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Muhammad Arrasy Rahman

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Career Objective

An **experienced researcher** who specializes in reinforcement learning and its specific application for multi-agent systems. Following the increasing real-world deployment of AI agents by different organizations, my research aims to ensure their capacity to coexist safely with humans and other AI agents by advancing the theoretical and practical understanding of **multi-agent reinforcement learning** (MARL), **game theory**, and **human-AI coordination**. With a proven track record of securing substantial research funding and producing impactful research, I aim to contribute to the research and product development of a leading company. I aim to lead projects that integrate multi-agent reinforcement learning and game-theoretic principles to deepen our theoretical understanding of cooperative intelligence, while developing beneficial interactive AI systems for real-world domains.

Education

Edinburgh, UK **The University of Edinburgh** **Sep 2018 – Jul 2023**

- **Ph.D. in Artificial Intelligence**
- **Supervisor**: Dr. Stefano V. Albrecht
- **Thesis title**: Advances in Open Ad Hoc Teamwork and Teammate Generation
- **Funding**: Edinburgh Enlightenment Scholarship – Teaching Track

Edinburgh, UK **The University of Edinburgh** **Sep 2016 – Dec 2017**

- **M.Sc. in Data Science**, Graduated with Distinction
- **Supervisor**: Dr. Henry Thompson
- **Thesis title**: Implementing Repeated Updates with Prioritized Experience Replay as Deep Reinforcement Learning Algorithms
- **Funding**: Indonesia Endowment Fund for Education Scholarship

Depok, Indonesia **Universitas Indonesia** **Sep 2011 – Jan 2015**

- **B.Sc. in Computer Science**, GPA: 3.85/4.00
- **Supervisor**: Dr. Denny
- **Thesis title**: Weighted Ensemble Clustering Using Self-Organizing Maps
- **Funding**: Samsung Indonesia Scholarship

Awards & Recognitions

- **Best Paper Awards:** Best Paper Runner Up at the Adaptive & Learning Agents Workshop at AAMAS 2021
- **Academic Performance Awards:** 2017 Class Prize for Top Performance in the MSc Data Science Program
- **Competitions:** 6th place at the NeurIPS 2024 Concordia Competition, 4th Place in Huawei UK's 2019 Autonomous Vehicles Challenge
- **Reviewing Awards:** ICML 2024 Best Reviewers Award, ECAI 2023 Quality Champion Review Award, NeurIPS 2022 Top Reviewers, ICML 2022 Best Reviewers (Top 10%) Recognition
- **Teaching Awards & Qualifications:** Associate Fellowship of the Higher Education Academy (HEA), Edinburgh Teaching Award

Employment

Postdoctoral Research Fellow **The University of Texas at Austin** **Nov 2022 – Now**

- **Host:** Prof. Peter Stone
- Wrote proposals to **help secure $300K research funding from Lockheed Martin and $500K DARPA**.

- For these funded projects, managed project personnel, interacted with program managers, and **researched the application of reinforcement learning, open-ended learning, large language models,** and **policy generation** for designing state-of-the-art methods to train agents that effectively collaborate with unknown teammate policies.
- Developed an offline RL to design AI advisors that enhance surgeons' decisions in the organ transplant domain.
- Mentored the multi-agent RL, ad hoc teamwork, and human-AI interaction research of students at UT Austin.
- Assisted the Ph.D. admissions process by evaluating applicants' reference letters and research statements.

Research Intern **Five AI** **Apr 2021 – Jun 2021**

- Designed and evaluated an inverse planning-based goal recognition algorithm for autonomous vehicles under partial observability, which was accepted at IROS 2021.

Data Scientist **Gojek Indonesia** **Oct 2017 – Mar 2018**

- Trained machine learning models to assign drivers to passengers.
- Developed an adaptive pricing model to handle service request surges.

Associate Data Scientist **Traveloka** **Sep 2015 – Apr 2016**

- Analyzed the different user clusters in the company's ticketing service app.
- Designed predictive models to identify potentially churning customers.

