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Omar Adalat

Education

Imperial College London — London, England
PhD in Computing — January 2025 – Present
- Supervisor: Dr. Francesco Belardinelli
- Thesis: Verifiable and Safe Multi-Agent Reinforcement Learning.
- Aligned student with the Safe and Trusted AI Centre for Doctoral Training partnership between Imperial College London and King's College London.

University of Bradford — Bradford, UK
BSc (Hons) in Computer Science — August 2019 – June 2022
- Graduated with First Class classification. Dissertation led to conference publication.
- Bachelor's Project: 88.8%.

Work Experience

Research and Knowledge Transfer Officer: Data Scientist | November 2022 – September 2024
University of Bradford & Rakusen's Ltd
- Applied ML research on an Innovate UK project focused on baking quality, sustainability, and Industry 4.0 digital transformation for a food manufacturing partner.
- Developed a bespoke production-data dashboard integrated with IoT sensors and an in-house Linux server, and deployed real-time predictive deep learning models to production.

Research Assistant | University of Bradford — March 2022 – September 2022
- Investigated automated controller synthesis for manufacturing systems, balancing formal expressivity with combinatorial performance across multiple formalisms.
- Implemented two open-source software tools that later resulted in published papers.

Awards and Honors

- **Gold Medal + Best-in-Show**, Open Research Bradford — May 2024
- **Best Final Year Project**, University of Bradford — July 2022
- **Best Poster**, AIERC 2022 — April 2022

Skills

Research Interests

Safe (Multi-agent) Reinforcement Learning, Formal Verification, Knowledge Representation & Reasoning, Strategic Reasoning, Safe AI, Explainable AI, Neurosymbolic AI, Controller Synthesis, AI Planning.

Technologies

C++ | Python | LaTeX | Java | Go | JavaScript | TypeScript | Git | SQL | Prolog | TensorFlow | PyTorch | d3rlpy | numpy | Svelte | SvelteKit | PostgreSQL

Languages

English (native); Urdu (native)

Talks and Outreach

- **Can You Train AI to Stay Safe?**. Interactive public engagement activity at Imperial's Great Exhibition Road Festival — June 26
- **Permissive Compositional Shielding**. Presentation on latest research at STAI CDT's Quadannual Student Seminar. — May 26
- **Model Safety and Compression**. Group presentation at STAI CDT's AI Sandpit 2026. — Apr 26
- **Decentralised Probabilistic Multiagent Shielding**. Talk at SPIKE's 2026 Neuro-symbolic AI Workshop. — Mar 26
- **Multi-Agent Reinforcement Learning for Alternating-Time Logic**. Presentation and discussion at the ICARL Reading Group based on the paper by Hahn et al. (link). — Mar 25
- **STAI CDT Journal Club**. Presented and discussed a published paper as part of the Journal Club of the Safe and Trusted AI CDT for 1st year students. — Mar 25

Selected Publications

1. **Omar Adalat** and Francesco Belardinelli. "Expressive Temporal Specifications for Reward Monitoring." *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*, 2026. DOI PDF
2. **Omar Adalat**, Daniele Scrimieri, and Savas Konur. "Optimal Manufacturing Controller Synthesis Using Situation Calculus." *Proceedings of the Forty-third SGAI International Conference on Artificial Intelligence, Artificial Intelligence XL*. Lecture Notes in Computer Science (LNAI), volume 14381, Springer, 2023. DOI PDF
3. **Omar Adalat** and Daniele Scrimieri. "Efficient Finite Element Mesh Mapping Using Octree Indexing." *Advances in Computational Intelligence Systems. UKCI 2022. Advances in Intelligent Systems and Computing*, volume 1454, Springer, Cham, 2022. DOI PDF

Academic Services

Conference Reviewing: RLC 2026, AAMAS 2025, ECAI 2025, RLC 2025.

Workshop Reviewing: EWRL 2026, IJCAI-ECAI NILA 2026

Journal Reviewing: *Journal of Intelligent Manufacturing* (2026), *Applied Artificial Intelligence* (2025), *Computers in Industry* (2025).

Module Demonstrator:

- (2024–2025) *40009 Computing Practical 1*.
- (2025–2026) *70028 Reinforcement Learning*, *70031 Formal Methods for Safe AI*, *70077 Intro. to Symbolic AI*, *60012/70050 Intro. to Machine Learning*, and *60034/70010 Deep Learning*.

Module Marking:

- (2024–2025) *40009 Computing Practical 1*.
- (2025–2026) *70028 Reinforcement Learning*, *70031 Formal Methods for Safe AI*, *70077 Intro. to Symbolic AI*, *60012/70050 Intro. to Machine Learning*, *60034/70010 Deep Learning*, *40009 Computing Practical 1*, *50007.3 Computing Practical 2*, *40018 Discrete Mathematics, Logic & Reasoning*, and *50009 Symbolic Reasoning*.

References

Associate Prof. Francesco Belardinelli
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Prof. Savas Konur
University of Bradford
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Associate Prof. Daniele Scrimieri
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Complete Publications List

1. **Omar Adalat** and Francesco Belardinelli. "Expressive Temporal Specifications for Reward Monitoring." *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*, 2026. DOI PDF
2. **Omar Adalat**, Daniele Scrimieri, Shukri Afazov, and Svetan Ratchev. "Model-based generation of manufacturing process plans through on-the-fly topology formation." *Computers & Industrial Engineering*, volume 208, Elsevier, 2025. DOI PDF
3. **Omar Adalat** and Savas Konur. "Offline deep reinforcement learning within the baking industry." *Proceedings of the 12th International Conference on Control, Mechatronics and Automation (ICCMA)*, 2024. DOI PDF
4. **Omar Adalat**, Daniele Scrimieri, and Savas Konur. "Optimal Manufacturing Controller Synthesis Using Situation Calculus." *Proceedings of the Forty-third SGAI International Conference on Artificial Intelligence, Artificial Intelligence XL*. Lecture Notes in Computer Science (LNAI), volume 14381, Springer, 2023. DOI PDF
5. Daniele Scrimieri, **Omar Adalat**, Shukri Afazov, and Svetan Ratchev. "An integrated data-and capability-driven approach to the reconfiguration of agent-based production systems." *International Journal of Advanced Manufacturing Technology*, volume 124, Springer, 2023. DOI PDF
6. **Omar Adalat**, Muhammad Talal, Mohammed Ali Cherif, and Daniele Scrimieri. "Model-based generation of manufacturing process plans through incremental topology formation." *Advances in Computational Intelligence Systems. UKCI 2022. Advances in Intelligent Systems and Computing*, volume 1454, Springer, Cham, 2022. DOI PDF
7. **Omar Adalat** and Daniele Scrimieri. "Efficient Finite Element Mesh Mapping Using Octree Indexing." *Advances in Computational Intelligence Systems. UKCI 2022. Advances in Intelligent Systems and Computing*, volume 1454, Springer, Cham, 2022. DOI PDF
8. Daniele Scrimieri, **Omar Adalat**, Shukri Afazov, and Svetan Ratchev. "Modular reconfiguration of flexible production systems using machine learning and performance estimates." *Manufacturing Modelling, Management and Control* (MIM), IFAC-PapersOnLine, volume 55, issue 10, 2022. DOI PDF