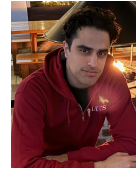# Aram Ebtekar

✉ aramebtech@gmail.com          in linkedin.com/in/arameb          🌐 arameb.com

## Employment History

**2025**    🔖 **MATS, AI Alignment Researcher.** Mathematical investigation of agents with pessimistic priors that avoid unprecedented outcomes, mentored by Michael K Cohen.

**2022 – ····**    🔖 **Independent AI & Physics Researcher.** Using a broad range of theoretical tools, I tackle foundational problems that most would consider too hard or open-ended. Occasionally I take industry contracts, the main one being in autonomous driving for Caterpillar.

**2018 – 2019**    🔖 **Mythic, Senior AI Research Scientist.** Led two exploratory efforts: video super-resolution, covering the whole pipeline from realistic dataset collection to neural architecture design; and hardware co-design investigations on how efficiently convolutional layers map to hardware, and how long the resulting models retain their accuracy.

**2016 – 2018**    🔖 **Waymo, Behavior Prediction Research Engineer.** Framed driver behaviour as trajectory optimization problems, enabling autonomous cars to predict surrounding drivers' movements in real-time; visualized the predictions; and led a study+brainstorm group to explore long-term solutions, particularly with deep reinforcement learning.

## Education

**2019 – 2022**    🔖 **Self-directed** custom version of what I wished my Ph.D. could be. An eclectic mix of graduate-level math, physics, economics, information theory, and undergrad-level humanities, gathered from a combination of UBC courses, MIT OpenCourseWare, textbooks, papers, and so on. It culminated in a research manuscript detailing a rigorous model for the casual arrow of time, which later became a cover article in Entropy. On the applied side, I developed and published the Elo-MMR skill estimation algorithm, now used by popular competition platforms such as CodeChef and DMOJ.

**2012 – 2015**    🔖 **Carnegie Mellon University, M.S., Ph.D. candidate** in Computer Science.
- Research projects in hybrid systems verification and search-based planning
- Teaching Assistant for 15-451/651 (Algorithms)
- Completed the 2012 Summer School in Algorithmic Economics
- Memberships: Graduate Student Assembly departmental representatives, Ballroom Dance Club, School of Computer Science musical performances

**2008 – 2012**    🔖 **University of British Columbia, B.Sc. Honours** in Computer Science & Mathematics.
- Research projects in evolutionary game theory and computational geometry
- GPA: 92% (A+)

## Research Publications

1. A. Ebtekar and M. Hutter, "Foundations of algorithmic thermodynamics," *Physical Review E*, 2025. 🔗 DOI: 10.1103/PhysRevE.111.014118.

2. A. Ebtekar, Y. Wang, and D. Janzing, "Toward universal laws of outlier propagation," *submitted to 41st Conference on Uncertainty In Artificial Intelligence*, 2025.

3. A. Ebtekar and M. Hutter, "Modeling the arrows of time with causal multibaker maps," *Entropy **cover article***, vol. 26, no. 9, p. 776, 2024. 🔗 DOI: 10.3390/e26090776.

4. A. Ebtekar and P. Liu, "Elo-MMR: A rating system for massive multiplayer competitions," in *Proceedings of 30th The Web Conference*, 2021, pp. 1772–1784. 🔗 DOI: 10.1145/3442381.3450091.

## Skills

| | | |
|---|---|---|
| Nat. Languages | ▉ | Fluent in English, French, Persian. Beginner in Spanish, Mandarin, Japanese. |
| Prog. Languages | ▉ | Rust, C++17, LaTeX, Python, PyTorch, Keras, Java, C. |
| Academic | ▉ | Theoretical computer science, mathematics, statistics, physics, philosophy, economics, robotics, machine learning, software design, technical writing, teaching. |

## Miscellaneous Experience

### Contest Achievements

| | | |
|---|---|---|
| 2015 | ▉ | 61st place among over 50,000 registrants in the Google Code Jam. |
| | ▉ | 57th place in the Topcoder Open Algorithm Competition. |
| | ▉ | 6th place in the North American Invitational Programming Contest's Open Division, as a solo contestant against teams of up to three. |
| | ▉ | Achieved Codeforces Grandmaster title, peak rating 2400+ on both Codeforces and Topcoder |
| | ▉ | ACM ICPC Pacific Northwest regional contest problem setter, author of problems J,L,N. |
| 2012 | ▉ | 18th place in the ACM ICPC World Finals in Warsaw, Poland. |
| 2011 | ▉ | Top 250, Team Honorable Mention in the William Lowell Putnam Mathematical Competition. |
| | ▉ | UBC Thunderbots, 9th place in the RoboCup SSL international robot soccer competition. |

### Selected Projects

| | | |
|---|---|---|
| 2020 | ▉ | **Technical Blogging.** My top article made the front page of Hacker News and received over 200 comments. |
| 2017 | ▉ | **Rust Algorithms Cookbook.** A collection of classic algorithms and data structures elegantly crafted in Rust, serving as a proof of concept of the language's compile-time safety discipline in contest programming. On 20/06/2017, it was the #1 trending GitHub repository globally. |
| 2012 | ▉ | **U! Robot!** Lead engineer in a team of 8 developers, completing a platformer game that was showcased at the 48-hour Global Game Jam. |