

Nicolas Nytko

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EDUCATION

University of Illinois at Urbana-Champaign

Aug 2020 - Dec 2026 (Expected)

Doctor of Philosophy, Computer Science

GPA 3.88 / 4.00

Advised by Luke Olson and Matthew West

Master of Science, Computer Science

Thesis: Learning Aggregates and Interpolation for Algebraic Multigrid

University of Illinois at Urbana-Champaign

Aug 2017 - Dec 2019

Bachelor of Science, Computer Science

GPA 3.72 / 4.00

Grainger College of Engineering

Harper College

Aug 2015 - May 2017

Transfer, Engineering Pathways

GPA 3.59 / 4.00

PROFESSIONAL AND RESEARCH EXPERIENCE

Center for Exascale-enabled Scramjet Design

Aug 2024 - Current

Graduate Research Assistant

Urbana, IL

- Developing JFNK implicit timestepping methods for nonlinear thermal radiation using discontinuous Galerkin spatial discretizations.
- Implemented lazily-evaluated multigrid solver for high performance computation on GPU clusters.
- Investigating use of element-level polytopic agglomeration for spatial coarsening.

Los Alamos National Laboratory

Jun 2023 - Current

Graduate Research Assistant

Los Alamos, NM

- Developed automatic code translation techniques for translating legacy structured PDE solvers to run on GPU accelerators, achieving 10 – 20× speed-up on key computational bottlenecks.
- Developed structured auxiliary space methods for high-performance solvers on complex domains by learning diffeomorphic maps to structured domains using neural ODEs.
- Researching multiresolution methods for learning problems on graph-structured data.

Enable Medicine

May 2022 - Aug 2022

Computational Biology Intern

Menlo Park, CA (Remote)

- Researched numerical methods for computational biology spatial spillover correction.
- Explored both data-driven and algebraic methods for correcting cell biomarker error.

Groupon

May 2021 - Aug 2021

Software Engineer Intern

Chicago, IL

Epic Systems Corporation

May 2018 - Aug 2019

Software Developer and Intern

Verona, WI

PUBLICATIONS

Nytko N., Reisner, A., Moulton, J., Olson L., West M., *Teaching An Old Dog New Tricks: Porting Legacy Code to Heterogeneous Compute Architectures With Automated Code Translation*, Submitted to International Journal of High Performance Computing Applications

Zaman T., **Nytko N.**, Taghibakhshi A., MacLachlan S., Olson L., West M., *Generalizing Lloyd's algorithm for graph clustering*, SIAM Journal on Scientific Computing

Taghibakhshi A., **Nytko N.**, Zaman T., MacLachlan S., Olson L. N., West M., *MG-GNN: Multigrid Graph Neural Networks for Learning Multilevel Domain Decomposition Methods*, ICML 2023

Zaman T., **Nytko N.**, Taghibakhshi A., MacLachlan S., Olson L. N., West M., *Generalizing Reduction-Based Algebraic Multigrid*, Numerical Linear Algebra with Applications

Nytko N., Taghibakhshi A., Zaman T., MacLachlan S., Olson L. N., West M., *Optimized Sparse Matrix Operations for Reverse Mode Automatic Differentiation*, Accepted to SIAM Journal on Scientific Computing

Taghibakhshi A., **Nytko N.**, Zaman T., MacLachlan S., Olson L. N., West M., *Learning Interface Conditions in Domain Decomposition Solvers*, NeurIPS 2022

Silva M., Hieronymi P., West M., **Nytko N.**, Deshpande A., Chuang J., Hilgenfeldt S., *Innovating and modernizing a Linear Algebra class through teaching computational skills*, ASEE 2022

Silva M., Shaffer E., **Nytko N.**, Amos J., *A Case Study of Early Performance Prediction And Intervention in a Computer Science Course*, ASEE 2020

Nytko N., West M., Silva M., *A Simple and Efficient Markup Tool to Generate Drawing-based Online Assessments*, ASEE 2020

PRESENTATIONS, WORKSHOPS

22nd Copper Mountain Conference on Multigrid Methods. *Geometric Multigrid on Complex Domains via Mesh Remapping.* Apr 16, 2025

SIAM Workshop Series, UIUC. *Introduction to Machine Learning with PyTorch.* Nov 12, 2024

18th Copper Mountain Conference On Iterative Methods. *Learning sparse iterative methods through gradient-based optimization.* Apr 17, 2024

21st Copper Mountain Conference On Multigrid Methods. *Gradient-based optimization of sparse relaxation schemes.* Apr 17, 2023

17th Copper Mountain Conference On Iterative Methods. *Learning Aggregates and Interpolation for Algebraic Multigrid.* Apr 6, 2022

Hands-On With CSE, UIUC. *Building a Neural Network with PyTorch.* Apr 8, 2021

20th Copper Mountain Conference On Multigrid Methods. *A Supervised Learning Approach to Predicting Multigrid Convergence.* Mar 29, 2021

AE3 Lightning Symposium, UIUC. *Creating Drawing Questions in PrairieLearn.* Oct 3, 2019

HONORS AND AWARDS

Student paper winner: 22nd Copper Mountain Conference on Multigrid Methods April 2025

Andrew & Shana Laursen Fellowship Fall 2022 - Spring 2023

Outstanding Teaching Assistant Spring 2021

Outstanding Course Assistant Fall 2018

Dean's List, College of Engineering Fall 2017, Spring 2018, Spring 2019

TEACHING EXPERIENCE

Graduate Teaching (UIUC)

CS 450 - Numerical Analysis (Fall 2023 - Spring 2024)

CS 357 - Numerical Methods I (Fall 2020 - Spring 2022)

MATH 257 - Linear Algebra (Computational Section Pilot) (Spring 2020)

CS 199 - Python for Data (Fall 2019 - Spring 2020)

Undergraduate Teaching (UIUC)

CS 357 - Numerical Methods I (Fall 2018 - Fall 2019)

CS 126 - Software Design Studio (Spring 2018)

ACTIVITIES

President, SIAM UIUC chapter

Fall 2024 - Current

President, Harper Society of Engineers

Spring 2017