

JOSEPH HUMPHREYS

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PROFESSIONAL PROFILE

I am a dedicated and innovative researcher with a passion for advancing the frontier of artificial intelligence, machine learning, and bio-inspired control in the application of robotics. I have delivered several high-impact projects that focused on augmenting deep reinforcement learning and optimal control with bio-inspired behaviour, leading to publications in several world-leading journals, including *Nature Machine Intelligence*, and generating international engagement within the media. The past three years, I was also involved in a diverse set of projects and teaching responsibilities, including running master's projects, collaborative projects with international institutes, delivering tutorials and labs, running the student rocketry propulsion team, and developing research solutions for industry-funded projects. Looking to the future, I aspire to expand the boundaries of robotics research through interdisciplinary collaboration, secure funding to lead impactful projects, and progress toward a research fellowship and eventual professorship in academia.

EDUCATION

PhD in Robotics, University of Leeds | 2022-2025 | Submitted

Project Towards Natural Versatility in Legged Robots through Bio-inspired and Learning-based Frameworks

Collaborations: EPSRC IAA TeLeMan Duo, UKRI AMPI, EU Horizon EUROBENCH, EPSRC Pipebots Initiative

MSc in Robotics and Mechatronics, University of Leeds | 2021-2022 | Distinction

BEng in Mechanical Engineering (Hons), Coventry University | 2016-2020 | 1st

PROFESSIONAL ROLES

UCL Humanoid Robotics Lab | Research Assistant | 2025-Present

Role: The development of loco-manipulation and bio-inspired locomotion frameworks for legged robots.

Real Robotics Lab | Research Assistant | 2025

Role: The development of design tools, algorithms and simulation environments for small scale pipe robots.

University of Leeds | Teaching Assistant | 2022-2025

Role: Leading the delivery of tutorials and labs in coding, hardware development, and classical mechanics modules.

Severn Trent | Design Engineer Intern | 2018-2019

Role: Working to deliver solution feasibility analysis and outline design on projects at wastewater plants.

PUBLICATIONS

- J. Humphreys, and C. Zhou, 2025. *Learning to Adapt through Bio-Inspired Gait Strategies for Versatile Quadruped Locomotion*. *Nature Machine Intelligence*, DOI: <https://doi.org/10.1038/s42256-025-01065-z>
- T. Peng, L. Bao, J. Humphreys, A. M. Delfaki, D. Kanoulas and C. Zhou, 2024. *Learning Bipedal Walking on a Quadruped Robot Via Adversarial Motion Priors*. *Towards Autonomous Robotics Systems*, DOI: https://doi.org/10.1007/978-3-031-72062-8_11
- J. Humphreys, J. Li, Y. Wan, H. Gao and C. Zhou, 2023. *Bio-Inspired Gait Transitions for Quadruped Locomotion*. *IEEE Robotics and Automation Letters*, DOI: <https://doi.org/10.1109/LRA.2023.3300249>
- Y. Wan, J. Sun, C. Peers, J. Humphreys, D. Kanoulas and C. Zhou, 2023. *Performance and Usability Evaluation Scheme for Mobile Manipulator Teleoperation*. *IEEE Transactions on Human-Machine Systems*, DOI: <https://doi.org/10.1109/THMS.2023.3289628>
- J. Humphreys, C. Peers, J. Li, Y. Wan and C. Zhou, 2023. *High Utility Teleoperation Framework for Legged Manipulators Through Leveraging Whole-Body Control*. *Journal of Intelligent and Robotic Systems*, DOI: <https://doi.org/10.1007/s10846-023-01866-7>
- J. Humphreys, C. Peers, J. Li, Y. Wan, J. Sun, R. Richardson and C. Zhou, 2022. *Teleoperating a Legged Manipulator Through Whole-Body Control*. *Towards Autonomous Robotic Systems*, DOI: https://doi.org/10.1007/978-3-031-15908-4_6
- J. Humphreys, C. Peers, Y. Wan, R. Richardson and C. Zhou, 2022. *Teleoperation of a Legged Manipulator for Item Disposal*. *UK Robotics and Autonomous Systems Conference*, DOI: <https://doi.org/10.31256/Ht4Wq6B>

