# LUCA CASTRI

PhD Student in
AI and Robotics
University of Lincoln, UK

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## SUMMARY

I am a Robotic and AI scientist specialised in Causal Inference applied to Human-Robot Spatial Interaction (HRSI). My research focuses on enabling robots to learn the effects of their behaviors by observing how humans react to the robot's actions and enhancing the quality of the interaction by exploiting the acquired causal knowledge.

**Research interests:** Causal Inference - Causal Robotics

## SKILLS

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

**Computer Science:** Python, C++, Java, SQL, JavaScript, HTML, LaTeX, git, MATLAB & Simulink

**Languages:** English - professional proficiency
Italian - native

## ACADEMIC EXPERIENCE

Jan/2023 – Jul/2023 — **Team member of LCASTOR RoboCup team** — **University of Lincoln**
- Team member of LCASTOR team competing in the 2023 RoboCup@Home Open Platform League
- Responsible for the "Person Following" task
- Technical tools – libraries – sensors: `ROS, Python` – Bayes People Tracker – Velodyne VLP-16

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

## PROFESSIONAL EXPERIENCE

Jan/2020 – Jun/2021 — **Software Specialist** — **Metapack Engineering**
- Analysis of logic and HMI requirements
- HMI and PLC development
- Handling motors and sensors and data coming from various sensors and cameras
- Developing communication protocols for HMI and machine devices (motor, camera, printer, PLC)
- Follow test and start-up procedures

  Main fields: Food and beverages – Pharmaceutical

Apr/2020 – Dec/2020 — **Test Engineer** — **Ferrari (Amaris Consultant)**
- Analysis of logic and HMI requirements, legislative constraints and corner cases
- Creation of test cases for single ECU validation
- Support to test engineer for the comprehension and the execution of tests
- Planning of test cases creation activities in order to meet deadlines related to software releases
- Collaboration in ECU design process for specification and constraints analysis

  Key Areas: ADAS (ACC, Blind Spot Detection, Park Assist System) – Event Data Record (AirBag) – Infotainment

## EDUCATION

Jul/2021 - present — **PhD in AI and Robotics** — **University of Lincoln**

Supervisors: Nicola Bellotto and Marc Hanheide
- I am currently involved in the European H2020 DARKO project, specifically responsible for Task 4 in Work Package 5, titled "Causal Reasoning for Safe HRSI". I actively participate in review and integration meetings.
- Main research topics: Causality, Robotics, Human-Robot Spatial Interaction (HRSI)

Oct/2016 - Jan/2019 — **Master of Science – Control Engineering (Mark: 110/110)** — **La Sapienza University of Rome**
- Relevant modules: Robotics, Process Automation, Multivariable systems, Control system.
- Thesis: "*Autonomous car driving systems: new control strategy*" - Supervisor: Antonio Carcaterra

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

## PUBLICATIONS AND TALKS

**Enhancing Human-Robot Spatial Interaction through Causal Inference**
Invited talk at the University of Padua (Oct 2023)

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

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

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