

Rachel Jade Domagalski

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SUMMARY

Mathematician with PhD expected in August 2021, skilled in social network analysis, graph theory, and combinatorics. Passionate about communicating science to the public. Looking for opportunities to use my analytical skills and creatively problem solve in a collaborative industrial setting.

EXPERIENCE

The Backbone of a Weighted Graph

2018 - 2021

- Designed methods for finding statistically significant edges of weighted graphs, specifically bipartite projections.
- Implemented new and existing methods in the R package `backbone`, which I am author and maintainer.
- The `backbone` package is highly downloaded and actively used within the network science community and I strive to create materials that make it easy to access and use.
- This research is funded by Natural Science Foundation Grants #1851625 and #2016320.

Permutation Statistics and Patterns

2020 - 2021

- Cyclic pattern avoidance – found and proved the number of permutations that avoid different pairs and triples of length four cyclic patterns, proved a cyclic version of the Erdős-Szekeres theorem, found the generating functions for cyclic descents over certain avoidance sets.
- Pinnacle sets – proved a bijection between admissible pinnacle sets and ballot numbers.
- Experience collaborating with large research team, coordinating with members in multiple locations.

The Erdős Institute's Data Science Boot Camp

May 2021

- Month long boot camp on data science and machine learning, including supervised learning algorithms for regression and classification, forecasting for time series data, dimensionality reduction, and neural networks.
- Completed a corporate sponsored project with three other participants called “ClassifyMyMeds: Predicting Prior Authorization Approval and Volume”, which won 3rd place out of 50 teams.

INVOLVEMENT

American Mathematical Society Graduate Student Chapter

2018 - 2021

- Founded the Student Chapter at Michigan State University
- President: August 2019 – August 2020
- Organized speakers, community events and conference travel
- Lead workshops to teach student body how to use Git, GitHub, Zotero, and LaTeX

Cloud Computing Fellow

2019 - 2020

- Research opportunity including workshops on aspects of cloud-based computing and hands-on support for optimizing my research for cloud computing, through Michigan State University's Cyber-Enabled Research group
- Learned how to use Microsoft Azure and develop cloud-based workflows.

Social Science Data Analytics Member

2019 – 2021

- Member of student engagement program to prepare future data scientists to take on social science questions.
- First place winner and popular vote winner for 2019 data visualization contest

SKILLS

Languages & Tools: R, Python, Mathematica, Git, GitHub, LaTeX, Jupyter, Excel, Microsoft Azure Cloud Computing

Analytical Skills: Social Network Analysis, Graph Theory, Combinatorics, Linear Algebra, Machine Learning, Generalized Linear Models and Regression, Probability Theory, Data Visualization, Science Communication

EDUCATION

Michigan State University

Doctor of Philosophy in Mathematics

East Lansing, MI

Expected August 2021

Central Michigan University

Master of Arts in Mathematics

Mount Pleasant, MI

May 2017

Bachelor of Science in Mathematics, Summa Cum Laude

May 2016