Matthew Eichhorn

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EDUCATION

Cornell University   August 2019 - Present
Ph.D. Candidate, Applied Mathematics
Masters of Science (2022)   GPA: 4.179

University at Buffalo, *The State University of New York*   August 2015 - May 2019
Bachelors of Science, Mathematics and Computer Science   GPA: 4.0
Honors College, Dean's List
Thesis: *Neural Networks for Plant Species Recognition in Street View Imagery*

Relevant Coursework
Algorithm (General, Online, Approximation), Market Design, Game Theory, Networks, Probability, Abstract Algebra, Combinatorics, Logic, Numerical Analysis, Functional Analysis

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PUBLICATIONS

- Ringland, J., Bohm, M., Baek, S.R., and **Eichhorn, M.**, "Automated survey of selected common plant species in Thai homegardens using Google Street View imagery and a deep neural network", Earth Science Informatics (ESI), 2021: 179-191.

- Dao T., Sohoni N., Gu A., **Eichhorn, M.**, Blonder A., Leszczynski M., Rudra R., and Ré C., "Kaleidoscope: An Efficient, Learnable Representation For All Structured Linear Maps", In Proceedings of 8th International Conference on Learning Representations (ICLR), 2020

- Dao, T., Gu, A., **Eichhorn, M.**, Rudra, A., Ré, C., "Learning Fast Algorithms for Linear Transforms Using Butterfly Factorizations", In Proceedings of 36th International Conference on Machine Learning (ICML), 2019: 1517-1527.

- Karan, S., **Eichhorn, M.**, Hurlburt, B., Iraci, G. and Zola, J., "Fast Counting in Machine Learning Applications", In Proceedings of 34th Uncertainty in Artificial Intelligence (UAI), 2018: 540-549.

PREPRINTS

- Banerjee, S., **Eichhorn, M.**, and Kempe, D., "Fair and Efficient Allocation with Quotas." arXiv preprint arXiv:2204.13019 (2022).

- Cortez, M., **Eichhorn, M.**, and Yu., c.L., "Graph Agnostic Estimators with Staggered Rollout Designs under Network Interference." arXiv preprint arXiv:2205.14552 (2022).

Conference Presentations

- "Simple yet Efficient Estimators for Network Causal Inference Even When the Network is Unknown", *American Causal Inference Conference* (ACIC). Berkeley, CA, May 2022.
- "Mind your Ps and Qs: Allocation with Priorities and Quotas", *Symposium on Foundations of Responsible Computing* (FORC). Cambridge, MA, June 2022.

Undergraduate Research Experience

Computer Science Department, University at Buffalo   Spring 2018 - Summer 2019
- Compare neural network architectures through lens of arithmetic circuit complexity
- Explore theory for efficient neural networks utilizing structured matrices

Project GLASS, University at Buffalo   Spring 2018 - Fall 2019
- Assess utility of Google Street View imagery to survey gardening practices in Thailand
- Heavily modify existing Neural Network architectures to assist in crop detection
- Develop Python and JavaScript utilities for image tagging and data processing

SCoRe Group, University at Buffalo   Fall 2016 - Fall 2017
- Devised efficient methods to answer counting queries in Bayesian networks
- Implemented heavily-optimized C++ data structures to efficiently answer queries

Teaching Experience

Cornell University
- *Co-Instructor*: CS 2800, Discrete Structures   Fall 2022
- *Teaching Assistant*: CS 2111, Programming Practicum (Java)   Spring 2022
- *Teaching Assistant*: CS 4820, Introduction to Analysis of Algorithms   Spring 2020, 2021
- *Facilitator*: Math Department Teaching Assistant Training   Fall 2021
- *Teaching Assistant*: MATH 1106, Calculus for the Life Sciences   Spring 2020, 2021

University at Buffalo
- *Teaching Assistant*: CSE 191, Discrete Structures   Fall 2017
- *Teaching Assistant*: CSE 250, Data Structures   Spring 2017, 2018
- *Teaching Assistant*: MTH 241, Calculus 3   Spring 2017
- *Teaching Assistant*: MTH 141, Calculus 1   Fall 2016

Employment Experience

Cornell Active Learning in Mathematics, Cornell University   Summers 2020-2022
Content Designer
- Developed class activities, course assignments, and readings to facilitate active instruction in an introductory calculus course.
- Created seven new workshops and projects for a linear algebra course through which students apply class concepts to problems from other disciplines.
- Developed a sequence of applied homework exercises to introduce relevant techniques from numerical analysis and algorithm design in an advanced linear algebra course.
- Worked with outside consultants to visualize student survey data in R as part of the department's active learning initiative.

Computer Science Department, Cornell University   Summers 2021, 2022
Course Developer
- Aided in the revision of the introductory discrete math course, including the writing of over 200 pages of course notes.
- Developed all materials for a new support course on discrete mathematics, including over 90 pages of notes and instructor guides and 100 exercises.
- Assisted in training the undergraduate facilitators for the course.

The Math Place, UB Undergraduate Learning Center   August 2017 - May 2019
Math Tutor
- Tutor students in subjects ranging from algebra and trigonometry to calculus
- Develop study strategies and crafted practice problems to aid students in test preparation

Awards and Recognition

Graduate Teaching Award, Cornell Computer Science Department   Fall 2021
Dean's Undergraduate Achievement Award, UB SEAS   Spring 2019
Undergraduate Researcher Award, UB Computer Science Department   Spring 2019
Dean's Outstanding Senior Award, UB College of Arts and Sciences   Spring 2019
Harriet F. Montague Award, UB Math Department   Fall 2018
Summer Math Scholarship, UB Math Department   Summer 2018
Grace W. Capen Academic Award, University at Buffalo   Spring 2017
Presidential Scholar, UB Honors College   Class of 2019