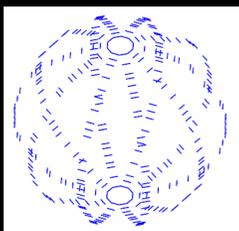
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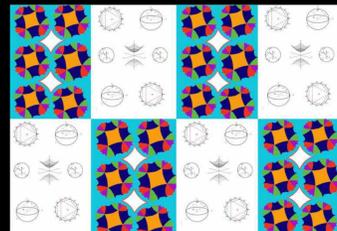
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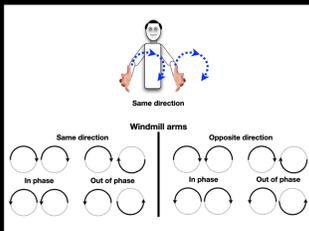
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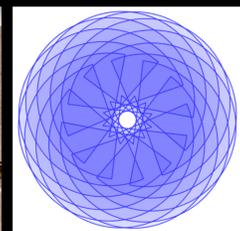
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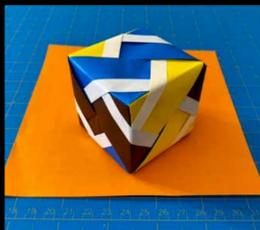
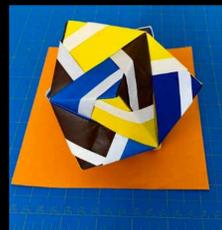
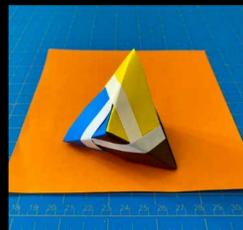
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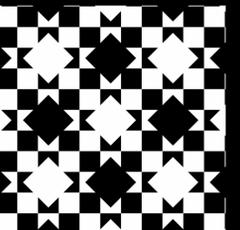
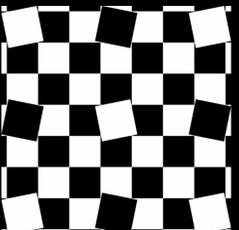
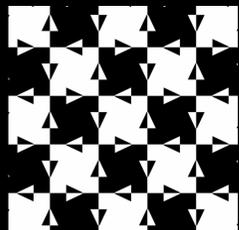
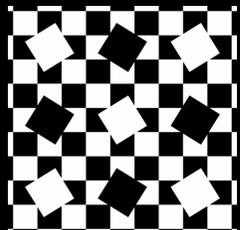
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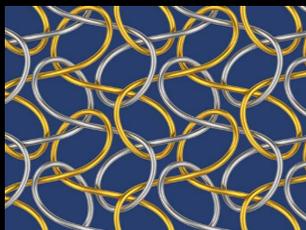
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CRAIG KAPLAN



FRANK FARRIS