Davide Corsi

Postdoctoral Researcher

University of California: Irvine - Irvine, CA

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Summary

Deep reinforcement learning researcher specializing in safety-critical AI and formal verification. Application of foundation models to robotic control, with a focus on safe reinforcement learning techniques for training and fine-tuning vision–language–action models to ensure system reliability. Practical background in sim-to-real transfer and deployment on diverse robotic platforms, including drones, manipulators, and aquatic vehicles. Demonstrated track record of leading cross-disciplinary research projects, mentoring students, and delivering high-impact publications, code, and datasets to the community.

Skills

- **Machine Learning & AI:** Deep Reinforcement Learning, Safety-Critical AI, Foundation Models (LLMs, VLMs), Causal Inference, Generative Models (VAE, Diffusion)
- **Programming & Systems:** Python, C++, PyTorch, TensorFlow, CUDA, Gymnasium, Unity3D
- **Robotics & Verification:** Sim-to-Real Transfer, Simulator Design, Robotic Control, Neural Network Verification, Safety Shields (LTL, Formal Methods)

Research Experience

University of California, Irvine *Feb 2024 – Present*

Postdoctoral Researcher *Irvine, CA*

- Designed RL methods for training and fine-tuning foundation models (VLMs/VLAMs) in safety-critical robotics.
- Integrated *causal inference* with model-based RL to improve predictive accuracy and robustness.
- Developed delay-tolerant RL algorithms for real-time robotic control.

University of Verona *Oct 2019 – Jan 2024*

Ph.D. in Computer Science & Research Fellow *Verona, Italy*

- Created safe deep RL algorithms balancing performance and safety guarantees.
- Applied DRL to real-world platforms, including autonomous boats and surgical robots.
- Built RL simulators and deployed sim-to-real transfer pipelines.
- Integrated formal verification with RL to enforce safety constraints.

The Hebrew University of Jerusalem *Feb 2022 – Jul 2022*

Visiting Researcher *Jerusalem, Israel*

- Worked on formal verification of RL-driven neural network controllers for safety-critical systems.
- Applied verification to deep learning models for robotic safety.

INTCATCH 2020 *Oct 2018 – Oct 2019*

Research Fellow *Verona, Italy*

- Engineered an autonomous aquatic drone (hardware + software) for environmental monitoring.
- Automated ecological data collection in collaboration with biologists.

Education

University of Verona *Oct 2019 - May 2023*

Ph.D. in Computer Science

- Thesis Title: “Safe Deep Reinforcement Learning: Enhancing the Reliability of Intelligent Systems”
- Advisor: Prof. Alessandro Farinelli

University of Verona *Oct 2016 - Jul 2018*

Master’s Degree in Computer Science [110/110]

- Thesis Title: “Experimental evaluation of Reinforcement Learning approaches: application to a redundant 7DOF manipulator”
- Advisor: Prof. Alessandro Farinelli

Grants

2025 **SAFRON: Safe and Assured Foundation Robots for Open Environments**, Role: Lead Researcher (DARPA). 12-month grant focused on integrating foundation models (LLMs, VLMs) into robotic control for safety-critical tasks. *$161,201*

Awards

2024 **Best Paper Award for "Aquatic Navigation: A Challenging Benchmark for Deep Reinforcement Learning"**, Reinforcement Learning Conference - RLC

Teaching Experience

2023 **Reinforcement Learning**, Teaching Assistant, *University of Verona*
2022 **Foundations of Artificial Intelligence**, Teaching Assistant, *University of Verona*
2021 **Foundations of Artificial Intelligence**, Teaching Assistant, *University of Verona*
2020 **Artificial Intelligence**, Teaching Assistant, *University of Verona*

Academic Service

2025 **Workshop Organizer**, Causal Reinforcement Learning Workshop at the Reinforcement Learning Conference *RLC 2025*
2025 **Senior Reviewer**, Second Reinforcement Learning Conference *RLC 2025*
2024 **Programme Committee**, Thirty-Ninth AAAI Conference on Artificial Intelligence *AAAI 2025*
2023 **Programme Committee**, Thirty-Eighth AAAI Conference on Artificial Intelligence *AAAI 2024*
2022 **Programme Committee**, Thirty-Seventh AAAI Conference on Artificial Intelligence *AAAI 2023*
2023 **Reviewer**, International Joint Conference on Artificial Intelligence *IJCAI 2023*
2023 **Reviewer**, International Conference on Autonomous Agents and Multiagent Systems *AAMAS 2023*

Selected Publications

[7] Realizable Continuous-Space Shields for Safe Reinforcement Learning
K. Kim, **D. Corsi**, A. Rodriguez, JB Lanier, B. Parellada, P. Baldi, C. Sanchez, R. Fox
Conference on Learning for Dynamics and Control (L4DC), 2025.

[6] Verification-Guided Shielding for Deep Reinforcement Learning
D. Corsi, G. Amir, A. Rodriguez, C. Sanchez, G. Katz, R. Fox
Reinforcement Learning Conference (RLC), 2024.

[5] Aquatic Navigation: A Challenging Benchmark for Deep Reinforcement Learning
D. Corsi, D. Camponogara, A. Farinelli
Reinforcement Learning Conference (RLC), 2024.

[4] The #DNN-Verification problem: Counting Unsafe Inputs for Deep Neural Networks
L. Marzari*, **D. Corsi***, F. Cicalese, A. Farinelli
International Joint Conference on Artificial Intelligence (IJCAI), 2023.

[3] Verifying Learning-Based Robotic Navigation Systems
G. Amir*, **D. Corsi***, R. Yerushalmi, L. Marzari, D. Harel, A. Farinelli, G. Katz
International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2023.

[2] Formal verification of Neural Networks for Safety-Critical Tasks in Deep Reinforcement Learning
D. Corsi, E. Marchesini, A. Farinelli
Conference on Uncertainty in Artificial Intelligence (UAI), 2021.

[1] Safe Reinforcement Learning Using Formal Verification for Tissue Retraction in Autonomous Robotic-Assisted Surgery.
A. Pore*, **D. Corsi***, E. Marchesini*, D. Dall'Alba, A. Casals, A. Farinelli, P. Fiorini
International Conference on Intelligent Robots and Systems (IROS), 2021.

For the full list of publications, visit my *Google Scholar* profile: `https://scholar.google.com/citations?user=chv2d8IAAAAJ&hl`.