Alexander Nicholas Sietsema

Los Angeles, CA | alexsietsema@ucla.edu | 517-993-7582
https://www.alexsietsema.com
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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) 2022 – present
University of California, Los Angeles Los Angeles, CA

M.A., Computational and Applied Mathematics 2022 – 2024
University of California, Los Angeles Los Angeles, CA

B.S., Advanced Mathematics; B.S., Computational Mathematics 2018 – 2022
Michigan State University East Lansing, MI
Dual-enrolled during high school 2017 – 2018

Lansing Community College Lansing, MI
Dual-enrolled during high school 2016 – 2017

Publications

Journal Publications

1. Benjamin Jarman, Lara Kassab, Deanna Needell, Alexander Sietsema - "Stochastic Iterative Methods for Online Rank Aggregation from Pairwise Comparisons." BIT Numerical Mathematics vol. 64, 2024. https://link.springer.com/article/10.1007/s10543-024-01024-x

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." To appear, Proc. 58th Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, 2024. https://arxiv.org/abs/2411.18805

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?SSO=1

Teaching Experience

Python With Applications II Teaching Assistant Spring 2023 – Winter 2025
Wrote discussion materials, led discussion sessions, evaluated student projects.

Python With Applications I Teaching Assistant Fall 2022, Winter 2023, Spring 2024
Wrote discussion materials, led discussion sessions, graded exams, led study sessions.

Honors Linear Algebra Undergraduate Learning Assistant Fall 2021
Led recitation sessions, graded homeworks, tests, exams, led study sessions, held LaTeX learning sessions.

Calculus I Course Assistant Spring 2020
Answered questions on Piazza, led biweekly help sessions for students, graded exams.

Calculus II Undergraduate Learning Assistant Fall 2019
Supervised two sections, led recitations sessions, led special review sessions, graded labs, quizzes, and exams.

Presentations / Posters

Conference / Poster Presentations

Stratified Non-Negative Tensor Factorization October 2024
Asilomar Conference on Signals, Systems, and Computers

Stochastic Iterative Methods for Online Rank Aggregation from Pairwise Comparisons February 2024
'Research in the Age of AI' Symposium

Comparing One-Step and Two-Step Descattering and Reconstruction June 2022
CT Meeting 2022, CMSE Department Student Research Symposium

An Algorithm For Counting Admissible Pinnacle Orderings June 2021
Permutation Patterns 2021 (Univ. of Strathclyde Combinatorics Group)

Pattern Avoidance in Cyclic Permutations January 2021
Joint Mathematics Meetings Poster Session, JMU SUMS Poster Session

A Cyclic Variant of the Erdős-Szekeres Theorem January 2021
Joint Mathematics Meetings Poster Session, JMU SUMS Poster Session

Pattern Avoidance in Cyclic Permutations November 2020
SUMS Conference at James Madison University

Seminar Presentations

A Stochastic Subtraction Game March 2022
Department of Mathematics Graduate And Undergraduate Student Seminar

Semi-Supervised Learning April 2021
Michigan State University Undergraduate Research and Arts Forum

Pattern Avoidance in Cyclic Permutations January 2021
Department of Mathematics Graduate And Undergraduate Student Seminar

Honors

Outstanding Poster 2021
Joint Mathematics Meetings Poster Session, "Pattern Avoidance in Cyclic Permutations"

Honorable Mention Poster 2021
Joint Mathematics Meetings Poster Session, "A Cyclic Variant of the Erdős-Szekeres Theorem"

Herbert T. Graham Scholarship 2020, 2021, 2022
Department of Mathematics Award

Paul and Wilma Dressel Endowed Scholarship 2019
Department of Mathematics Award

FAITH Endowment Scholarship for Academic Excellence 2018 – 2022
Endowment for Greek Orthodoxy and Hellenism

Dr. Helene Tzitsikas Education Scholarship 2018
Holy Trinity Greek Orthodox Church Parish Award

Michigan State University Alumni Distinguished Freshman 2018 – 2022
University full-tuition scholarship

Dean's List 2018 – Present
(all undergraduate semesters)

Technical Skills

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

Projects

Honors Senior Thesis Spring 2022
Advisor: Albert Cohen

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, with applications to sports analytics.

Projects in Industrial Mathematics Spring 2022
Advisor: Peiru Wu

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
Advisor: Daniel Appelö

Developing and analyzing computational tools for quantum computing applications.

MSU Risk Management and Sports Analytics Group Fall 2021
Advisor: Albert Cohen

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
Advisor: Jamie Haddock

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
Advisor: Ekaterina Rapinchuk

Exploring methods and tools for semi-supervised learning and graph-based learning.

MSU Signals, Learning, and Imaging Group Spring 2020 – Spring 2022
Advisor: Saiprasad Ravishankar

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.