

# ALEXANDER NICHOLAS SIETSEMA

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## RESEARCH INTERESTS

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

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## CITIZENSHIP

USA

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## EDUCATION

<b>Ph.D., Computational and Applied Mathematics (in progress)</b> <i>University of California, Los Angeles</i> <b>Advanced to candidacy</b>	2022 – 2027 (proj.) Los Angeles, CA Fall 2024
<b>M.A., Computational and Applied Mathematics</b> <i>University of California, Los Angeles</i>	2022 – 2024 Los Angeles, CA
<b>B.S., Advanced Mathematics; B.S., Computational Mathematics</b> <i>Michigan State University</i> <i>Dual-enrolled during high school</i>	2018 – 2022 East Lansing, MI 2017 – 2018
<b>Lansing Community College</b> <i>Dual-enrolled during high school</i>	Lansing, MI 2016 – 2017

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## PUBLICATIONS

\* indicates equal contribution

### JOURNAL PUBLICATIONS

4. Benjamin Jarman, Lara Kassab, Deanna Needell, **Alexander Sietsema**. “Stochastic Iterative Methods for Online Rank Aggregation from Pairwise Comparisons”. *BIT Numerical Mathematics* vol. 64, p. 26 (2024). <https://link.springer.com/article/10.1007/s10543-024-01024-x>
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, p. 102320 (2022). <https://www.sciencedirect.com/science/article/abs/pii/S019688582200001X>
2. Rachel Domagalski, Jinting Liang, Quinn Minnich, Bruce E. Sagan, Jamie Schmidt, **Alexander Sietsema**. “Pinnacle Set Properties”. *Discrete Mathematics*, vol. 345, iss. 7, p. 112882 (2022). <https://www.sciencedirect.com/science/article/abs/pii/S0012365X22000887>
1. Rachel Domagalski, Jinting Liang, Quinn Minnich, Bruce E. Sagan, Jamie Schmidt, **Alexander Sietsema** - “*Cyclic Shuffle Compatibility*.” Séminaire Lotharingien de Combinatoire, vol. 85d (2021). <https://www.mat.univie.ac.at/~slc/wpapers/s85domasaga.pdf>

### CONFERENCE PUBLICATIONS

4. Kedar Karhadkar\*, **Alexander Sietsema**\*, Deanna Needell, Guido Montufar. “Harmful Overfitting in Sobolev Spaces”. *Submitted* (2026). <https://arxiv.org/abs/2602.00825>
3. David R Johnson, **Alexander Sietsema**, Rishabh Anand, Deanna Needell, Smita Krishnaswamy, Michael Perlmutter. “VDW-GNNs: Vector diffusion wavelets for geometric graph neural networks”. *Submitted* (2026). <https://arxiv.org/abs/2510.01022>

2. **Alexander Sietsema\***, Zerrin Vural\*, James Chapman, Yotam Yaniv, Deanna Needell. “Stratified Non-Negative Tensor Factorization”. *Proc. 58th Asilomar Conf. on Signals, Systems and Computers*. IEEE, pp. 260-264. (2024). <https://ieeexplore.ieee.org/document/10942969>
1. **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*. SPIE, vol. 12304, pp. 532-538 (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>

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## TEACHING EXPERIENCE

- Python With Applications II (PIC 16B) Teaching Assistant** Spring 2023 – Winter 2026  
*Wrote discussion materials, led discussion sessions, evaluated student projects.*
- Python With Applications I (PIC 16A) Teaching Assistant** Fall 2022, Winter 2023, Spring 2024  
*Wrote discussion materials, led discussion sessions, graded exams, led study sessions.*
- Honors Linear Algebra (MTH 317H) Undergraduate Learning Assistant** Fall 2021  
*Led recitation sessions, graded homeworks and exams, led study sessions, held LaTeX learning sessions.*
- Calculus I (MTH 132) Course Assistant** Spring 2020  
*Answered questions on Piazza, led biweekly help sessions for students, graded exams.*
- Calculus II (MTH 133) Undergraduate Learning Assistant** Fall 2019  
*Supervised two sections, led recitations sessions, led special review sessions, graded labs, quizzes, and exams.*

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## PRESENTATIONS

### CONFERENCE ORAL PRESENTATIONS

1. “**Stratified Non-Negative Tensor Factorization**”, 58th Asilomar Conf. on Signals, Systems, and Computers, Pacific Grove, CA, Oct. 2024.

### SEMINAR TALKS

3. “**Harmful Overfitting in Sobolev Spaces**”, Michigan State University Applied Mathematics Seminar, April 2026 (scheduled).
2. “**A Stochastic Subtraction Game**”, Michigan State University Graduate and Undergraduate Student Seminar, May 2022.
1. “**Pattern Avoidance in Cyclic Permutations**”, Michigan State University Graduate and Undergraduate Student Seminar, January 2021.

