

UNIVERSITY OF

**CAMBRIDGE** 

DEPARTMENT OF ENGINEERING

### TAROS'23 & JOINT ROBOTICS CDT CONFERENCE



	DAY 0: TUESDAY, 12 SEPTEMBER 2023
17:00 20:00	Student Registration & Welcome Courtyard Marquee/Department of Engineering
DAY 1: WEDNESI	DAY, 13 SEPTEMBER 2023
08:00 - 09:00	Registration (Day 1) Courtyard Marquee & LT4/Department of Engineering
DAY 1 ACTI	VITIES: Dr Constance Tipper Lecture Theatre
09:00 - 09:15	Welcome and Introduction Fumiya lida
09:15 - 10:00	Fernando Rodriguez y Baena Imperial College London
10:00 - 11:00	<b>Short Talks:</b> Session 1 Chair: Perla Maiolino
11:00 – 11:30	BREAK: Refreshments Courtyard Marquee/Department of Engineering
11:30 – 12:30	<b>Short Talks:</b> Session 2 Chair: Mingfeng Wang
12:30 – 14:00	LUNCH & Poster Sessions Courtyard Marquee & LT4/ LT1 & 2
14:00 - 14:45	<b>Jamie Shotton</b> Wayve
14:45 – 15:45	<b>Short Talks:</b> Session 3 Chair: Arsen Abdulali
15:45 – 17:15	Poster Sessions & Refreshments Courtyard Marquee/ LT1 & 2
18:30 – 19:00	Reception & TAROS'23 Celebration Dinner
19:00 - 21:00	at Robinson College

DAY 2: THURSDAY, 14 SEPTEMBER 2023		
08:30 - 09:00	<b>Registration (Day 2)</b> Courtyard Marquee & LT4/Department of Engineering	
DAY 2 ACTIVITIES: Dr Constance Tipper Lecture Theatre		
09:00 - 09:45	Amanda Prorok University of Cambridge	
09:45 - 10:45	Short Talks: Session 1 Chair:	
10:45 — 11:15	Coffee Break & Poster Session Courtyard Marquee/ LT1 & 2	
11:15– 12:15	<b>Short Talks:</b> Session 2 Chair:	
12:15 - 14:00	LUNCH & Poster Session Courtyard Marquee & LT4/ LT1 & 2 /Agriforwards CDT Steering Committee Meeting/	
14:00 - 14:45	<b>Gert Kootstra</b> Wageningen University Chair: Prof Marc Hanheide	
14:45 – 15:45	Industry/Government/UK-RAS Forum Chair: Manuel Giuliani	
15:45 – 16:30	Coffee Break & Poster Session Courtyard Marquee/ LT1 & 2	
16:30 - 17:00	<b>QMUL UK PhD Awards</b> Chair: Lorenzo Jamone	
17:00 - 17:30	TAROS Awards Chair: Perla Maiolino	
17:30 – 19:00	Women in Robotics Chair: Isabelle Ormerod LT1 & 2	
19:30 – 21:00	Academics & Industry Networking (Corpus Christi) Cambridge Pub Tour (Student activity)	



08:30 - 09:00	<b>Registration (Day 3)</b> Courtyard Marquee & LT4/Department of Engineering
DAY 3 ACT	IVITIES: Dr Constance Tipper Lecture Theatre
09:00 - 09:30	<b>CDT Sessions INTRO</b> Chairs: Fumiya lida/Marc Hanheide
09:30 - 10:30	<b>CDT Session 1: CDT-RAS (Edinburgh)</b> Chair: Marc Hanheide
10:30 - 11:00	BREAK: Refreshments & all CDT Poster Session Courtyard Marquee/ LT1 & 2
11:00 - 12:00	<b>CDT Session 2: Farscope (Bristol)</b> Chair: Helen McGloin
12:00 - 12:30	<b>CDT Panel:</b> Student Training & Career Chair:
12:30 – 13:30	LUNCH & Poster Session Courtyard Marquee & LT4/ Inglis Building Corridor & OHMC
13:30 – 14:30	CDT Session 3: AIMS (Oxford)
14:30 — 15:00	<b>CDT Panel:</b> Future Collaborations Chair:
15:00 – 17:00	Farewell Reception & Poster Session All AF CDT Students/Robotic Demonstrations Courtyard Marquee/ Inglis Building Corridor & OHMC





DAY 0: TUESDAY, 12 SEPTEMBER 2023		
17:00 20:00	Student Registration & Welcome Courtyard Marquee/Department of Engineering	
UNIVERSITY OF CAMBRIDGE DEPARTMENT OF ENGINEERING	On <b>Tuesday, the 12<sup>th</sup> of</b> <b>September 2023</b> we would like to invite all students attending the conference to an informal evening event that will include conference registration and a spread of pizza.	
Agri Girigo Control Co	This is a low-key welcome gathering where students can meet and greet each other in the friendly surroundings of the	

