Caroline Wang

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Education

University of Texas at Austin **Austin, TX**
Ph.D. student supervised by Prof. Peter Stone August 2020 – Present

- **GPA:** 4.0/4.0
- **Research interests**: Multi-agent reinforcement learning, ad hoc teamwork, reinforcement learning.
- **Coursework:** Learning-based Optimal Control, Reinforcement Learning, Theory of Probability, Neural Networks, Robot Learning, Programming Languages, Graduate Algorithms.

Duke University **Durham, NC**
Double Major in Computer Science and Mathematics August 2016 – May 2020
Graduation with Highest Distinction.

- **GPA:** 3.93/4.00
- **GRE:** 340/340 (170 Quantitative, 170 Verbal Reasoning); 5.5/6.0 Analytical Writing.
- **Selected Coursework:** Probabilistic Machine Learning, Machine Learning I/II, Real Analysis I/II, Statistics, Design/Analysis of Algorithms, Higher Dimensional Data Analysis, Topological Data Analysis, Probability, Linear Algebra.

Publications and Presentations

** indicates co-first authorship; § indicates attendance at competition/conference/workshop.*

- **Caroline Wang**, M. A. Rahman, I. Durugkar, E. Liebman, and P. Stone. N-Agent Ad Hoc Teamwork. NeurIPS 2024§ (**Poster presentation**).
- Z. Wang*, **Caroline Wang***, X. Xiao, Y. Zhu, and P. Stone. Building Minimal and Reusable Causal State Abstractions for Reinforcement Learning. AAAI 2024§ (**Oral and poster presentation**).
- **Caroline Wang***, I. Durugkar*, E. Liebman*, and P. Stone. DM^2: Distributed multi-agent reinforcement learning via distribution matching. AAAI 2023§ (**Oral and poster presentation**).
- **Caroline Wang**, G. Warnell, and P. Stone. D-Shape: Demonstration-shaped reinforcement learning via goal-conditioning. AAMAS 2023§ (**Oral and poster presentation**).
- P. MacAlpine, B. Liu, W. Macke, **Caroline Wang**, and P. Stone. UT Austin Villa: RoboCup 2021 3D simulation league competition champions. Robot World Cup, 2022.
- **Caroline Wang***, B. Han*, B. Patel, F. Mohideen, and C. Rudin. In pursuit of interpretable, fair and accurate machine learning for recidivism prediction. Journal of Quantitative Criminology, 2021.
- C. Rudin, **Caroline Wang**, and B. Coker. Broader issues surrounding model transparency in criminal justice risk scoring. Harvard Data Science Review, 2020.
- C. Rudin, **Caroline Wang**, and B. Coker. The age of secrecy and unfairness in recidivism prediction. Harvard Data Science Review, 2020.

Internships

Sony AI Summer 2023
Mentor: Varun Kompella
Project: Automatically weighing event tables to improve reinforcement learning sample efficiency.

- Developed experience-replay based algorithms to improve sample efficiency of reinforcement learning on Sony game environments.

Data Science for Social Good Summer 2019
Project: Quantifying traffic dynamics in Greater London to improve air pollution models

- Created open-source, end-to-end system that analyzes London traffic camera feeds using computer vision, and outputs junction-level, near real-time traffic statistics for emissions models.
- Created historical dataset of London traffic statistics. Dataset can be applied to improve emissions models, and/or by local transport authorities to optimize traffic flow/assess effects of roadworks.

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Data+ Summer 2018
Supervised by Prof. Jun Yang, Department of Computer Science, Duke University
Project: Automated real-time political fact-checking
- Adapted Transformer model to perform paraphrase matching/entailment detection for political claims.
- Contributed to pipeline for app backend that could analyze an audio source and return related fact-checks from a PostgreSQL database of around 18000 previously checked claims.

Research Experience

Research Assistant Fall 2020 – Present
Supervised by Prof. Peter Stone, Department of Computer Science, UT Austin
Project: N-Agent Ad Hoc Teamwork
- Proposed and formulated novel problem of N-agent ad hoc teamwork.
- Developed algorithmic approach towards solving N-agent ad hoc teamwork.

Project: Building Minimal and Reusable Causal State Abstractions for Reinforcement Learning
- Developed algorithm that learns causal dynamics and reward relationships to generate a state abstraction that is reusable across environments sharing the same dynamics.

Project: Distributed multi-agent reinforcement learning via distribution matching
- Investigated the use of distribution matching for multi-agent cooperation

Project: Deep reinforcement learning for learning a sprint in RoboCup 3DSim
- Developed parallelized framework for deep RL on a Condor cluster.
- UTAustinVilla team placed 1st at RoboCup 3dSim League Competition in 2021; 3rd in 2022/23.

Project: Combining reinforcement learning with imitation from observation
- Developed novel, model-free reinforcement learning + imitation from observation algorithm.

Research Assistant Fall 2017 – Spring 2020
Supervised by Prof. Cynthia Rudin, Department of Computer Science, Duke University
Project: Interpretable and fair machine learning to predict criminal recidivism
- Determined most appropriate definitions of fairness to apply to the criminal recidivism problem.
- Designed state-of-the-art, interpretable machine learning models to predict criminal recidivism.

Project: Reverse engineering black-box algorithms for criminal recidivism prediction
- Partially reverse-engineered a black-box risk-assessment algorithm (COMPAS) via machine learning and feature analysis.

Professional Service

Graduate Women and Gender Minorities in Computing (GWGMC) Spring 2022 – Present
- Re-started and co-led the GWGMC student organization at UT Austin.
- Organizer of Women and Gender Minorities in Computing Research Symposium.

Guest Editor for Neural Computing & Applications Journal Fall 2023 – Spring 2024
- Served as guest editor for special issue in Neural Computing & Applications (Springer Nature).

Adaptive Learning Agents (ALA) Workshop at AAMAS 2023 / 24 Fall 2022 – Spring 2024
- Organizing committee for the ALA 2023 and 2024 Workshops.

Program Committee Various
- Reviewer for NeurIPS 2024, ICRA 2024, GCRL Workshop@NeurIPS 2023, ICML 2023, AAMAS 2023, ALA Workshop@AAMAS 2023, ICRA 2021.

Awards and Honors

UT Austin Graduate School Fellowship Summer 2024

- Fellowship support from the Graduate School at UT Austin.

CRA Outstanding Undergraduate Researcher Award Finalist 2020

- Computing Research Association (CRA) award program recognizes undergraduate students who show outstanding potential in computing research; 23 finalists selected from North America.

Data Science for Social Good Fellowship Summer 2019

- 38 fellows from 800+ global applicants selected to work on societally impactful data science projects at Imperial College London, UK.

Barry M. Goldwater Scholarship 2019

- Highly prestigious undergraduate STEM research scholarship. 2019 Goldwater Scholars selected from an estimated pool of over 5,000 college students and 443 academic institutions in U.S.

Skills and Interests

- **Skills:** Python (proficient), C++ (beginner), NN libraries (PyTorch), distributed computing clusters (Condor, Slurm), UNIX command line, GitHub version control.
- **Activities/Interests:** Chamber music, tennis, cat fostering