

# Atrisha Sarkar

(She/Her)

(514)-623-5805  
atrisha.sarkar@uwaterloo.ca

PhD Candidate  
University of Waterloo

git.uwaterloo.ca/a9sarkar

## INTERESTS

- Human-AI Interaction
- Multi-Agent Systems
- AI Safety, Fairness, and Accountability

## EDUCATION

PhD, Computer Science, University of Waterloo	2016 — Present
Master of Mathematics, Computer Science, University of Waterloo	2014 — 2016
Bachelor of Technology, Computer Science and Engineering, Vellore Institute of Technology, India	2002 — 2006

## RESEARCH EXPERIENCE

**PhD research** 2016 — Present

- Drawing insights from traffic psychology and behavioral economics, I designed ways in which behavioral game theory can be used to create models of naturalistic human driving behavior in order to evaluate the safety of autonomous vehicles (AV) in real-world conditions.
- I developed safety validation frameworks for human-AI interaction (with specific focus on autonomous vehicles) by identifying how to incorporate natural human behavior to evaluate the safety of AI driven systems. These frameworks include generation of rare-event scenarios, as well as identification of common points of failure, such as occlusions.
- In order to make decisions made by autonomous vehicle more understandable to regulators and broader public without deep technical expertise, I developed a taxonomy of strategic interactions that can be used for better understanding of decisions made by AV planners.
- Played a key role in the development of ‘autonomoose’, one of the first autonomous vehicles on Canadian public roads.

**Masters research** 2014 — 2016

- Highly configurable software systems suffers from exponential blowup of feature space, which prevents engineers from testing all possible configurations of the software. I developed machine-learning based models to analyse and predict the performance of such systems with a cost-efficient approach.

## TEACHING EXPERIENCE

**Teaching assistant and Co-instructor** Spring, Fall 2021

- Taught a class on platform capitalism in CS492: Social Implications of Computing class for upper year undergraduate students.
- Co-Instructor for Ethics in Data Science and AI workshop for students in Masters in Data Science and AI program.

**Teaching assistant** 2018-2020

- Marked assignments and conducted tutorials for Introduction to Artificial Intelligence (CS486/686) and Social Implications of Computing (CS492) courses for upper year undergraduate students.

## PROFESSIONAL EXPERIENCE

<b>Principal Engineer</b>	2013 — 2014
Bridge Solutions Group	Bangalore, India

- Lead a technical team to incorporate new features into IBM Sterling Warehouse Management System.

<b>Staff Software Developer</b>	2007 — 2013
IBM Software Labs	Bangalore, India

- Member of IBM Sterling Integrator standards development team. Work involved design and development of e-Invoicing solution. Research and design of IBM multi enterprise gateway, a cloud based offering of the product.
- Was a part of the IBM Sterling Total Payments (STP) initial development team. Sterling Total Payments was an application for financial institutions that helps simplify the complexity of the bank’s processes through an integrated approach that consolidates customer set-up, exception handling, and visibility in a single location across all lines of payments business in its IT architecture.

## PROGRAMMING LANGUAGE PROFICIENCY

High proficiency	Python (including SciPy and NumPy), JAVA, SQL
Moderate proficiency	R, TensorFlow

## PUBLICATIONS

---

1. **Sarkar, A.** & Czarnecki, K. *Solution Concepts in Hierarchical Games under Bounded Rationality with Applications to Autonomous Driving* in *Proceedings of the AAAI Conference on Artificial Intelligence* (2021), 5698–5708.
2. **Sarkar, A.**, Larson, K. & Czarnecki, K. Generalized dynamic cognitive hierarchy models for strategic driving behavior. *arXiv preprint arXiv:2109.09861* (2021).
3. **Sarkar, A.**, Larson, K. & Czarnecki, K. A taxonomy of strategic human interactions in traffic conflicts. *arXiv preprint arXiv:2109.13367* (2021).
4. Kahn, M., **Sarkar, A.** & Czarnecki, K. I Know You Can't See Me: Dynamic Occlusion-Aware Safety Validation of Strategic Planners for Autonomous Vehicles Using Hypergames. *arXiv preprint arXiv:2109.09807* (2021).
5. Ilievski, M., Sedwards, S., Gaurav, A., Balakrishnan, A., **Sarkar, A.**, Lee, J., Bouchard, F., De Iaco, R. & Czarnecki, K. Design space of behaviour planning for autonomous driving. *arXiv preprint arXiv:1908.07931* (2019).
6. **Sarkar, A.** & Czarnecki, K. *A behavior driven approach for sampling rare event situations for autonomous vehicles* in *2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* (2019), 6407–6414.
7. Juodisius, P., **Sarkar, A.**, Mukkamala, R. R., Antkiewicz, M., Czarnecki, K. & Wasowski, A. Clafer: Lightweight modeling of structure, behaviour, and variability. *The Art, Science, and Engineering of Programming* **3** (2019).
8. **Sarkar, A.**, Czarnecki, K., Angus, M., Li, C. & Waslander, S. *Trajectory prediction of traffic agents at urban intersections through learned interactions* in *2017 IEEE 20th International Conference on Intelligent Transportation Systems (ITSC)* (2017), 1–8.
9. Zayan, D., **Sarkar, A.**, Antkiewicz, M., Maciel, R. S. P. & Czarnecki, K. Example-driven modeling: on effects of using examples on structural model comprehension, what makes them useful, and how to create them. *Software & Systems Modeling* **18**, 2213–2239 (2019).
10. Guo, J., Yang, D., Siegmund, N., Apel, S., **Sarkar, A.**, Valov, P., Czarnecki, K., Wasowski, A. & Yu, H. Data-efficient performance learning for configurable systems. *Empirical Software Engineering* **23**, 1826–1867 (2018).
11. **Sarkar, A.**, Guo, J., Siegmund, N., Apel, S. & Czarnecki, K. *Cost-efficient sampling for performance prediction of configurable systems* in *2015 30th IEEE/ACM International Conference on Automated Software Engineering (ASE)* (2015), 342–352.

## AWARDS & HONORS

---

- |           |   |
|-----------|---|
| 2019-2020 | Ontario Graduate Scholarship<br>President's Graduate Scholarship, University of Waterloo                                      |
| 2020-2021 | Queen Elizabeth II Graduate Scholarship in Science and Technology<br>President's Graduate Scholarship, University of Waterloo |