#### **Registration (Day 1)** 08:00 - 09:00Courtyard Marquee & LT4/Department of Engineering **DAY 1 ACTIVITIES: Dr Constance Tipper Lecture Theatre** Welcome and Introduction 09:00 - 09:15 Fumiya lida Fernando Rodriguez y Baena 09:15 - 10:00Imperial College London Short Talks: Session 1 10:00 - 11:00 Chair: Perla Mailino **BREAK:** Refreshments 11:00 - 11:30 Courtyard Marguee/Department of Engineering Short Talks: Session 2 11:30 - 13:00 Chair: Mingfeng Wang LUNCH & Poster Sessions 13:00 - 14:00 Courtyard Marquee & LT4 / LT1 & 2/OHMC **Jamie Shotton** 14:00 - 14:45 Wayve Short Talks: Session 3 14:45 - 15:45 Chair: Arsen Abdulali **Poster Sessions & Refreshments** 15:45 - 17:15 Courtyard Marguee/LT1 & 2/OHMC **Reception & TAROS'23 Celebration Dinner** 18:30 - 19:00 at Robinson College 19:00 - 21:00

**Prof Fernando Rodriguez y Baena Imperial College London** 



**Dr Jamie Shotton** Wayve





Please come to pick up your conference name badge and a slice of pizza.

Trumpington Street.

courtyard behind the main building of the Department

of Engineering that is on



19:00 - 21:00

## WELCOME TO TAROS'23 & JOINT ROBOTICS CDT CONFERENCE

Prototype Robotic Arm Manipulator

PRESENTATION

Cpg-based Locomotion Control Of A Quadruped Robot With An Active Spine

Simultaneous Base And Arm Trajectories For Multi-target Mobile Agri-robot

Towards Wait-and-catch Routine Of A Dynamic Swinging Object Using A

PRESENTER

Yunlong LIAN

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TEODORESCU

Josh DAVY

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08:00 - 09:00	<b>Registration (Day 1)</b> Courtyard Marquee & LT4 / Department of Engineering	
DAY 1 ACTIVITIES: Dr Constance Tipper Lecture Theatre		
09:00 - 09:15	Welcome and Introduction Fumiya lida	
09:15 - 10:00	Keynote 1: Sethu Vijayakumar University of Edinburgh	
10:00 - 11:00	SHORT TALKS: Locomotion & Manipulation Chair: Perla Maiolino	
11:00 – 11:30	<b>BREAK:</b> Refreshments Courtyard Marquee/Department of Engineering	
11:30 - 13:00	SHORT TALKS: Visual & Tactile Sensing Chair: Mingfeng Wang	
13:00 - 14:00	LUNCH & Poster Sessions Courtyard Marquee & LT4 / LT1 & 2/OHMC	
14:00 - 14:45	<b>Keynote 2:</b> Jamie Shotton Wayve	
14:45 - 15:45	SHORT TALKS: Machine Vision Chair: Arsen Abdulali	
15:45 – 17:15	<b>Poster Sessions &amp; Refreshments</b> Courtyard Marquee/ LT1 & 2	
18:30 – 19:00 19:00 – 21:00	Reception & TAROS'23 Celebration Dinner at ROBINSON COLLEGE	

F ERLA IVIAIULINU	Wenxing LIU	Sim-to-real Deep Reinforcement Learning With Manipulators For Pick-and-place
	PRESENTER	PRESENTATION
SHORT TALKS: VISUAL & TACTILE	Prasad RAYAMANE	Human-Robot Handover with Vision-Based Tactile Sensors
Sensing	N'Zebo Richard ANVO	Automated 3D Mapping, localization and pavement inspection with low cost RGB- D cameras and IMUs
CHAIR: MINGFENG WANG	Gabriele GIUDICI	Validation Of Multi-finger Robotic Telemanipulation System With Tactile Feedback
WINGPENG WANG	Jaskaran Singh WALIA	Optimised Custom Dataset For Efficient Detection Of Underwater Trash
	PRESENTER	PRESENTATION
	Sandeen BABLI	East 3D Semantic Segmentation Using a Self Attention Network and Random

	PRESENTER	PRESENTATION
SHORT TALKS:	Sandeep BABU Majid JEGARIAN	Fast 3D Semantic Segmentation Using a Self Attention Network and Random Sampling
MACHINE VISION Chair:	Bradley HURST	An assessment of self-supervised learning for data efficient potato instance segmentation
ARSEN ABDULALI	Charalampos MATSANTONIS	A Geometric Algebra Solution to the 3D Registration Problem
	Dario MANTEGAZZA	Active Anomaly Detection for Autonomous Robots: a Benchmark



SHORT TALKS:

LOCOMOTION & MANIPULATION

CHAIR:

