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. I have also been working on various graph problems including sparsification and linear systems solving.

EDUCATION

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

- Carnegie Mellon University
  - Graduate Research Fellowship, National Science Foundation, 2024
- Rutgers University
  - 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

PREPRINTS

- *On Sketching Trimmed Statistics*
  with H. Lin and D. Woodruff
  Full Version
- *Unbiased Insights: Optimal Streaming Algorithms for ℓ_p Sampling, the Forget Model, and Beyond*
  with H. Lin, W. Swartworth, and D. Woodruff
  Full Version

PUBLICATIONS

- *Numerical Linear Algebra in Linear Space*
  with Y. Liu and J. Yang
  Symposium on Discrete Algorithms, **SODA 2026**
  Full Version

- *Entrywise Approximation for Matrix Inversion and Linear Systems*
  with M. Ghadiri and J. Yang
  Symposium on Discrete Algorithms, **SODA 2026**

- *Maximum Coverage in Turnstile Streams with Applications to Fingerprinting Measures*
  with A. Ene, A. Epasto, V. Mirrokni, H. Nguyen, D. Woodruff, and P. Zhong
  International Conference on Machine Learning, **ICML 2025**
  Long Presentation | Full Version

- *Relative Error Fair Clustering in the Weak-Strong Oracle Model*
  with V. Braverman, P. Dharangutte, S. Jiang, C. Wang, Y. Zhang, and S. Zhou
  International Conference on Machine Learning, **ICML 2025**
  Full Version

- *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*
  with S. Assadi
  International Conference on Approximation Algorithms for Combinatorial Optimization Problems, **APPROX 2022**
  Presentation | Conference Version | Full Version

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

◊ **Carnegie Mellon University, Computer Science Dept.** Spring 2024, Spring 2025
Teaching Assistant
- Courses: Algorithms for Big Data, Algorithm Design and Analysis
- Create recitation problems and lead recitation sections to facilitate active and collaborative learning

◊ **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** Jan 2023 – Present
- Organized the algorithms and complexity lunch seminar
- Co-organizing the W+NB lunch

◊ **Carnegie Mellon University Women@SCS TechNights** Nov 2023
- Designed and ran a session to teach middle school girls in the greater Pittsburgh area the basics of error-correcting codes 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