Publications

Journals

1. Arrasy Rahman, Ignacio Carlucho, Niklas Höpner, and Stefano V Albrecht. A general learning framework for open ad hoc teamwork using graph-based policy learning. ***Journal of Machine Learning Research***, 24(298):1–74, 2023
2. Arrasy Rahman, Elliot Fosong, Ignacio Carlucho, and Stefano V Albrecht. Generating teammates for training robust ad hoc teamwork agents via best-response diversity. ***Transactions on Machine Learning Research***, 2023

Conferences

1. Kale-ab Abebe Tessera, Arrasy Rahman, and Stefano V Albrecht. HyperMARL: Adaptive hypernetworks for multi-agent RL. In *The Thirty-ninth Annual Conference on Neural Information Processing Systems*, 2025 (**To appear at NeurIPS 2025**)
2. Chandler Smith et al. Evaluating generalization capabilities of LLM-based agents in mixed-motive scenarios using concordia. In *The Thirty-ninth Annual Conference on Neural Information Processing Systems Datasets and Benchmarks Track*, 2025 (**To appear at NeurIPS 2025**)
3. Caroline Wang, Arrasy Rahman, Ishan Durugkar, Elad Liebman, and Peter Stone. N-agent ad hoc teamwork. ***Advances in Neural Information Processing Systems***, 2024
4. Elliot Fosong, Arrasy Rahman, Ignacio Carlucho, and Stefano V Albrecht. Learning complex teamwork tasks using a given sub-task curriculum. In ***International Conference on Autonomous Agents and Multiagent Systems***, 2024
5. Arrasy Rahman, Jiaxun Cui, and Peter Stone. Minimum coverage sets for training robust ad hoc teamwork agents. In ***Proceedings of the 38th AAAI Conference on Artificial Intelligence***, February 2024
6. Reuth Mirsky, Ignacio Carlucho, Arrasy Rahman, Elliot Fosong, William Macke, Mohan Sridharan, Peter Stone, and Stefano V Albrecht. A survey of ad hoc teamwork research. In ***European Conference on Multi-Agent Systems***, pages 275–293. Springer, 2022
7. Josiah P Hanna, Arrasy Rahman, Elliot Fosong, Francisco Eiras, Mihai Dobre, John Redford, Subramanian Ramamoorthy, and Stefano V Albrecht. Interpretable goal recognition in the presence of occluded factors for autonomous vehicles. In ***2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)***, pages 7044–7051. IEEE, 2021
8. Muhammad A Rahman, Niklas Hopner, Filippos Christianos, and Stefano V Albrecht. Towards open ad hoc teamwork using graph-based policy learning. In ***International Conference on Machine Learning***, pages 8776–8786. PMLR, 2021 (**Best paper runner-up at ALA 2021**)

9. Filippos Christianos, Georgios Papoudakis, Muhammad A Rahman, and Stefano V Albrecht. Scaling multi-agent reinforcement learning with selective parameter sharing. In ***International Conference on Machine Learning***, pages 1989–1998. PMLR, 2021

Workshop Papers & Preprints

1. Caroline Wang, Arrasy Rahman, Jiaxun Cui, Yoonchang Sung, and Peter Stone. Rotate: Regret-driven open-ended training for ad hoc teamwork. *arXiv preprint arXiv:2505.23686*, 2025 (**Oral Presentation at CoCo-MARL 2025**)
2. Cameron Angliss, Jiaxun Cui, Jiaheng Hu, Arrasy Rahman, and Peter Stone. A benchmark for generalizing across diverse team strategies in competitive pokëmon. *arXiv preprint arXiv:2506.10326*, 2025
3. Caroline Wang, Di Yang Shi, Elad Liebman, Ishan Durugkar, Arrasy Rahman, and Peter Stone. Sequence modeling for n-agent ad hoc teamwork. *arXiv preprint arXiv:2506.05527*, 2025
4. Elliot Fosong, Arrasy Rahman, Ignacio Carlucho, and Stefano V Albrecht. Few-shot teamwork. *arXiv preprint arXiv:2207.09300*, 2022
5. Ignacio Carlucho, Arrasy Rahman, William Ard, Elliot Fosong, Corina Barbalata, and Stefano V Albrecht. Cooperative marine operations via ad hoc teams. *arXiv preprint arXiv:2207.07498*, 2022
6. Georgios Papoudakis, Filippos Christianos, Arrasy Rahman, and Stefano V Albrecht. Dealing with non-stationarity in multi-agent deep reinforcement learning. *arXiv preprint arXiv:1906.04737*, 2019

Selected Talks

- **Minimum Coverage Sets for Training Robust Ad Hoc Teamwork Agents**
  Arrasy Rahman and Jiaxun Cui
  UC Berkeley Multiagent Learning Seminar (Virtual), Oct 2023
- **Minimum Coverage Sets for Training Robust Ad Hoc Teamwork Agents**
  Arrasy Rahman
  The University of Edinburgh's Reinforcement Learning Reading Group (Virtual), Sept 2023
- **Advances in Ad Hoc Teamwork**
  Arrasy Rahman
  Carnegie Mellon University – AI & Social Good Group Meeting (Virtual), Aug 2023
- **Deep Reinforcement Learning for Multi-Agent Interaction**
  Stefano Albrecht, Arrasy Rahman, Filippos Christianos, and Georgios Papoudakis
  UC Berkeley Multiagent Learning Seminar (Virtual), Jul 2022
- **Graph Convolutional Networks**
  Arrasy Rahman
  Guest Lecture at the University of Indonesia's Faculty of Computer Science, Oct 2020

