

Mirabel Reid

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EDUCATION

Georgia Institute of Technology, Atlanta, GA, USA

Pursuing PhD in Computer Science

Sep 2020-Present

GPA: 3.91

University of Pittsburgh, Pittsburgh, PA, USA

Bachelor of Science

Sep 2016-April 2020

Double Major in Computer Science, Mathematics

GPA: 4.0

RESEARCH INTERESTS

- Mathematically tractable models for neural computation.
- Cognitive abilities of Large Language Models (LLMs).
- Interplay between machine and human learning and computation.

WORK EXPERIENCE

Max Planck Institute for Intelligent Systems

Tübingen, DE

Research Intern

May 2023-Aug 2023

- Devised a model of online human/AI expert systems under budget constraints.
- Simulated the model in **Python** on real and artificial Human/AI performance data.

Los Alamos National Laboratory

Los Alamos, NM, USA

Research Intern

May 2022-Oct 2022

- Researched improvements for Machine Learning workflows for scientific applications.
- Built a metadata visualization platform in **Python** in collaboration with domain scientists.
- Built a database backend in **SQL** to support visual training data selection.

Software Engineering Institute

Pittsburgh, PA, USA

Intern: Emerging Technology Center, Software Solutions Division

Jan 2020-Aug 2020

- Investigated novel applications of Graph Neural Networks for software development
- Implemented machine learning solutions in **PyTorch** and **ROS**

Georgia Tech

Atlanta, GA, USA

Civic Data Science Intern

May 2019-Aug 2019

- Collaborated with city officials and research faculty to analyze the impact of federal housing policies in the city of Albany, Georgia.
- Created a research-grade database by connecting disparate civic data sources with **Python** and **SQL**

University of Pittsburgh

Pittsburgh, PA, USA

Research Assistant

Jan 2017-Dec 2019

- Researched a mathematical model for common properties of natural transportation networks.
- Built algorithms in **MATLAB** and **C++** to automatically process Digital Elevation Models

HONORS/AWARDS

Georgia Tech ARC-ACO Fellowship

Nov 2023

ARC Triad Research Fellowship

Nov 2021

Georgia Tech Presidential Fellowship

Apr 2020

Culver Award (Achievement in Mathematics)

Apr 2020

Brackenridge Research Fellowship

May 2018

PUBLICATIONS

Reid, M., & Zhang, D. (2025). The alpha-Cap Process: A Continuous Model for Random Geometric Networks of Binary Neurons. In submission.

Reid, M., & Vempala, S. S. (2024). Does GPT Really Get It? A Hierarchical Scale to Quantify Human vs AI's Understanding of Algorithms. Proceedings of AAAI 2025, Oral Presentation. *arXiv preprint arXiv:2406.14722*.

Reid, M., Sühr, T., Vernade, C., and Samadi, S. (2024) “Online Decision Deferral under Budget Constraints”, *arXiv preprint arXiv:2409.20489*

Reid, M. & Vempala, S. S. (2023). The k -Cap Process on Geometric Random Graphs. In *The Thirty Sixth Annual Conference on Learning Theory* (pp. 3469-3509). PMLR.

Reid, M., Sweeney, C., and Korobkin, O. (2024) “Improving Radiography Machine Learning Workflows via Metadata Management for Training Data Selection”, *arXiv preprint arXiv:2408.12655*

PRESENTATIONS

“On k -Winners-Take-All as a Model of Neuron Communication”, Seminar talk, Carnegie Mellon University Theory Lunch, 2025.

“Does GPT Really Get It? A Hierarchical Scale to Quantify Human vs AI's Understanding of Algorithms”.

- Poster Presentation, Workshop on Behavioral ML at NeurIPS 2024.
- Lightning Talk, Simons Institute Workshop on Understanding Higher-Level Intelligence 2024.

“Assemblies and the k -Cap Process: The Effects of Locality on Neural Firing Dynamics”, Poster presentation, Computational and Systems Neuroscience (COSYNE) 2023

“Convergence of the k -cap Process on Graphs with Weight Reciprocity”, Poster presentation, INFORMS Applied Probability Society Meeting 2023.

“The k -Cap Process on Geometric Random Graphs”, Poster presentation, Mathematical and Scientific Foundations of Deep Learning Annual Meeting 2022

TEACHING

- *Fall 2023* Teaching Assistant for Advanced Algorithms
- *Fall 2021* Teaching Assistant for the Introduction to Graduate Algorithms
- *Spring 2019* Teaching Assistant for Discrete Mathematics