# Hassam U. Sheikh

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## Education

**Aug 2016 – Dec 2020** | ***Ph.D.* - Computer Science**
Dissertation: *Multi-agent Reinforcement Learning for Defensive Escort Teams*
University of Central Florida, Orlando

**Sept 2012 – Sept 2013** | ***M.S.* - Advanced Computer Science**
Thesis: *Who is Speaking? Male or Female*
University of Manchester, England

**Aug 2008 – June 2012** | ***B.S.* - Computer Engineering**
Senior Project: *Speech-Controlled Android Robot with Vision*
University of Engineering & Technology, Lahore

## Work Experience

**Aug 2025 – Present** | ***Software Engineer – Reinforcement Learning* - Anyscale**
- **RLlib:** Technical owner for stability, performance, and correctness across RLlib's distributed training and inference stack; define and enforce production-quality bars.
- **RLlib:** Lead reliability hardening by diagnosing and eliminating high-impact failure modes (hangs, deadlocks, non-determinism, resource leaks) in large-scale RL workloads.
- **RLlib:** Drive benchmark-driven performance engineering and regression-prevention guardrails (CI stress tests, determinism checks, perf gates), delivering measurable runtime gains at scale.

**May 2020 – Nov 2024** | ***Research Scientist* - Intel Labs**
- **Blue-Agents:** Built a modular RL research library implementing state-of-the-art algorithms, accelerating experimentation and standardizing research workflows across the RL team.
- **MatSci-LLM:** Core developer of MatSci-LLM, enabling automated materials discovery workflows spanning code generation, analysis, and experimentation.
- **DNS (ICML 2022):** Proposed a Determinantal Point Process (DPP)-based neural network sampler for ensemble RL, reducing computation by 50% while outperforming baselines.
- **MED-RL (ICLR 2022):** Proposed five regularization methods for ensemble RL to prevent value-function collapse and maximize representation diversity in parameter space.
- **LISR (IJCNN 2022):** Proposed an intrinsic reward generator based on learned symbolic trees, producing interpretable intrinsic rewards via arithmetic and logical operators.
- **ECNet (BayLearn 2021):** Developed a training mechanism optimizing task reward and communication cost via learned communication gates, reducing communication cost by 75% without sacrificing performance.

**Aug 2016 – Dec 2020** | ***Graduate Assistant* - University of Central Florida**
- **DE-MADDPG (IJCNN 2020):** Proposed a multi-critic method disentangling global team reward and local agent rewards; reduced parametric growth from exponential to linear and improved performance by 97% over baselines.
- **MAUPG (AAMAS 2019:):** Developed a multi-agent policy-gradient approach using Universal Value Function Approximators (UVFA) to solve multi-scenario single-task learning for cooperative systems.

**Sept 2015 – Aug 2016** | ***Software Engineer* - EZOfficeInventory**
- Shipped bug fixes and major features for EZOfficeInventory and EZRentOut as a full-stack Ruby on Rails engineer in a production SaaS environment.
- Designed and implemented a Zendesk integration: built Ruby on Rails APIs for bidirectional ticketing and asset workflows.
- Developed and launched the EZOfficeInventory Zendesk Marketplace application end-to-end.
- Analyzed large-scale customer behavior data to model conversion likelihood and inform product decisions.

## Publications

- **H. Sheikh**, K. Frisbee, M. Phielipp, "DNS: Determinantal Point Process Based Neural Network Sampler for Ensemble Reinforcement Learning" in *International Conference on Machine Learning (**ICML 2022**).*
- **H. Sheikh**, M. Phielipp, L. Bölöni, "Maximizing Ensemble Diversity in Deep Reinforcement Learning" in *International Conference on Learning Representations (**ICLR 2022**).*
- **H. Sheikh**, S. Khadka, S. Miret, S. Majumdar, M. Phielipp, "Learning Intrinsic Symbolic Rewards in Reinforcement Learning" in *International Joint Conference on Neural Networks (**IJCNN 2022**).*

- M. Mendula, S. Khodadadeh, S. Bacanli, S. Zehtabian, **H. Sheikh**, L. Bölöni, D. Turgut, P. Bellavista, "Interaction and Behaviour Evaluation for Smart Homes: Data Collection and Analytics in the ScaledHome Project" in *International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems (**MSWIM 2021**).*
- **H. Sheikh**, L. Bölöni, "Multi-Agent Reinforcement Learning for Problems with Combined Individual and Team Reward" in *International Joint Conference on Neural Networks (**IJCNN 2020**).*
- **H. Sheikh**, L. Bölöni, "Emergence of Scenario-Appropriate Collaborative Behaviors for Teams of Robotic Bodyguards" in *International Conference on Autonomous Agents and Multiagent Systems (**AAMAS 2019**).*
- **H. Sheikh**, M. Razghandi, L. Bölöni, "Learning Distributed Cooperative Policies for Security Games via Deep Reinforcement Learning" in *IEEE International Conference on Computer Software and Applications (**COMPSAC 2019**).*
- Qadir, M.Z., Jilani, A.N., **H. Sheikh**, "Automatic Feature Extraction, Categorization and Detection of Malicious Code in Android Applications" *International Journal of Information & Network Security, Vol. 3, No. 1, 2014, pp. 12–17.*

## Workshops

- V. Kumar, **H. Sheikh**, S. Majumdar, M. Phielipp, "Minimizing Communication while Maximizing Performance in Multi-Agent Reinforcement Learning" in ***BayLearn 2021**.*
- **H. Sheikh**, L. Bölöni, "Preventing Value Function Collapse in Ensemble Q-Learning by Maximizing Representation Diversity" in *Workshop on Deep Reinforcement Learning at **NeurIPS 2020**.*
- **H. Sheikh**, L. Bölöni, "Designing a Multi-Objective Reward Function for Creating Teams of Robotic Bodyguards Using Deep Reinforcement Learning" in *Workshop on Goal Specifications for Reinforcement Learning at **ICML 2018**.*
- **H. Sheikh**, L. Bölöni, "The Emergence of Complex Bodyguard Behavior Through Multi-Agent Reinforcement Learning" in *Workshop on Autonomy in Teams at **ICML 2018**.*

## Patents

- V. Kumar, **H. Sheikh**, S. Majumdar, M. Phielipp, "System and Method for Controlling Inter-Agent Communication in Multi-Agent Systems" patent application ***(17/544,718)**.*

## Skills

- **ML/RL:** PyTorch, JAX, TensorFlow, Keras, NumPy, Pandas
- **Systems:** Kubernetes, Docker, SQL (MySQL, MS-SQL), Redis, Horovod
- **Languages:** Python, C++, C, C#, JavaScript, Ruby, SQL, HTML