



Samuel Kroger

Computational Applied Mathematics & Operations Research
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EDUCATION

- **Rice University, Houston, Texas** 2019-2024
PhD in Computational Applied Mathematics & Operations Research
Dissertation: *Clique relaxations and the Minority Districting Problem*
Committee: Dr. Illya V. Hicks (chair), Dr. Andrew J. Schaefer, Dr. Arlei Silva, Dr. Hamidreza Validi
- **Rice University, Houston, Texas** 2019-2022
Master in Computational and Applied Mathematics
Dissertation: *The Maximum Anchored k -core Problem: Integer Programming Formulations*
Committee: Dr. Illya V. Hicks (chair), Dr. Andrew J. Schaefer, Dr. Arlei Silva
- **Bates College, Lewiston, Maine** 2016-2019
Bachelor of Arts (Pure Mathematics)

RESEARCH INTERESTS

US Political Redistricting, Graphs/Networks, Mixed Integer Programming, Gubernatorial Optimization

PUBLICATIONS

Under Review

- S. Kroger, H. Validi, I. Hicks. A polytime preprocess algorithm for the maximum cardinality independent set problem, submitted to *Optimization Letters* in Summer 2023
- S. Kroger, H. Validi, I. Hicks. Maximizing resilience in large-scale social networks, submitted to *INFORMS Journal on Optimization* in Summer 2022

In Preparation

- S. Kroger, H. Validi, T. Perini, I. Hicks. In pursuit of compact Black-majority districting plans, planned submission to *Operations Research* in Fall 2023
- S. Kroger, A. Silva, I. Hicks. The collapsed k -core problem applications in epidemiology and the power grid, planned submission to *Networks* in Spring 2024

TEACHING

- Center for Teaching Excellence certification** Fall 2022 - Fall 2024
Completed a four course program to prepare graduate students to teach. We studied publications in the science of teaching and learning, and taught mock classes which peers evaluated. I designed a flipped course on Graph Theory.
- Instructor of record: Matrix Analysis** Summer 2023
A ten week undergraduate course covering proof writing, linear algebra, matrix decompositions and algorithms. Students came from many disciplines including: computer science, biology, pure math, and applied math. ADD SENTENCE ONCE GET INSTRUCTOR EVALUATIONS.
- Teachers Assistant: Matrix Analysis for Data Science** Spring 2021, Spring 2023
Served twice as teacher's assistant. In the Spring of 2021, my main responsibility were holding project sessions - the class was divided into groups of 3 which would meet with me to work on small group projects. In the Spring of 2023, I held recitations and office hours weekly.
- Teachers Assistant: Matrix Analysis** Fall 2021
I held virtual and in person office hours for a large undergraduate course. I was also responsible for grading the midterm and final.
- Grader: Matrix Analysis, Stochastic Models, Matrix Analysis for Data Science, Graph Theory** Fall 2019, 2020, 2022
For each of these classes I was responsible for grading homework, midterms, and final exams. Graph Theory was a graduate level course, Stochastic models was available to undergraduate and graduate students and Matrix Analysis and Matrix Analysis for Data Science were undergraduate level courses.

SERVICE

- Reviewer for *Socio-Economic Planning Sciences*,** 2023
Served as a reviewer for the journal *Socio-Economic Planning Sciences*
- CMOR Colloquium Committee,** Summer 2022
I represented the CMOR graduate student body in a departmental meeting on the upcoming 2022 colloquium schedule.
- CMOR Graduate student recruiter,** 2022
I worked on the 2022 CMOR graduate recruitment weekend. I helped plan the recruitment weekend by organizing tours, meals, and events for CMOR graduate prospective students.
- INFORMS annual meeting session chair,** 2022
Organized and chaired a session titled **Network Analysis** for the 2022 INFORMS annual meeting.
- Reviewer for *Networks*,** 2022
Served as a reviewer for the journal *Networks*.
- INFORMS annual meeting session chair,** 2021
Organized and chaired a in person and virtual session titled **Network Optimization and its Applications** for the 2021 INFORMS annual meeting.

CONFERENCE PRESENTATIONS AND INVITED TALKS

- S. Kroger, A. Silva, I. Hicks. The collapsed k -core problem. 2023 INFORMS Annual Meeting, Phoenix, AZ, October 15th, 2023
- S. Kroger, H. Validi, T. Perini I. Hicks. In pursuit of compact black-majority districting plans. 2023 INFORMS Annual Meeting, Phoenix, AZ, October 15th, 2023
- Teaching effectiveness colloquium. 2023 INFORMS Annual Meeting, Phoenix, AZ, October 14th, 2023
- S. Kroger, H. Validi, T. Perini I. Hicks. A benders decomposition approach for solving the majority-minority districting problem. 2022 INFORMS Annual Meeting, Indianapolis, IN, October 16th, 2022
- S. Kroger, H. Validi, T. Perini I. Hicks. A decomposition approach for solving the majority-minority districting problem. 2022 INFORMS Computing Society conference, Tampa, FL, January 24th, 2022
- S. Kroger, H. Validi, I. Hicks. MIP formulations for solving the maximum anchored k -core problem. 2021 INFORMS Annual Meeting, Anaheim, CA, October 24, 2021

REFERENCES

Dr. Illya V. Hicks, Professor and CMOR Department Chair
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