

# Charlotte Aten

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## Education

- 2017–2022 **PhD in Mathematics**, *University of Rochester*, Rochester, NY.  
Thesis title: Finite Generation of Families of Structures Equipped with Compatible Group Actions
- 2014–2017 **Bachelor of Science in Mathematics (Honors)**, *University of Rochester*, Rochester, NY.
- 2012–2014 **Associate of Science in Mathematics**, *Monroe Community College*, Rochester, NY.  
Awarded with honors

## Research Interests

My research interests skew combinatorial and I have an affinity for universal algebra. On the algebro-topological side of combinatorics I like to study graphs/complexes/manifolds manufactured from (quasi)groups and on the analytic side I am interested in applications of the theory of multi-linear forms to sum-product phenomena in additive combinatorics. In either case, representation theory is always relevant.

## Publications and recent preprints

- Charlotte Aten and Alex Iosevich. “A multi-linear geometric estimate”. In: *arXiv e-prints* (Dec. 2021). arXiv: 2112.00810 [math.NT]
- Charlotte Aten and Semin Yoo. “Orientable smooth manifolds are essentially quasigroups”. In: *arXiv e-prints* (Oct. 2021). arXiv: 2110.05660 [math.RA]
- Charlotte Aten. “Multiplayer rock-paper-scissors”. In: *Algebra universalis* 81.3 (2020)
- Charlotte Aten. “Multiplayer Rock-Paper-Scissors”. In: *Algebras and Lattices in Hawai’i*. Ed. by Kira Adaricheva, William DeMeo, and Jennifer Hyndman. Apr. 2018, pp. 12–19
- C. Aten et al. “Tiling sets and spectral sets over finite fields”. In: *Journal of Functional Analysis* (Sept. 2015)

## Talks

- 2022 **Machine Learning Seminar**, *University of Denver*.  
Perceptrons and the Fundamental Theorem of Statistical Learning
- 2022 **Machine Learning Seminar**, *University of Denver*.  
PAC Learning
- 2022 **Algebra and Logic Seminar**, *University of Denver*.  
Invariants of Structures
- 2022 **Joint Mathematics Meetings 2022**.  
Distributive lattices in rock-paper-scissors
- 2022 **Panglobal Algebra and Logic Seminar (Spring)**, *University of Colorado at Boulder*.  
Orientable smooth manifolds are essentially quasigroups
- 2021 **Virginia Tech Analysis and Mathematical Physics Seminar (Fall)**, *Virginia Tech*.  
A multi-linear geometric estimate

- 2021 **Binghamton University's Graduate Conference in Algebra and Topology**, *Binghamton University*.  
Orientable smooth manifolds are essentially quasigroups
- 2021 **SUMS Math Talk**, *University of Rochester*.  
My Hawai'ian Earring
- 2021 **New York Combinatorics Seminar (Spring)**, *The City University of New York*.  
Multiplayer rock-paper-scissors
- 2021 **Rochester Combinatorics Seminar (Spring)**, *University of Rochester*.  
Universal algebra gives universal approximation for neural nets
- 2021 **Panglobal Algebra and Logic Seminar (Spring)**, *University of Colorado at Boulder*.  
Multiplayer rock-paper-scissors
- 2020 **Binghamton University's Graduate Conference in Algebra and Topology**, *Binghamton University*.  
Multiplayer rock-paper-scissors
- 2020 **SUMS Math Talk**, *University of Rochester*.  
A High School Algebra Problem
- 2019 **Graduate Student Seminar (Fall)**, *University of Rochester*.  
More Multiplayer Rock-Paper-Scissors
- 2018 **Binghamton University's Graduate Conference in Algebra and Topology**, *Binghamton University*.  
Topological Lattices and Book Spaces
- 2018 **Graduate Student Seminar (Fall)**, *University of Rochester*.  
Classifying Topological Magmas
- 2018 **Algebras and Lattices in Hawai'i**, *University of Hawai'i at Manoa*.  
Multiplayer Rock-Paper-Scissors
- 2018 **Graduate Student Seminar (Spring)**, *University of Rochester*.  
Multiplayer Rock-Paper-Scissors
- 2017 **Binghamton University's Graduate Conference in Algebra and Topology**, *Binghamton University*.  
Universal Algebra and Boolean Semilattices
- 2017 **Graduate Student Seminar (Fall)**, *University of Rochester*.  
A Brief Introduction to Universal Algebra
- 2017 **Senior thesis presentation**, *University of Rochester*.  
The Topology of Magmas
- 2017 **Nebraska Conference for Undergraduate Women in Mathematics**.  
Poster: Relational Structures as Directed Hypergraphs
- 2016 **National Conference on Undergraduate Research**, *University of North Carolina at Asheville*.  
The Topology of Magmas
- 2016 **National Conference for McNair Scholars**, *University of Maryland*.  
Topological Algebra: On Viewing Operations as Simplicial Complexes
- 2015 **David T. Kearns Center Research Symposium**, *University of Rochester*.  
Constructions of Geometric Objects Encoding Algebraic Structures

