

# LUCA CASTRI

## Embodied AI & Robotics Researcher | Intelligent Autonomy & Robot Learning

Researcher in Embodied AI with extensive experience deploying data-driven learning and reasoning frameworks on real-world mobile platforms. Expert in navigation, spatial HRI, and fleet coordination using ROS/ROS2. Proven track record in EU-funded research ([DARKO](#)), bridging the gap between theoretical AI models and robust physical deployment.

Nationality Italian Languages Italian (native), English (fluent) 📍 Rome, IT

🌐 [lcastri.github.io](#)   [in lcastri](#)   [🔊 lcastri](#)   ✉ [lucacastri94@gmail.com](mailto:lucacastri94@gmail.com)   📞 +39 3341011284   📄 [List of Publications](#)

## ACADEMIC EXPERIENCE

### Postdoctoral Research Associate

#### University of Lincoln (Partnered with [JABAS AI](#))

📅 Jul 2025 – Ongoing   📍 Lincoln, UK

- Designed multi-robot coordination algorithms on a heterogeneous fleet, optimizing path planning and collision avoidance in dynamic shared environments
- Developed a fleet management system dashboard for real-time monitoring, task allocation, and remote intervention of the robot fleet

### Researcher Associate

#### University of Lincoln ([EU H2020 DARKO Project](#))

📅 Jul 2021 – Jul 2025   📍 Lincoln, UK

- Pioneered Causal Inference frameworks to enhance robot decision-making in human-shared environment
- Bridged the Sim-to-Real gap by developing containerized (Docker) ROS/ROS2 software stacks on real mobile robots ([TIAGo](#), [RB-KAIROS+](#))
- Directed research and implementation of RL strategies for robot task planning

## PROFESSIONAL EXPERIENCE

### Industrial Automation Engineer

#### Metapack Engineering

📅 Jan 2020 – Jun 2021   📍 Rome, Italy

- Led the full-cycle deployment (design, testing, on-site commissioning) of automated pharmaceutical lines under strict production deadlines
- Designed and implemented real-time communication protocols (TCP/IP, UDP) integrating vision systems, motors, and PLCs

### Embedded System Validation Engineer

#### Ferrari

📅 Apr 2019 – Dec 2019   📍 Maranello, Italy

- Validated safety-critical embedded software for ADAS and Airbag ECUs, ensuring compliance with strict automotive safety standards. Conducted HIL testing and analyzed CAN bus data for fault detection in real-time systems

## EDUCATION

### Ph.D. in AI and Robotics

#### University of Lincoln

📅 Jul 2021 – Sept 2025   📍 Lincoln, UK

- My research focused on exploiting causal inference to advance intelligent mobile robotics in dynamic interaction settings, enabling robots to improve prediction, decision-making, and overall autonomy in human-shared environments
- Thesis: “*Causal Inference for Intelligent Mobile Robots in Dynamic Interaction Settings*”
- Ph.D. Advisors: [Nicola Bellotto](#) and [Marc Hanheide](#)

### M.Sc. in Control Engineering

#### La Sapienza, University of Rome

📅 Oct 2016 – Jan 2019   📍 Rome, Italy

- Thesis: “*Autonomous car driving systems: new control strategy*” – Advised by [Antonio Carcaterra](#)
- Final Mark: 110/110 (Italian grading system)
- Awarded with the **Honors Program** (“*Percorso d'Eccellenza*”) for graduating in 2 years with high honors

### B.Sc. in Information and Control Engineering

#### La Sapienza, University of Rome

📅 Sep 2013 – Oct 2016   📍 Rome, Italy

- Thesis: “*Modeling and Control of Robot KUKA LWR4+ in Simulink / VRML*” – Advised by [Alessandro De Luca](#)
- Final Mark: 101/110 (Italian grading system)

## SKILLS

- Languages:** Python, C++, C, SQL
- AI & Robotics:** Tensorflow, Keras, Scikit-learn, ROS, ROS2, Gazebo, pyBullet
- Robots & Sensors:** [TIAGo](#), [RB-KAIROS+](#), [HUNTER 2.0](#), 3D LiDAR
- DevOps & Tools:** Docker, Git, GitHub Actions, CI/CD

## EVENT PARTICIPATION

- Peer Reviewer:** IEEE ICRA, IEEE IROS, Knowledge-Based Systems, CLeaR
- Attended the Advanced Course on AI (ACAI 2021)

## PUBLICATIONS

### Journal Articles 📄

- [L. Castri](#), G. Beraldo and N. Bellotto. (2025), "Causality-enhanced Decision-Making for Autonomous Mobile Robots in Dynamic Environments," *Expert Systems with Applications*. 🌐 [Project Website](#)
- [L. Castri](#), S. Mghames, M. Hanheide and N. Bellotto. (2024), "CANDOIT: Causal Discovery with Observational and Interventional Data from Time-Series," *Advanced Intelligent Systems*. 🐙 [GitHub repo](#)

