

ALEXANDER NICHOLAS SIETSEMA

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RESEARCH INTERESTS

Numerical Linear Algebra, Optimization, Machine Learning, Data Science, Applications.

CITIZENSHIP

USA

EDUCATION

Ph.D., Computational and Applied Mathematics (in progress) <i>University of California, Los Angeles</i>	2022 – present Los Angeles, CA
M.A., Computational and Applied Mathematics <i>University of California, Los Angeles</i>	2022 – 2024 Los Angeles, CA
B.S., Advanced Mathematics; B.S., Computational Mathematics <i>Michigan State University</i> <i>Dual-enrolled during high school</i>	2018 – 2022 East Lansing, MI 2017 – 2018
Lansing Community College <i>Dual-enrolled during high school</i>	Lansing, MI 2016 – 2017

PUBLICATIONS

JOURNAL PUBLICATIONS

1. Benjamin Jarman, Lara Kassab, Deanna Needell, Alexander Sietsema - “Stochastic Iterative Methods for Online Rank Aggregation from Pairwise Comparisons.” In review, BIT Numerical Mathematics. 2024.
2. Rachel Domagalski, Jinting Liang, Quinn Minnich, Bruce E. Sagan, Jamie Schmidt, Alexander Sietsema - “Cyclic Shuffle Compatibility.” Séminaire Lotharingien de Combinatoire, vol. 85, 2021.
<https://www.mat.univie.ac.at/~slc/wpapers/s85domasaga.pdf>
3. Rachel Domagalski, Sergi Elizalde, Jinting Liang, Quinn Minnich, Bruce E. Sagan, Jamie Schmidt, Alexander Sietsema - “Cyclic Pattern Containment and Avoidance.” Advances in Applied Mathematics, vol. 135, 2022. <https://www.sciencedirect.com/science/article/abs/pii/S019688582200001X>
4. Domagalski, Jinting Liang, Quinn Minnich, Bruce E. Sagan, Jamie Schmidt, Alexander Sietsema - “Pinnacle Set Properties, 2021.” Discrete Mathematics, vol. 345, iss. 7, 2022.
<https://www.sciencedirect.com/science/article/abs/pii/S0012365X22000887>

CONFERENCE PUBLICATIONS

1. Alexander Sietsema, Zerrin Vural, James Chapman, Yotam Yaniv, Deanna Needell - “Stratified Non-Negative Tensor Factorization.” Submitted, Proc. 56th Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, 2024
2. Alexander N. Sietsema, Michael T. McCann, Marc L. Klasky, Saiprasad Ravishankar - “Comparing One-step and Two-step Scatter Correction And Density Reconstruction In X-Ray CT.” 7th International Conference on Image Formation in X-Ray Computed Tomography, vol. 12304, 2022.
<https://www.spiedigitallibrary.org/conference-proceedings-of-spie/12304/2647151/Comparing-one-step-and-two-step-scatter-correction-and-density/10.1117/12.2647151.full?SS0=1>

TEACHING EXPERIENCE

Python With Applications II Teaching Assistant <i>Wrote discussion materials, led discussion sessions, evaluated student projects.</i>	Spring 2023 – Spring 2024
Python With Applications I Teaching Assistant <i>Wrote discussion materials, led discussion sessions, graded exams, led study sessions.</i>	Fall 2022, Winter 2023, Spring 2024
Honors Linear Algebra Undergraduate Learning Assistant <i>Led recitation sessions, graded homeworks, tests, exams, led study sessions, held LaTeX learning sessions.</i>	Fall 2021
Calculus I Course Assistant <i>Answered questions on Piazza, led biweekly help sessions for students, graded exams.</i>	Spring 2020
Calculus II Undergraduate Learning Assistant <i>Supervised two sections, led recitations sessions, led special review sessions, graded labs, quizzes, and exams.</i>	Fall 2019

PRESENTATIONS / POSTERS

CONFERENCE / POSTER PRESENTATIONS

Stochastic Iterative Methods for Online Rank Aggregation from Pairwise Comparisons <i>'Research in the Age of AI' Symposium</i>	February 2024
Comparing One-Step and Two-Step Descattering and Reconstruction <i>CT Meeting 2022, CMSE Department Student Research Symposium</i>	June 2022
An Algorithm For Counting Admissible Pinnacle Orderings <i>Permutation Patterns 2021 (Univ. of Strathclyde Combinatorics Group)</i>	June 2021
Semi-Supervised Learning <i>Michigan State University Undergraduate Research and Arts Forum</i>	April 2021
Pattern Avoidance in Cyclic Permutations <i>Joint Mathematics Meetings Poster Session, JMU SUMS Poster Session</i>	January 2021
A Cyclic Variant of the Erdős-Szekeres Theorem <i>Joint Mathematics Meetings Poster Session, JMU SUMS Poster Session</i>	January 2021
Pattern Avoidance in Cyclic Permutations <i>SUMS Conference at James Madison University</i>	November 2020

