

William Swartworth

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Department of Mathematics
University of California Los Angeles

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Work and Teaching Experience

University of California Los Angeles / Graduate Student Instructor

Spring 2023, Los Angeles CA

Instructor for M 182 (Algorithms)

University of California Los Angeles / Teaching Assistant

2017-present, Los Angeles CA

Courses taught:

- PIC 10A: Introduction to Programming in C++ (x11)
- PIC 10B: Intermediate Programming in C++
- M 182: Introduction to Algorithms (x3)
- M 131A: Real Analysis (x3)
- M 164: Optimization
- M 61: Discrete Mathematics
- M 31B: Integration and Infinite Series
- M 31AL: Differential and Integral Calculus Laboratory

UCLA Math REU/ Assistant Mentor

Summer 2022, Los Angeles CA

Art of Problem Solving / Course Instructor

2017 - Present

Courses taught:

- Introduction to Programming in Python
- Intermediate Algebra
- Introduction to Geometry
- Precalculus
- Introduction to Counting and Probability
- Intermediate Counting and Probability
- AMC 10 problem Series
- Prealgebra I
- Introduction to Algebra A
- Introduction to Algebra B

Art of Problem Solving / Summer Intern

Summer 2016, Summer 2017, San Diego CA

Education

University of California Los Angeles / PhD in Mathematics

2017 - 2023

Advisor: Deanna Needell

University of California Los Angeles / Masters in Mathematics

2017-2019

University of Texas at Austin / BS in Computer Science, Dean's Scholars Honors

2013 - 2017

Honors Thesis: Testing Hereditary Properties of Sequences (Best thesis award)

Advisor: Eric Price

University of Texas at Austin / BS in Mathematics, Dean's Scholars Honors

2013 - 2017

Honors Thesis: Automating Sylow Arguments

Advisor: Daniel Allcock

Awards

Pacific Journal of Mathematics Dissertation Award

Smoky Mountains Data Challenge, Best Solution Runner Up

Advanced Category, 2021

Best Undergraduate Thesis in Computer Science

University of Texas at Austin, 2017 (advised by Eric Price)

Publications

Optimal Eigenvalue Approximation via Sketching

Symposium on the Theory of Computing (STOC)

William Swartworth, David Woodruff

SP2: A Second Order Stochastic Polyak Method (ICLR)

International Conference on Learning Representations

Deanna Needell, Robert Gower, Shuang Li, William Swartworth, Martin Takac

Testing Positive Semidefiniteness with Linear Measurements

Foundations of Computer Science (FOCS), 2022

Deanna Needell, William Swartworth, David Woodruff

Quantile Based Iterative Methods for Corrupted Systems of Linear Equations

SIAM Journal on Matrix Analysis and Applications (SIMAX), 2022

Deanna Needell, Jamie Haddock, Liza Rebrova, William Swartworth

Population-Based Hierarchical Non-negative Matrix Factorization for Survey Data

Proceedings of the IEEE/ACM International Conference on Big Data Computing, Applications and Technologies: National Symposium for NSF REU Research in Data Science, Systems, and Security, 2022

Xiaofu Ding, Xinyu Dong, Olivia McGough, Chenxin Shen, Annie Ulichney, Ruiyao Xu, William Swartworth, Jocelyn Chi, Deanna Needell

Undergraduate REU project, Assistant Mentor

Selectable Set Randomized Kaczmarz

Numerical Linear Algebra, 2022

Yotam Yaniv, Jacob Moorman, William Swartworth, Thomas Tu, Daji Landis

Reconstructing piezoelectric responses over a lattice: adaptive sampling of low dimensional time series representations based on relative isolation and gradient size

SMC Proceedings, 2021

Michael Lindstrom, Deanna Needell, William Swartworth

Stochastic Gradient Descent Methods for Corrupted Systems of Linear Equations

Conference on Information Sciences and Systems (CISS), 2020

Deanna Needell, Jamie Haddock, Liza Rebrova, William Swartworth

Testing Hereditary Properties of Sequences

RANDOM 2017

Cody Freitag, Eric Price, William Swartworth

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Conference Talks

Testing Positive Semidefiniteness with Linear Measurements

FOCS 2022 (Denver CO)

Iteratively Solving Corrupted Linear Systems

ICCOPT 2022 (Bethlehem PA)

SMC Data Challenge Lightning Talk

Smokey Mountain Conference 2021 (Remote)

Testing Hereditary Properties of Sequences

RANDOM 2017 (Berkeley CA)

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Skills

Programming: Python (Pytorch, NumPy, SciPy, Jupyter), C++, Java, Git