### Conference and Workshops Proceedings 👥

- A. Rudenko, Y. Zhu, T. Rodrigues de Almeida, T. Schreiter, [L. Castri](#), N. Bellotto, T. Linder, N. Vaskevicius, L. Palmieri, M. Magnusson, A. J. Lilienthal. (2025), "Hierarchical System to Predict Human Motion and Intentions for Efficient and Safe Human-Robot Interaction in Industrial Environments," *German Robotics Conference (GRC)*.
- E. Stracca, A. Rudenko, L. Palmieri, P. Salaris, [L. Castri](#), N. Mazzi, V. Rakcevic, N. Vaskevicius, T. Linder, N. Bellotto, T. Schreiter, Y. Zhu, M. Castellano-Quero, O. Napolitano, E. Stefanini, L. Heuer, M. Magnusson, A. Swikir and A. Lilienthal (2025)., "DARKO-Nav: Hierarchical Risk- and Context-aware Robot Navigation in Complex Intralogistic Environments," *European Robotics Forum (ERF)*.
- S. Mghames, [L. Castri](#), M. Hanheide and N. Bellotto. (2024), "neuROSym: Deployment and Evaluation of a ROS-based Neuro-Symbolic Model for Human Motion Prediction," *IEEE International Conference on Cybernetics and Intelligent Systems (CIS) and IEEE Conference on Robotics, Automation and Mechatronics (RAM)*. 🐙 [GitHub repo](#)
- [L. Castri](#), G. Beraldo, S. Mghames, M. Hanheide and N. Bellotto. (2024), "Experimental Evaluation of ROS-Causal in Real-World Human-Robot Spatial Interaction Scenarios," *IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*. 🌐 [Project Website](#)
- [L. Castri](#), G. Beraldo, S. Mghames, M. Hanheide and N. Bellotto. (2024), "ROS-Causal: A ROS-based Causal Analysis Framework for Human-Robot Interaction Applications," *Causal-HRI Workshop, ACM/IEEE International Conference on Human-Robot Interaction (HRI)*. 🌐 [Project Website](#)
- [L. Castri](#), S. Mghames and N. Bellotto. (2023), "Efficient Causal Discovery for Robotics Applications," *Italian Conference on Robotics and Intelligent Machines (I-RIM 3D)*.
- S. Mghames, [L. Castri](#), M. Hanheide and N. Bellotto. (2023), "Qualitative Prediction of Multi-Agent Spatial Interactions," *IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*.
- S. Mghames, [L. Castri](#), M. Hanheide and N. Bellotto. (2023), "A Neuro-Symbolic Approach for Enhanced Human Motion Prediction," *International Joint Conference on Neural Networks (IJCNN)*.
- [L. Castri](#), S. Mghames, M. Hanheide and N. Bellotto. (2023), "Enhancing Causal Discovery from Robot Sensor Data in Dynamic Scenarios," *Conference on Causal Learning and Reasoning (CLeaR)*. 🐙 [GitHub repo](#)
- [L. Castri](#), S. Mghames and N. Bellotto. (2023), "From Continual Learning to Causal Discovery in Robotics," *AAAI Bridge Program "Continual Causality"*.
- [L. Castri](#), S. Mghames, M. Hanheide and N. Bellotto. (2022), "Causal Discovery of Dynamic Models for Predicting Human Spatial Interactions," *International Conference on Social Robotics (ICSR)*.
- S. Ghidoni, M. Terreran, D. Evangelista, E. Menegatti, C. Eitzinger, E. Villagrossi, N. Pedrocchi, N. Castaman, M. Malecha, S. Mghames, [L. Castri](#), M. Hanheide and N. Bellotto. (2022), "From Human Perception and Action Recognition to Causal Understanding of Human-Robot Interaction in Industrial Environments," *Convegno Nazionale CINI sull'Intelligenza Artificiale (Ital-IA)*.

## INVITED TALKS

- [Causalflow: A Unified Framework for Causality in Time-Series](#), sktime Meetup Series (Online), Jun 2025
- [Causal Inference for Intelligent Mobile Robots in Dynamic Interaction Settings](#), University of Oxford, Jun 2025
- [Enhancing Human-Robot Spatial Interaction through Causal Inference](#), University of Padua, Oct 2023
- Guest lectures on *Causal Discovery for Time-Series*, University of Padua, Nov ([2023](#), [2024](#), [2025](#)), Apr ([2024](#))

## OPEN-SOURCE CONTRIBUTIONS

🐙 [lcastri/causalflow](#)

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A unified framework for causality in time-series, with a suite of methods for causal discovery from both observational and interventional data.