LUCA CASTRI

PhD Student in
AI and Robotics
University of Lincoln, UK

lcastri.github.io
lucacastri94@gmail.com
/in/luca-castri/
github.com/lcastri
Lincoln, UK
+39 3341011284|+44 07763735768

SUMMARY

I am a AI and Robotic scientist specialised in Causal Inference applied to Robotics. My research focuses 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.

Research interests: Causal Inference - Causal Robotics

SKILLS

Robotics & AI: ROS, Gazebo, Docker, Keras, Tensorflow, Scikit-learn

Computer Science: Python, C++, Java, SQL, JavaScript, HTML, LaTeX, git

Languages: Italian (native) - English (fluent)

ACADEMIC EXPERIENCE

Causal Discovery for Time-Series Data — **University of Padua**, Nov 2024
- Lecture in the Artificial Intelligence course of the Computer Science program (Autumn term)

Causal Discovery for Time-Series Data — **University of Padua**, Apr 2024
- Lecture in the Artificial Intelligence course of the Computer Science program (Spring term)

MSc Student Supervisor — **University of Lincoln**, Jan 2024 – Jun 2024
- Thesis: "Learning hierarchical tasks for human-robot on-demand co-production"

Causal Discovery — **University of Padua**, Apr 2023
- Lecture in the Artificial Intelligence course of the Computer Science program (Spring term)

Team member of LCASTOR RoboCup team — **University of Lincoln**, Jan 2023 – Jul 2023
- 2023 RoboCup@Home Open Platform League

Associate Demonstrator (Workshop assistant) — **University of Lincoln**, Oct 2021 – Jun 2022
- Advanced Artificial Intelligence (Autumn term)
- Autonomous and Mobile Robotics (Spring term)

PROFESSIONAL EXPERIENCE

Software Specialist — **Metapack Engineering**, Jan 2020 – Jun 2021
- Designed, developed, and validated HMI and PLC systems
- Developed communication protocols (motors, cameras, printers, PLCs)
- Supported test and start-up procedures
- Main fields: Food and beverages – Pharmaceutical

Test Engineer — **Ferrari (via Amaris)**, Apr 2019 – Dec 2019
- Analysed logic and HMI requirements, legal constraints, and edge cases
- Contributed to ECU design and validation
- Key Areas: ADAS – AirBag – Infotainment

EDUCATION

PhD in AI and Robotics — **University of Lincoln**, Jul 2021 – present
- Supervisors: Nicola Bellotto and Marc Hanheide
- Led the "Causal Reasoning for Safe Human-Robot Spatial Interaction" research task within the EU H2020 DARKO project. The research focuses on applying causal inference to enhance robot autonomy and decision-making in human-shared environments.

Master of Science – Control Engineering (Mark: 110/110) — **La Sapienza University of Rome**, Oct 2016 – Jan 2019
- Supervisors: Gianluca Pepe, Antonio Carcaterra
- Thesis: "*Autonomous car driving systems: new control strategy*"

Bachelor of Science – Information and Control Engineering (Mark: 101/110) — **La Sapienza University of Rome**, Sep 2013 – Oct 2016
- Supervisor: Alessandro De Luca
- Thesis: "*Modeling and Control of Robot KUKA LWR4+ in Simulink / VRML*"

HONORS

Percorso d'Eccellenza (Honors Program) - Master's Degree — **La Sapienza University of Rome**, Jan 2019
Graduated in 2 years with an average grade > 28/30

INVITED TALKS

Causalflow: A Unified Framework for Causality in Time-Series Jun 2025
sktime Meetup Series (Online)

Causal Inference for Intelligent Mobile Robots in Dynamic Interaction Settings Jun 2025
Oxford Robotics Institute, University of Oxford

Enhancing Human-Robot Spatial Interaction through Causal Inference Oct 2023
University of Padua

EVENTS PARTICIPATION

Conference Reviewer: *CLeaR - ICRA - IROS*

Workshop Reviewer: *ICRA Long-term Human Motion Prediction*

Attended courses: *Advanced Course on AI (ACAI2021)*

PUBLICATIONS

Causality-enhanced Decision-Making for Autonomous Mobile Robots in Dynamic Environments
L. Castri, G. Beraldo and N. Bellotto. (2025)
under-review
https://lcastri.github.io/PeopleFlow

Hierarchical System to Predict Human Motion and Intentions for Efficient and Safe Human-Robot Interaction in Industrial Environments
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)
German Robotics Conference (GRC)

DARKO-Nav: Hierarchical Risk- and Context-aware Robot Navigation in Complex Intralogistic Environments
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).
European Robotics Forum (ERF)

CAnDOIT: Causal Discovery with Observational and Interventional Data from Time-Series
L. Castri, S. Mghames, M. Hanheide and N. Bellotto. (2024)
Advanced Intelligent Systems
https://github.com/lcastri/causalflow

neuROSym: Deployment and Evaluation of a ROS-based Neuro-Symbolic Model for Human Motion Prediction
S. Mghames, **L. Castri**, M. Hanheide and N. Bellotto. (2024)
Proceedings of IEEE International Conference on Cybernetics and Intelligent Systems (CIS) and IEEE Conference on Robotics, Automation and Mechatronics (RAM)
https://github.com/sariahmghames/neuROSym

Experimental Evaluation of ROS-Causal in Real-World Human-Robot Spatial Interaction Scenarios
L. Castri, G. Beraldo, S. Mghames, M. Hanheide and N. Bellotto. (2024)
Proceedings of IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)
https://lcastri.github.io/roscausal

ROS-Causal: A ROS-based Causal Analysis Framework for Human-Robot Interaction Applications
L. Castri, G. Beraldo, S. Mghames, M. Hanheide and N. Bellotto. (2024)
Causal-HRI Workshop, ACM/IEEE International Conference on Human-Robot Interaction (HRI)
https://lcastri.github.io/roscausal

Efficient Causal Discovery for Robotics Applications
L. Castri, S. Mghames and N. Bellotto. (2023)
Proceedings of Italian Conference on Robotics and Intelligent Machines (I-RIM 3D)

Qualitative Prediction of Multi-Agent Spatial Interactions
S. Mghames, **L. Castri**, M. Hanheide and N. Bellotto. (2023)
Proceedings of IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)

A Neuro-Symbolic Approach for Enhanced Human Motion Prediction
S. Mghames, **L. Castri**, M. Hanheide and N. Bellotto. (2023)
Proceedings of International Joint Conference on Neural Networks (IJCNN).

Enhancing Causal Discovery from Robot Sensor Data in Dynamic Scenarios
L. Castri, S. Mghames, M. Hanheide and N. Bellotto. (2023)
Proceedings of Conference on Causal Learning and Reasoning (CLeaR)
https://github.com/lcastri/fpcmci

From Continual Learning to Causal Discovery in Robotics
L. Castri, S. Mghames and N. Bellotto. (2023)
AAAI Bridge Program "Continual Causality"

Causal Discovery of Dynamic Models for Predicting Human Spatial Interactions
L. Castri, S. Mghames, M. Hanheide and N. Bellotto. (2022)
Proceedings of International Conference on Social Robotics (ICSR)

From Human Perception and Action Recognition to Causal Understanding of Human-Robot Interaction in Industrial Environments
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)
Convegno Nazionale CINI sull'Intelligenza Artificiale (Ital-IA)