

# Riley Chinburg

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## Education

### Oberlin College – Oberlin OH

August 2018 - June 2022

*Bachelor of Arts, Double Major in Math and Computer Science*  
Minor in Gender, Sexuality, and Feminist Studies

## Research

### Research Assistant to Oberlin Computer Science Professor Sam Taggart

May 2022 - Present

It is well known that two round repeated sales auctions have a pooling equilibrium when the seller's value distribution is  $U[0,1]$ . This research asks how the equilibrium would be affected if the seller were given a cost to store the data. Specifically, the seller's cost to store is chosen from a distribution and we determine when there is still a pooling equilibrium and how this distribution affects the seller's expected payoff. This has implications for determining the value of past data in repeated auctions such as ad space auctions.

### Oberlin College Honors in Mathematics

October 2021 – June 2022

The chromatic symmetric function(CSF) of a graph is a graph invariant that encodes information about the proper colorings, number of triangles, matchings, and spanning trees of the graph as well as other properties. This research looked at these properties and determined how to find such properties of the graph based on coefficients of the Schur symmetric functions and power sum symmetric functions in the CSF. To learn about this topic I had to build up a knowledge of representation theory, representations of symmetric groups, and how these relate to the symmetric functions.

### Oberlin College Winter Term math research program

January 2020

A still unsolved problem in graph theory asks whether a Moore graph of degree 57 and girth 5 exists. Moore graphs are graphs that in some sense have a maximum number of vertices given the degree and girth. The Hoffman-Singleton Theorem completely categorizes the Moore graphs but leaves the existence of this one graph unanswered. My research with Prof. Calcut attempted to find lower bounds on the number of possible edge matchings between groups of vertices in the graph. This would reduce the time necessary to search for the missing Moore graph computationally.

## Computer Skills

Sage ♦ Julia ♦ Mathematica ♦ MATLAB ♦ LaTeX ♦ Python ♦ Java ♦ R ♦ Scheme ♦ Linux/BASH

## Related Coursework

Group Theory ♦ Number Theory ♦ Cryptography ♦ Complex Analysis ♦ Measure Theory ♦ Topology ♦ Probability Theory ♦ Complexity Theory ♦ Artificial Intelligence

## Related Experience

### Center for Learning, Education, and Research in the Sciences

February – June 2022

*Workshop Leader/Designated Tutor for Theory of Computation Course*

Led twice weekly educational workshops to assist students of all levels attain course proficiency

Taught two class sessions for professor McKay

### Oberlin Center for Information Technology

September 2019 – June 2022

*Student Network Assistant*

Maintained and updated wireless and wired broadband infrastructure on campus

## Additional Experience

### Oberlin Math Major's Committee

Feb 2019 - June 2022

*Chair*

- Planning weekly Math Tea events to build community among math students and faculty
- Liaison between faculty and students
- Planning a yearly department T-shirt
- Organizing math talks by faculty twice a semester
- Holding weekly meetings with the committee

### Oberlin Student Cooperative Association

October 2021-June 2022

*Member of Keep Housing and Dining Coop*