- J. Li, H. Gao, Y. Wan, **J. Humphreys**, C. Peers, H. Yu and C. Zhou, 2022. [Whole-body Control for a Torque-controlled Legged Mobile Manipulator](#). *Actuators*, DOI: <https://doi.org/10.3390/act11110304>
- J. A. Castano, **J. Humphreys**, E. M. Hoffman, N. F. Talavera, M. C. R. Sanchez and C. Zhou, 2022. [Benchmarking Dynamic Balancing Controllers for Humanoid Robots](#). *Robotics*, DOI: <https://doi.org/10.3390/robotics11050114>
- C. Peers, **J. Humphreys**, Y. Wan, J. Li, J. Sun, R. Richardson and C. Zhou, 2022. [Trigger-assisted Ambidextrous Control Framework for Teleoperation of Two Legged Manipulators](#). *Towards Autonomous Robotic Systems*, DOI: https://doi.org/10.1007/978-3-031-15908-4_5

RESEARCH PROJECTS

EPSRC IAA TeLeMan DUO | 2024-2025

Outline: The development of a teleoperation framework for multiple legged robots, capable of handling the challenges of real-world environments and exploiting shared autonomy.

Key Tasks:

- Assisted in the writing of the project proposal and led the project in its later stages.
- Development a bio-inspired deep reinforcement learning locomotion framework for zero-shot adaptation to complex real-world terrains.
- Led collaborative projects between the University of Leeds and University College London.

Output: Publications in Nature Machine Intelligence and Annual Conference Towards Autonomous Robotics Systems. Features at ICRA 2024 and in BBC Look North, The Telegraph, Radio New Zealand, and ITV news bulletin.

EPSRC Pipebots Initiative | 2025

After targeted discussion on stakeholder requirements, I developed deep learning tools for the design of pipe climbing robots to be deployed by BT in real infrastructure, along with designing several hardware experiments for validation.

Innovate UK AMPI | 2022-2024

Outline: The development of a teleoperation loco-manipulation control framework for explosive ordnance disposal using legged robots.

Key Tasks:

- Development of a bespoke optimal control-based whole-body controller for intuitive teleoperation.
- Formulation of a bio-inspired gait scheduler for quadruped agnostic gait transitions.
- Development of performance and usability metrics for teleoperation control of legged manipulators.
- Led collaborative projects between the University of Leeds and Harbin Institute of Technology.

Output: Publications in IEEE Transactions on Human-Machine Systems, IEEE Robotics and Automation Letters, Journal of Intelligent & Robotic Systems, Annual Conference Towards Autonomous Robotics Systems, and UKRAS22 Conference Proceedings. Features in UK Lab Live and IEEE Spectrum Video Friday.

EU Horizon EUROBENCH | 2022

In collaboration with King Juan Carlos University, I developed core simulation environments, performance metrics, and control framework testing procedures in the drive to create the first benchmarking framework for robotic systems, which also led to a journal publication.

TEACHING

Teaching Assistant | 2022-2025

Outline: Supervising, leading, and assisting in the delivery of course content across coding (MECH1010), mechanical design (MECH2636), and classical mechanics modules (MECH1310).

Key Tasks:

- Supervised several master's projects and junior PhD students, leading to several co-authored publications.
- Designing and delivering tutorials, focusing on class engagement.
- Preparing lab material and running lab exercise to best prepare students for upcoming coursework.
- Providing individual and group coding support while also designing example questions and coding challenges.
- Marking coursework and class tests.

EXTRACURRICULAR, INTERESTS AND OTHER ACHIEVEMENTS

- Designed and built a liquid rocket engine and cryogenic centrifugal pump.
- Competed at the Race2Space National Propulsion Competition 2023 and 2024 in which our team won an award.
- Achieved the Silver and Bronze Duke of Edinburgh Award.
- I train in kickboxing and Muay Thai.
- I regularly rock climb

REFERENCES AVAILABLE UPON REQUEST