Hoai-An Nguyen

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RESEARCH INTERESTS

My primary research interests include the design and analysis of algorithms and complexity theory. I have been working on designing sublinear algorithms and establishing lower bounds in models motivated by big data such as sublinear-time and streaming. Currently, I am exploring streaming algorithms for optimization objectives. More broadly, I am also interested in machine learning theory, graph algorithms, and communication complexity.

EDUCATION

- **Carnegie Mellon University**
  Ph.D. in Computer Science Expected, May 2028
  - Advisors: Yang (Richard) Peng and David Woodruff

- **Rutgers University, New Brunswick**
  B.S. in Computer Science, B.A. in Economics May 2023
  - Thesis: *Asymptotically Optimal Bounds for Estimating H-Index in Sublinear Time with Applications to Subgraph Counting*
  - Advisor: Sepehr Assadi
  - *Summa cum laude* with highest honors in field, GPA: 4.00

HONORS AND AWARDS

- Henry Rutgers Scholar Thesis Award, Rutgers School of Arts and Sciences, 2023
- Nicholas V. Novielli Memorial Endowed Scholarship, Rutgers CS Department, 2023
- Paul Robeson Scholar, Rutgers School of Arts and Sciences, 2023
- Matthew Leydt Society, Rutgers University, 2023
- Dean's Excellence Award, Rutgers School of Arts and Sciences, 2023
- John C. Daniel Award, Rutgers Economics Department, 2023
- Milton Friedman Distinguished Scholar, Rutgers Economics Department, 2023
- Rizvi Research Award, Rutgers CS Department, 2022
- Edward L. Shustak Memorial Scholarship, Rutgers Economics Department, 2022
- Presidential Scholarship, Rutgers University, 2019 – 2023
- Honors College Designation, Rutgers University, 2019 – 2023
- National Merit Finalist Scholarship, Rutgers University, 2019 – 2023

PUBLICATIONS

- *Near-Optimal Bounds for Approximating Impact Indices in a Stream*
  H. Lin, H. Nguyen, and D. Woodruff
  In submission for publication in conference proceedings

- *Provable Reset-free Reinforcement Learning by No-Regret Reduction*
  H. Nguyen, C. Cheng
  International Conference on Machine Learning, **ICML 2023**
  Also spotlighted at **AAAI 2023 RL4PROD Workshop**
  Conference Version | Full Version

- *Asymptotically Optimal Bounds for Estimating H-Index in Sublinear Time with Applications to Subgraph Counting*
  S. Assadi, H. Nguyen

International Conference on Approximation Algorithms for Combinatorial Optimization Problems, **APPROX 2022**
Presentation | Conference Version | Full Version

ONGOING PROJECTS

◊ **Carnegie Mellon University, Computer Science** Sept 2023 – Present
- Working with Professor David Woodruff, CMU student Praneeth Kacham, and Google researchers Alessandro Epasto, Vahab Mirrokni, and Peilin Zhong on a project with privacy motivations to perform efficient submodular maximization on dynamic streams

◊ **Rutgers University, Computer Science** Sept 2022 – Present
- Collaborating with Professor Sepehr Assadi and Postdoctoral Researcher Zihan Tan to design a streaming algorithm for the travelling salesman problem

INDUSTRY RESEARCH EXPERIENCE

◊ **Microsoft Research, Reinforcement Learning Group** Summer 2022
Research Intern
- Interned with Ching-An Cheng
- Carried out extensive literature review on reset-free reinforcement learning (RL), safe RL, and constrained MDPs
- Published *Provable Reset-free Reinforcement Learning by No-Regret Reduction* in ICML 2023
- Spotlighted in AAAI 2023 RL4PROD Workshop

INDUSTRY EXPERIENCE

◊ **Facebook** Summer 2021
Software Engineering Intern
- Created infrastructure to compare static and dynamic ads to detect problems and facilitate migration to the dynamic ad model
- Identified and collected data on broken fields and features within multi-ad ad sets
- Collaborated with the representation fix team to resolve identified issues
- Tools used: C++, Python, Pandas, Mercurial

◊ **Bank of America** Summer 2020
Technology Analyst Intern
- Combined deep learning and image processing to explore facial recognition on live video streams
- Utilized machine learning and regression models to forecast ATM cash withdrawals
- Tools used: Python, OpenCV, Pandas, Torch, Sklearn, DLIB

TEACHING EXPERIENCE

◊ **Rutgers University, Department of Computer Science** Sept 2020 – May 2023
Learning Assistant
- Courses: Data Structures, Introduction to Computer Science
- Led recitations to facilitate active and collaborative learning

Head Learning Assistant Jan 2021 – May 2022
- Assisted in the coordination of the Data Structures course
- Managed ~30 other learning assistants and created recitation problems
- Helped review and revise course assignments and exams

◊ **Rutgers University, Department of Computer Science** Spring 2022, Spring 2023
Teaching Assistant
- Course: Design and Analysis of Computer Algorithms
- Ran recitations and office hours to assist students
- Wrote problems for homework assignments and exams

◊ **Other**
Private Tutor Sept 2019 – May 2021
- Tutored college students in Physics, Calculus, and Computer Science

Teaching Assistant Sept 2017 – May 2019
- Worked at a Kumon Learning Center
- Assisted K-12 students in math and English

LEADERSHIP

◊ **Carnegie Mellon University Women@SCS TechNights** 2023
- Planning a session to teach middle school girls in the greater Pittsburgh area the basics of error-correcting codes
- Will run the error-correcting codes TechNight in November with a co-lead

◊ **Rutgers Undergraduate Student Alliance of Computer Scientists**
Mentor Sept 2020 – May 2023
- Advised a small pod of CS students to help them navigate the major and recruiting

Outreach Director May 2020 – May 2021
- Organized speaker and company events centered around CS research and software engineering
- Facilitated student interaction with CS faculty, graduate students, and alumni
- Collaborated with the Women in Computer Science club to promote diversity

Education Chair Jan 2020 – May 2020
- Helped organize hacker hours which brought industry speakers to lead participants through a short project

OTHER ACTIVITIES

◊ Google's CS Research Mentorship Program (2023A)
◊ Fostering dogs through Paws Across Pittsburgh