Other Professional Activities

Organizational Roles

- **Seminar Series Organizer:** Ad Hoc Teamwork Seminar Series (2023-2024)
- **Workshop Organizer:** Workshop in Ad Hoc Teamwork (IJCAI 2022, AAAI 2024), LLM-based Multi-Agent Systems Workshop (AAAI 2026), Workshop on Multi-Agent Learning and Generative AI (ICLR 2026)

Reviewing/Editorial Work

- **Journals:** AAMAS Journal, Neural Computing & Applications (NCAA), TMLR
- **Conferences:** AAMAS (2022, 2023, 2024, 2025), ICML (2022, 2023, 2024, 2025), NeurIPS (2022, 2023, 2024, 2025), AAAI (2023, 2024, 2025), ECAI 2023, IJCAI 2024, ICLR (2024, 2025), RLC 2024
- **Workshops:** ALA (2022, 2023, 2024), CoCoMARL (2024, 2025), WAHT (2022, 2024)

Administrative Roles

- **Ph.D. Admissions Committee Member:** UT Austin (Dec 2023 - Jan 2024)

Relevant Skills

- **Research Expertise:** (Multi-agent) Reinforcement Learning, Agent Modeling, Human-AI Interaction, Multi-Agent Systems, Game Theory, Open-Ended Learning, Large Language Models

- **Technical:** Python, PyTorch, JAX, NumPy, Tensorflow, Hydra, Wandb

Teaching & Mentoring Experience

Mentor & Coordinator **Indonesia Mengglobal** **Jun 2024 – Now**

- Mentored Indonesian students seeking admission into top ML/AI graduate programs by providing advice and feedback on their research and application materials.
- Designed the curriculum for the Ph.D. bootcamp program, which prepares Indonesian students who are aspiring to pursue a Ph.D. in reputable universities overseas.
- **Mentored students:** Rahmah Khoirussyifa' Nurdini, Muhammad Dira Kurnia, Mochamad Rizal Hidayat

Research Advisor **King's College London** **Jun 2024 – Now**

- Co-advised research on applying LLMs to MARL with Dr. Stefanos Leonardos and Dr. Yali Du.
- **Advised students:** Zihao Li

Research Advisor **The University of Texas at Austin** **Nov 2022 – Now**

- Co-advised students researching Ad Hoc Teamwork (AHT) & MARL with Prof. Peter Stone.
- **Advised students:** Caroline Wang, Jiaxun Cui, Zhihan Wang, Lingyun Xiao, Rolando Fernandez, Di Yang Shi, Cameron Angliss, Sanjit Juneja, Johnny Liu, Aditya Madhan, Alexa England

Research Advisor **The University of Edinburgh** **Jan 2020 – Now**

- Co-advised research related to Ad Hoc Teamwork (AHT) & MARL with Dr. Stefano Albrecht.
- **Advised students:** Kale-ab Tessera, Elliot Fosong, Tawqir Sohail, Paul Chelarescu, Niklas Höpner

Instructor **Bangkit Academy** **Sep 2023 – Feb 2024**

- Delivered lectures to prepare undergraduate students from different Indonesian universities with the required skills to pursue ML/AI-related careers.
- **Courses:** Introduction to Machine Learning, Introduction to Unsupervised Learning

Teaching Support Provider **The University of Edinburgh** **Sep 2018 – Aug 2020**

- Designed slides on deep reinforcement learning and delivered them throughout four meetings.
- Devised assignments on model-free and deep RL while also implementing evaluation tools that help provide feedback to course participants.
- Held office hours and demonstration sessions to help students learn more about RL.
- **Courses:** Reinforcement Learning (2018/2019); Reinforcement Learning (2019/2020).

Teaching Support Provider **Universitas Indonesia** **Sep 2012 – Jan 2015**

- Held office hours and tutorials to discuss course materials with students.
- Provided feedback to student assignments.
- **Courses:** Linear Algebra (2012/2013); Intelligent Systems (2013/2014); Automata theory (2013/2014); Probability and Statistics (2014/2015).