Ross J. Cocks

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Artistic Practice

In the search for beauty, art and mathematics reveal themselves to be two sides of the same coin. As such, I move freely between them, manifesting mathematical art.

Overview _

- This is a hybrid document-merging the depth and rigor of my mathematical background with the creativity and vision of an artistic practice.
- Citations are in The Chicago Manual of Style (CMS).
- Although carefully curated, a significant portion of the work has been trimmed for brevity.
- For a more comprehensive overview of my work, please visit rossjcocks.com ∠.

Education

| MSc | University of New Mexico, Pure Mathematics | Sept 2023 |
|----------|--|-----------------------|
| | Thesis: In Progress | |
| BA | University of Toronto, Architectural Studies | Sept 2019 – June 2023 |
| | Honours with Distinction | |
| | • Thesis: Wieringa's Wall 🗹 | |
| | Advisor: Nicholas Hoban | |
| Dip. | International Career School Canada, Interior Decorating | Sept 2018 – June 2019 |
| Artis | tic Projects | |
| White | On White, On White (or Translation No. 02), July 27, 2023 | Project Details 🗹 |
| • [| Digital Mixed Media | |
| • E N | Exhibited on July 27, at the 2023 International Bridges Art Exhibition 🗹 in Halifax, NS, Canada. | |
| • / t | A depiction of the Riemann Sphere and a Hyperbolic Helicoid that has been put hrough a Mobius Transformation to counter Malevich's <i>White on White</i> (1918). | |
| • (| Currently in a private collection in Waterloo, ON, Canada. | |
| Wieri | nga's Wall, June 29, 2023 | Project Details 🗹 |
| • E | PS Foam, Formica, Acrylic Paint, Silicon | |
| • (| Inveiled June 29, 2023, at The Fields Institute 🗹 in Toronto, ON, Canada. | |
| • \ | Vall sculpture of 3D tiles that aids in both the aesthetics and acoustics of the room. Constructed using the <i>Cut and Project Method</i> of a 5D lattice. | |
| • [| Permanent installation found in Room 230. | |
| Saffm | an-Taylor in Color, October 28, 2022 | Project Details 🗹 |
| • (| Castor Oil, Glycerol, Water, Food Coloring, and Photographed Using a Nikon 5600 | |
| • (E | Inveiled October 28, 2022, at the Myhal Centre for Engineering Innovation and Entrepreneurship 🗹, in Toronto, ON, Canada. | |
| • / r | A collection (arranged mathematically) of captured moments of fluid injections performed within a Hele-Shaw Cell. | |

• Permanent installation found on third floor.

Hyperbolic Helicoid & Child Series, February 6 - August 1, 2022

- Digital Mixed Media
- Two separate vantage points of a pavilion constructed through an arrangement of a hyperbolic helicoid that has been put through a Mobius transformation.

Project Details 🗹

Project Details 🗹

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- Part 1: Unveiled August 1, at the 2022 International Bridges Art Exhibition ☑, in Helsinki, Finland.
- Currently on tour with Experience Workshop Global STEAM Network 🗹 in Finland.
- Part 2: Completed February 6, 2022.
- Currently in a private collection in Pittsburgh, PA, USA.

Sonata No. 02 - Op. 2021, April 6, 2022

- Digital Mixed Media
- Unveiled April 6, at the 2022 Joint Mathematics Meeting ☑ (Online due to COVID-19 Pandemic).
- Adaptation of the 2D Toothpick Sequence to three dimensions and integrated with a 3D Hilbert Curve to form an architectural framework, which is then placed through a Mobius Transformation.
- Currently in a private collection in Albuquerque, NM, USA.

Rhapsody No. 02 - Op. 2021, April 6, 2022

- Digital Mixed Media
- Unveiled April 6, at the 2022 Joint Mathematics Meeting 🗹 (Online due to COVID-19 Pandemic).
- Vantage point of a pavilion constructed through an arrangement of a gyroid that has been put through a deformation process.
- Currently in a private collection in Edmonton, AB, Canada.