### POSTERS

12. “**VDW-GNNs: Vector diffusion wavelets for geometric graph neural networks**”, IPAM Workshop: Mathematics of Cancer: Open Mathematical Problems, Los Angeles, CA, Feb. 2026.
11. “**Stratified Non-Negative Tensor Factorization**”, Workshop: Approximation And Learning In High Dimensions, Centre de Recherches Mathématiques, Montreal, QC, Canada, June 2025.
10. “**Stochastic Iterative Methods for Online Rank Aggregation from Pairwise Comparisons**”, 2nd Conf. on Random Matrix Theory and Numerical Linear Algebra, Seattle, WA, June 2025.
9. “**Stratified Non-Negative Tensor Factorization**”, Workshop: Approximation And Learning In High Dimensions, Centre de Recherches Mathématiques, Montreal, QC, Canada, June 2025.

8. “Stochastic Iterative Methods for Online Rank Aggregation from Pairwise Comparisons”, Research in the Age of AI Symposium, Los Angeles, CA, Feb. 2024.
7. “Comparing One-Step and Two-Step Descattering and Reconstruction”, CT Meeting 2022, Baltimore, MD, June 2022.
6. “Comparing One-Step and Two-Step Descattering and Reconstruction”, MSU CMSE Student Research Symposium, East Lansing, MI, May 2022.
5. “An Algorithm For Counting Admissible Pinnacle Orderings”, Permutation Patterns 2021 (Univ. of Strathclyde Combinatorics Group), June 2021.
4. “Pattern Avoidance in Cyclic Permutations”, Joint Mathematics Meetings Poster Session, Jan. 2021.
3. “A Cyclic Variant of the Erdős-Szekeres Theorem”, Joint Mathematics Meetings Poster Session, Jan. 2021.
2. “Pattern Avoidance in Cyclic Permutations”, JMU SUMS Poster Session, Dec. 2020.
1. “A Cyclic Variant of the Erdős-Szekeres Theorem”, JMU SUMS Poster Session, Dec. 2020.

## HONORS AND AWARDS

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<b>Department Award (\$3,000)</b>	2026
<i>UCLA Department of Mathematics Award</i>	
<b>HEGDE Grant (\$2,000)</b>	2025
<i>UCLA Department of Mathematics Award</i>	
<b>RMT NLA II Travel Award (\$800)</b>	2025
<i>2nd Conf. on Random Matrix Theory and Numerical Linear Algebra Award</i>	
<b>CRM Thematic Program Travel Award (\$1,300)</b>	2025
<i>Centre de Recherches Mathématiques Award</i>	
<b>First-Year Student Fellowship (\$7,000)</b>	2025
<i>UCLA Department of Mathematics Award</i>	
<b>Outstanding Poster</b>	2021
<i>Joint Mathematics Meetings Poster Session, “Pattern Avoidance in Cyclic Permutations”</i>	
<b>Honorable Mention Poster</b>	2021
<i>Joint Mathematics Meetings Poster Session, “A Cyclic Variant of the Erdős-Szekeres Theorem”</i>	
<b>Herbert T. Graham Scholarship (\$6,000)</b>	2020, 2021, 2022
<i>Michigan State University Department of Mathematics Award</i>	
<b>Paul and Wilma Dressel Endowed Scholarship (\$2,000)</b>	2019
<i>Michigan State University Department of Mathematics Award</i>	
<b>FAITH Endowment Scholarship for Academic Excellence (\$15,500)</b>	2018 – 2022
<i>Endowment for Greek Orthodoxy and Hellenism</i>	
<b>Dr. Helene Tzitsikas Education Scholarship (\$4,000)</b>	2018
<i>Holy Trinity Greek Orthodox Church Parish Award</i>	
<b>Michigan State University Alumni Distinguished Freshman (\$61,022)</b>	2018 – 2022
<i>Michigan State University Full-Tuition Scholarship</i>	
<b>Dean’s List</b>	2018 – Present
<i>(all undergraduate semesters)</i>	

## ADDITIONAL SELECTED PROJECTS

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### **Scripps National Spelling Bee**

Spring 2024

*(Subject to NDA)*

Analysis of word list difficulty leveling and in-competition word selection.

### **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.

### **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.

## EXTRACURRICULAR ACTIVITIES

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**UCLA Math Department Ultimate Frisbee (2022 – 2025)** | Organizer

**MSU Math Department Ultimate Frisbee (2018 - 2022)** | Organizer

**Phantom Regiment Drum and Bugle Corps (2019)** | Euphonium, small ensembler

*2019 Drum Corps International World Class Championship Finalist*

**Interests:** Escape rooms, music, cooking, hiking, playing hockey, ultimate frisbee, euchre, college football