CHARLOTTE PARK

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RESEARCH INTERESTS

Causal Inference, Algorithms, Theoretical Computer Science, ML Theory

EDUCATION

Massachusetts Institute of Technology, Ph.D. in Computer Science   August 2022 - May 2027
Advised by Prof. Devavrat Shah

California Institute of Technology, B.S. in Computer Science   October 2018 - June 2022
GPA: 4.1/4.3

The University of Edinburgh, Exchange Student   Fall 2020
School of Informatics

APPLICABLE SKILLS

Languages	Python, Java, C, OCaml, MATLAB, Mathematica, Javascript
Libraries and Frameworks	Pytorch, Keras/Tensorflow, Opencilk, Git, Jupyter, Docker

RESEARCH EXPERIENCE

Massachusetts Institute of Technology   August 2022 - Present
Graduate Researcher (PhD Student)   *Cambridge, MA*
Advised by Prof. Devavrat Shah

- Working to design a counterfactual simulator for social systems relying solely on historical, observational data.
- Developing an algorithm for counterfactual estimation based on sequential user-interaction data from an e-commerce platform with 250 million+ users.
- Working to develop robust theory around algorithm to guarantee performance using methods in causal inference, high-dimensional statistics, and machine learning.

California Institute of Technology   October 2021 - June 2022
Undergraduate Researcher   *Pasadena, CA*
Advised by Prof. Leonard Schulman

- Worked on causal inference and causal identification algorithms in the DAG framework.
- Presented final work as senior thesis counting towards B.S. in Computer Science.
- Provided formal proof of the 3 rules of Do-Calculus, resulting in a document presented at the Causality Bootcamp workshop hosted by the Simons Institute.
- Rigorously proved hedge criterion in proof of correctness for the Sipser/Pearl causal identification algorithm.

Massachusetts Institute of Technology   June 2021 - August 2021
Visiting Undergraduate Researcher   *Cambridge, MA*
Advised by Prof. Charles E. Leiserson

- Optimized ray tracing engine in C while generating reproducible results.
- Parallelized code using OpenCilk and obtained profiling results on machines with up to 8 cores.
- Performed work-span analysis to analyze potential for parallelism. Optimized both serial and parallel code to obtain runtimes up to 75 times as fast as original code.

Massachusetts Institute of Technology June 2020 - August 2020
Visiting Undergraduate Researcher *Cambridge, MA*
Advised by Prof. Charles E. Leiserson

- Worked on optimization of child filtering in spatial partition trees using uncompressed and compressed tries.
- Examined various algorithmic techniques for constructing theoretically optimal tries.
- Developed and implemented heuristic algorithm for reordering trie codes in C.

PROFESSIONAL EXPERIENCE

Akamai Technologies June 2019 - September 2019
Software Engineering Intern *Cambridge, MA*

- Developed Java-based server for generating blame file detailing revision history of customer metadata.
- Integrated Git's blame feature in project to improve upon existing diff tool within Property Manager service available directly to customers.
- Attended daily Scrum Team meetings which provided a collaborative environment to discuss ideas and allow for a greater understanding of other projects within the company.

TEACHING EXPERIENCE

Algorithms (CS 38) March 2022 - June 2022
Head Teaching Assistant

- Instructor: Peter Schröder

Machine Learning and Data Mining (CS/CNS/EE 155) January 2022 - March 2022
Teaching Assistant, Graduate Level

- Instructor: Yisong Yue

Algorithms (CS 38) March 2021 - June 2021
Teaching Assistant

- Instructor: Peter Schröder

Introduction to Programming Methods (CS 2) January 2021 - March 2021
Teaching Assistant

- Instructor: Adam Blank

HONORS AND AWARDS

- MIT Presidential Fellow
- School of Engineering Exemplary Scholar, MIT

PROJECTS

Projection of COVID-19 Cases

- Developed model to project COVID-19 case rates given changes in policy.
- Trained LGBM model with state- and county-level data.
- Model could predict case rates n weeks in the future for arbitrary county and state datasets.

OUTREACH AND LEADERSHIP

MSRP (MIT Summer Research Program) January 2023 - Present
Application Reader

- Read applications and help select next cohort of MSRP participants, a summer program which offers research opportunities to students from underrepresented groups.

GAAP (Graduate Application Assistance Program)   September 2022 - Present
Mentor

- Mentor students applying to PhD programs in EECS from underrepresented backgrounds.

Ruddock House Executive Committee   February 2020 - February 2022
Social Manager

- Plan social events, manage events budget, and maintain social media for Ruddock House, one of the eight undergraduate houses at Caltech.