Collaborative Projects

| Acoustic Resonator Vases, June 2, 2023 | Project Details 🗹 |
|---|-------------------|
| • Unveiled at The Canadian Clay & Glass Gallery 🗹. | |
| Part of the larger exhibition entitled, Robotic Clay: New Methods in Architectural Ceramics ☑, which lasted until September 10, 2023. | |
| Investigated the opportunities and limits presented by implementing the Kuka KR 150 R2700 Robot 2 on a KL4000 Linear Axis in clay extrusion for artistic and archi- tectural purposes. | |
| UR10 Workshop, June 12, 2022 | Project Details 🗹 |
| Three-day robotics workshop at Toronto Metropolitan University Z, in Toronto, ON, Canada. | |
| Investigated the opportunities and limits presented by implementing the UR10 Robotic Arm ² into art and architecture. | |
| Constructed sculpture now housed in Daphne Cockwell H. Sciences Complex Z. | |
| Mass Timber Sound Diffusers, June 4, 2022 | Project Details 🗹 |
| Investigated the opportunities and limits presented by implementing the Kuka KR 150 R2700 Robot C on a KL4000 Linear Axis in the CNC Milling of mass timber for astic and architectural purposes. | |
| | |

• Currently in a private collection in Toronto, ON, Canada.

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Presentations

Conference Talks

Wieringa Surface: The Implementation of Aperiodicity into Architectural Acoustics

July 5, 2023

June 29, 2023

Math 1130

Fall 2024

Spring 2025

Summer 2025

Course Details

- CAAD Futures 2023: INTERCONNECTIONS: Co-computing beyond boundaries 🗹 at TU Delft, Netherlands, July 5-7, 2023.
- Virtually presented a peer-reviewed contributing talk during the program's third session.
- Ten-minute presentation summarizing findings from a co-authored paper published in the CAAD Futures 2023 proceedings.
- Presentation Recording: Wieringa Surfaces ☑.

Public Lectures

Unveiling of Wieringa's Wall

• Invited lecture delivered at the unveiling of Wieringa's Wall **Z**. The talk explored the geometric and conceptual foundations of the work, highlighting the interplay between art, architecture, acoustics, and mathematics.

Publications _____

Periodicals

| Wieringa's Wall Lands at Fields | October 16, 2023 |
|--|------------------|
| Cocks, Ross J. "Wieringa's Wall Lands at Fields." <i>Fields Notes</i> 21, no. 3, October 16, 2023. Magazine Article 🗹 | |

Peer-Reviewed

| Wieringa S | urface: The In | plementation of Aperiodicity into Architectural Ac | coustics July 5, 2023 |
|------------|----------------|--|-----------------------|
| | | | |

Cocks, Ross, John Nguyen, and Brady Peters. "Wieringa Surface: The Implementation of Aperiodicity into Architectural Acoustics." In *International Conference on Computer-Aided Architectural Design Futures*, pp. 190-203. Cham: Springer Nature Switzerland, 2023. Conference Paper

Teaching

Instructor of Record

A Survey of Mathematics, University of New Mexico

- An introductory undergraduate mathematics course designed for non-STEM majors. The course emphasized conceptual understanding through real-world applications, theories, and methods.
- Topics: Graph Theory, Elementary Growth Models, Statistics and Probability, and a mathematical topic of the instructor's choosing.
- I selected Mathematical Art and designed the curriculum.
- The capstone was a visit to the UNM Art Museum 🗹 to view works in their collection related to math. Please check out the mini-documentary by Chris Gomez on the visit. Mini-Documentary 🗹

Honors Bestowed

Awards

Graduate Teaching Assistantship

· Competitive award providing stipend and full tuition support in recognition of academic excellence and teaching responsibilities.

University of Toronto Excellence Award (UTEA)

- · An extremely competitive award that provides opportunities for research experience at the undergraduate level in the Natural Sciences & Engineering (NSE), Social Sciences & Humanities (SSH), or Health & Life Sciences (HLS).
- At the time of receiving, each UTEA award was valued at a minimum of 7,500 CAD for the allotted summer.