- 2014 **Scholars' Day**, *Monroe Community College*.  
Division by Zero: Development of a Relevant Algebra with Historical Context
- 2013 **Math Awareness Month**, *Monroe Community College*.  
An Introduction to Hyperspace with a Construction of the 4-Cube

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## Events Hosted

- 2019 **Pi Day**, *University of Rochester*.  
Mathematical art exhibit and student poster session.
- 2014 **Math Awareness Month**, *Monroe Community College*.  
Interactive Math Day

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## Other Conferences Attended

- 2017 **Joint Mathematics Meetings**, *Atlanta, GA*.

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## Honors and Awards

- 2017 **Provost's Fellowship**, *University of Rochester*.  
Fellowship awarded to broaden the diversity of graduate students at the university.
- 2017 **Doris Ermine Smith Award**, *University of Rochester*.  
Award given in recognition of students who show significant achievement in the areas of French and/or Mathematics.
- 2015 **McNair Scholar**, *University of Rochester*.  
United States federal program which prepares underrepresented undergraduate students for doctoral studies.
- 2014 **Xerox STEM Scholarship**, *Monroe Community College*.  
Scholarship created to support Monroe County residents who will pursue careers in STEM.
- 2013 **Jan Z. Wiranowski Renaissance Scholarship**, *Monroe Community College*.  
Scholarship created to assist high-achieving students who will pursue careers in mathematics or a mathematics-related field.

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## Teaching

- Winter 2023 **MATH 1150 Social Choice Theory**, *University of Denver*.
- Fall 2020 **MATH 2060 Elements of Linear Algebra**, *University of Denver*.
- Fall 2022 **MATH 1951 Calculus I**, *University of Denver*.
- Spring 2022 **Grader for MTH 240 Topology**, *University of Rochester*.
- Fall 2021 **TA for MTH 208 Operations Research**, *University of Rochester*.
- Summer 2021 **Instructor for MTH 165 Linear Algebra with Differential Equations**, *University of Rochester*.
- Spring 2021 **Instructor for informal representation theory reading course**, *University of Rochester*.  
Taught representation theory to undergraduate math student David Crncevic.
- Spring 2021 **Workshop TA for MTH 161 Calculus IA**, *University of Rochester*.
- Spring 2021 **Grader for MTH 248 Graph Theory**, *University of Rochester*.  
Graded homework assignments.
- Fall 2020 **Grader for MTH 165 Linear Algebra with Differential Equations**, *University of Rochester*.
- Summer 2020 **Instructor for MTH 162 Calculus IIA**, *University of Rochester*.

- Spring 2020 **Recitation TA for MTH 162 Calculus IIA**, *University of Rochester*.  
Fall 2019 **Recitation TA for MTH 164 Multidimensional Calculus**, *University of Rochester*.  
Spring 2019 **Grader for MTH 248 Graph Theory**, *University of Rochester*.  
Graded homework assignments.  
2014–2016 **Tutor**, *University of Rochester Center for Excellence in Teaching and Learning*.  
Peer tutor for mathematics courses.

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## Outreach

- Summer 2021 **Python instructor and project leader for Tripods NSF REU/Grad for All 2021**, *University of Rochester/Cornell University*.  
Guided coding sessions and initiated an ongoing research project on a connection between neural nets and universal algebra.
- Summer 2020 **Python instructor and Mentor for Tripods NSF REU/Grad for All 2020**, *University of Rochester/Cornell University*.  
Guided coding sessions, wrote example code and exercises, and mentored undergraduates from underrepresented groups attending local colleges.
- Summer 2018 **Teaching Assistant for Grad STEM for All**, *University of Rochester*.  
Lectured, guided problem sessions, and mentored undergraduates from underrepresented groups attending local colleges.
- Fall 2017 **Tutor for Upward Bound**, *University of Rochester Kearns Center*.  
Volunteer tutor for underrepresented high school students.

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## Organizations

- 2021–2022 **outGRADS Treasurer**, *University of Rochester*.  
outGRADS is a queer graduate student affinity organization founded in 2021.
- 2018–2022 **AMS Graduate Student Chapter President**, *University of Rochester*.
- 2013–2014 **Math Club President**, *Monroe Community College*.
- 2012–2013 **Math Club Treasurer**, *Monroe Community College*.