SEMINAR PRESENTATIONS

A Stochastic Subtraction Game <i>MSU Risk Management and Sports Analytics Group presentation</i>	March 2022
Optimizing Point-After Attempt Strategies for College Football <i>MSU Risk Management and Sports Analytics Group presentation</i>	December 2021
One-Step and Two-Step Descattering <i>Signals, Learning, and Imaging Group presentation</i>	October 2021
Kaczmarz Methods and Best Linear Unbiased Estimators <i>Signals, Learning, and Imaging Group presentation</i>	September 2021
Pattern Avoidance in Cyclic Permutations <i>Department of Mathematics Graduate And Undergraduate Student Seminar</i>	January 2021
Nearest-Neighbor Sampling Densities and Descattering Performance <i>Signals, Learning, and Imaging Group presentation</i>	December 2020
Iterative Methods for Descattering <i>Signals, Learning, and Imaging Group presentation</i>	September 2020
Descattering with a Gaussian Kernel <i>Signals, Learning, and Imaging Group presentation</i>	July 2020

HONORS

Outstanding Poster	2021
<i>Joint Mathematics Meetings Poster Session, "Pattern Avoidance in Cyclic Permutations"</i>	
Honorable Mention Poster	2021
<i>Joint Mathematics Meetings Poster Session, "A Cyclic Variant of the Erdős-Szekeres Theorem"</i>	
Herbert T. Graham Scholarship	2020, 2021, 2022
<i>Department of Mathematics Award</i>	
Paul and Wilma Dressel Endowed Scholarship	2019
<i>Department of Mathematics Award</i>	
FAITH Endowment Scholarship for Academic Excellence	2018 – 2022
<i>Endowment for Greek Orthodoxy and Hellenism</i>	
Dr. Helene Tzitsikas Education Scholarship	2018
<i>Holy Trinity Greek Orthodox Church Parish Award</i>	
Michigan State University Alumni Distinguished Freshman	2018 – 2022
<i>University full-tuition scholarship</i>	
Dean's List	2018 – Present
<i>(all undergraduate semesters)</i>	

TECHNICAL SKILLS

Languages: Python, Matlab, R, L^AT_EX, Julia, C++, C#
Libraries: Pandas, NumPy, itertools, Matplotlib, Seaborn, Plotly, scikit-learn, SciPy, Statsmodels, BeautifulSoup, Requests, Selenium, Scrapy, Tensorflow, Keras, PyTorch, Anaconda

PROJECTS

Honors Senior Thesis	Spring 2022
<i>Advisor: Albert Cohen</i>	
Exploring game theoretic properties and theorems for an novel stochastic variant of the classical subtraction game, including optimal move selection and conditions for excluding available moves.	
Projects in Industrial Mathematics	Spring 2022
<i>Advisor: Peiru Wu</i>	
Creating a data handling pipeline for hospital Medicare and Medicaid cost reports, as well as investigating trends in those reports. Industry project with The Rybar Group.	
Appelö High Order Group	Fall 2021
<i>Advisor: Daniel Appelö</i>	
Developing and analyzing computational tools for quantum computing applications.	
MSU Risk Management and Sports Analytics Group	Fall 2021
<i>Advisor: Albert Cohen</i>	
Developing new methods for optimal decision making for two-point conversion attempts in American football; analyzing the effects of fights in hockey on the outcomes of games.	
UCLA Computational and Applied Mathematics REU	Summer 2021
<i>Advisor: Jamie Haddock</i>	
Exploring Kaczmarz methods for inconsistent and corrupted linear systems and their connections to maximum likelihood estimation techniques for ranking sports teams.	
Department of Mathematics Exchange Program	Spring 2021
<i>Advisor: Ekaterina Rapinchuk</i>	
Exploring methods and tools for semi-supervised learning and graph-based learning.	
Combinatorics Research	Fall 2020 – Summer 2021
<i>Advisor: Bruce Sagan</i>	
Proving new results on shuffle sets, permutation statistics, and pattern avoidance for cyclic permutations.	
MSU Signals, Learning, and Imaging Group	Spring 2020 – Spring 2022
<i>Advisor: Saiprasad Ravishankar</i>	
Investigating algorithms for correcting scattering artifacts in MeV tomography measurements in collaboration with researchers at Los Alamos National Laboratories. Additionally, considering data-driven algorithms to solve compressed sensing problems.	