Natural Sciences and Engineering Research Council of Canada (NSERC) Undergraduate Student Research Award (USRA)

- An extremely competitive national award that is intended to nurture interest and develop potential for a research career in health, natural sciences and engineering, or social sciences and humanities.
- At the time of receiving NSERC's URSA, the award was valued at 7,500 CAD for the allotted summer.

John & Myrna Daniels Foundation Opportunity Award

- · Awarded to students in the Honours Bachelor of Arts programs based on financial need and academic merit.
- Valued at 3,000 CAD at the time of receiving the award.

Kinsmen Canada Bursary

- Kin Canada Bursaries is a program of the Hal Rogers Endowment Fund.
- At the time of receiving the bursary, valued at 1,000 CAD, the award was bestowed on select Canadian students from coast-to-coast who were pursuing post-secondary education and based on academic merit.

Eugene L. Brody Award

- Established to perpetuate the memory of Eugene L. Brody, a student at the University of Alberta for twenty-three years, who had cerebral palsy and was able to make outstanding contributions in extra-curricular activities.
- At the time of receiving, four bursaries, valued at 1,000 CAD, were awarded each year to select students, as well as an engraved trophy.

Grants

| John H. Daniels Architecture, Landscape, and Design Undergraduate Grant | University of New Toronto |
|---|---------------------------|
| Competitive grant awarded to new or continuing undergraduate students in good academic standing enrolled in the Faculty's undergraduate programs. | August 2023 |
| • Grant received was 3,000 CAD and was used to partially fund Wieringa's Wall 🗹. | |

Scholarships

| International Amigo Scholarship | University of New Mexico |
|---|--------------------------|
| Most prestigious scholarship bestowed at the UNM, grants international students | August 2023 |
| (non-immigrant visa holders) the resident, in-state tuition rate. | |
| At the time of reacting the end of reacting in state taken rate. | |

At the time of receiving, the scholarship was valued at over 16,000 USD per year.

University of New Mexico

August 2023 - June 2027

University of Toronto

Natural Sciences and

Engineering Research Council of Canada (NSERC)

University of Toronto

Summer 2022

April 2022

Kin Canada

July 2017

September 2019

University of Alberta

Summer 2023

Alexander Rutherford Scholarship

• This scholarship was named in honour of Alexander Rutherford, who had the distinction of being Alberta's first Premier and Minister of Education and is to recognize and reward academic achievement of senior high school students.

• At the time of receiving, the scholarship was valued at 2,500 CAD.

Proficiencies _____

Languages: LaTeX, Python, Java, C#

Software: Rhino/Grasshopper, Twinmotion, Photoshop, Illustrator, InDesign, Premiere Pro, After Effects, Microsoft Suite

Technologies: 3D Printing, Waterjet Cutting, Laser Cutting, CNC Milling, Kuka Robotics, Algorithmic Design, Generative Art, Geometric Modeling

Traditional: Welding, Wood Sculpture, Epoxy Sculpting, Acrylic Painting, Clay, Architecture Model Construction

Affiliations _____

American Mathematical Society, Member2022 - PresentHatton Lab, University of TorontoFeb. 2022 - Aug. 2023Digital Fabrication Laboratory, University of TorontoSept. 2021 - Aug. 2023Golden Key International Honour Society, MemberSept. 2016 - Present

Media _____

A Survey of Mathematics, *Mini-Documentary*

• The capstone was a visit to the UNM Art Museum 🗹 to view works in their collection related to math. Please check out the mini-documentary by Chris Gomez on the visit. Mini-Documentary 🗹

References _____

Nicholas Hoban, Director of Applied Technologies and Lecturer

- 🖾 nicholas.hoban@daniels.utoronto.ca
- Thesis Advisor (September 2022 April 2023)
- Employer (September 2021 April 2023)
- Lecturer (Winter 2021)

John Nguyen, Architectural Acoustic Researcher

- ☑ jn495@cam.ac.uk
- Co-Author: Wieringa Surfaces: The Implementation of Aperiodicity into Architectural Acoustics (July 2023)
- Project Lead: Acoustic Resonator Vases (September 2022 June 2023)
- Project Lead: Mass Timber Sound Diffusers (May/June 2022)

University of Toronto

Date

University of Cambridge