PERLA MAIOLINO







	PRESENTER	POSTER
	David BATTY	Occupancy Map Abstraction for Autonomous Ground Rover Exploration in Hazardous Environments
	Xiaoliang ZHANG	Towards Long-horizon Motion Planning in Dynamic Environments
	Alex ELLERY	What is a Universal Constructor that we should be Mindful of it?
	Daniel S. JOHNSON	Receding Horizon Contact Planning for Advanced Motions in Hexapod Robots
POSTER SESSION 1	Roee M. FRANCOS	Spiral Sweeping Protocols for Detection of Smart Evaders
	Christopher WHEAT	Detection and Classification of Unmanned Aerial Vehicles using Commercial Off-The-Shelf Radar Detectors
LECTURE THEATRE 1 (LT1)	Qi ZHANG	Towards Lifelong Social Robot Navigation in Dynamic Environments
	Brian ANGULO	Evaluation of Safety Constraints in Autonomous Navigation with Deep Reinforcement Learning
	Sarfraz AHMED	Investigation of Action Recognition for Improving Pedestrian Intent Prediction
	Gjosse ZIJLSTRA	Toward Semi-Autonomous Terrestrial Robots for Atmospheric Electricity Measurement
	Zhiyuan YANG	Evaluation of SLAM algorithms for Search and Rescue applications
	Mal FAZLIU	Automating Robotic Gas Distribution Mapping in Unknown and GPS-denied Environments
	Elif DEGIRMENCI	Developing an Integrated Runtime Verification for Safety and Security of Industrial Robot Inspection System









**POSTER SESSION 2** 

LECTURE THEATRE 2 (LT2)

# WELCOME TO TAROS'23 & JOINT ROBOTICS CDT CONFERENCE

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PRESENTER	POSTER
Elijah ALABI	Evaluation Of OSMC Open Source Motor Driver for Reproducible Robotics Research
Lupo MANES	Cable-loop Gripper Add-on for Multimodal Grasping of Lab Supplies
Dexter SHEPHERD	Low-resolution Sensing for Sim-to-real Complex Terrain Robots
Kshitij GAIKWAD	Open Source Hardware Robotics Interfacing Board
Adam SPIERS	Naturalistic Robot Arm Trajectory Generation via Representation Learning
Ciaran DOWDS	Object Feature Reconstruction via Robotic In-Hand-Manipulation and Haptic Proprioception
Ian HOWARD	Design and kinematic analysis of a 3D-printed 3DOF robotic manipulandum
Shibao YANG	Reinforcement Learning-based Adaptive Probabilistic Movement Primitives in Hybrid Scenarios (Extended Abstract)
Laurence ROBERTS-ELLIOTT	Towards an Abstract Lightweight Multi-robot ROS Simulator for Rapid Experimentation
Joshua W. G. GILMOUR	Towards Heterogeneous Modular Robotic Systems for Industrial Applications
James KELLETT	Angled Cantilever Construction by Force-Aware Robotic Swarms









OTHER CONFERENCE ACTIVITIES		
<b>13 September</b> 18:30 21:00	<b>Reception &amp; TAROS'23 Dinner</b> Robinson College	
<b>14 September</b> 16:30 17:00	<b>OMUL UK PhD Awards</b> Department of Engineering	
<b>14 September</b> 17:00 17:30	<b>TAROS'23 Awards</b> Department of Engineering	
<b>14 September</b> 17:30 19:00	WOMEN in ROBOTICS Department of Engineering	
<b>14 September</b> 19:30 21:00	<b>ACADEMIC &amp; INDUSTRY NETWORKING</b> Corpus Christi	
<b>15 September</b> 15:00 17:00	<b>FAREWELL RECEPTION</b> Department of Engineering	

08:30 - 09:00	<b>Registration (Day 2)</b> Courtyard Marquee & LT4/Department of Engineering
DAY 2	ACTIVITIES: Dr Constance Tipper Lecture Theatre
09:00 - 09:45	Amanda Prorok University of Cambridge
09:45 - 10:45	<b>Short Talks:</b> Session 1 Chair:
10:45 - 11:15	<b>Coffee Break &amp; Poster Session</b> Courtyard Marquee/ LT1 & 2
11:15– 12:15	<b>Short Talks:</b> Session 2 Chair:
12:15 - 14:00	LUNCH & Poster Session Courtyard Marquee/ LT1 & 2 /Agriforwards CDT Steering Committee Meeting/
14:00 - 14:45	<b>Gert Kootstra</b> Wageningen University Chair: Prof Marc Hanheide
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17:00 – 17:30	TAROS'23 Awards Chair: Perla Maiolino
17:30 - 19:00	WOMEN in Robotics Chair: Isabelle Ormerod LT1 & 2
19:30 - 21:00	Academic & Industry Networking Event (Corpus Christi) Cambridge Pub Tour (Student activity)

**Dr Amanda Prorok** University of Cambridge

**Dr Gert Kootstra** 



Wageningen University











PRESENTER

James O'KEEFFE

Myles FLANAGAN

OINT ROBOTICS CDT CONFERENC
PRESENTATION
Hardware Validation of Adaptive Fault Diagnosis in Swarm Robots
Mobile Robots For Collaborative Manipulation Over Uneven Ground Using Decentralised Impedance Control
Multi-agent Collaborative Target Search Based on Curiosity Intrinsic Motivation
Simulation of Collective Bernoulli-Ball System for Characterizing Dynamic Self- stability and State Transitions
PRESENTATION
An Automated Precision Spraying Evaluation System
Smart Parking System Using Heuristic Optimization For Autonomous Transporta Robots In Agriculture

CONFERENCE	
08:30 - 09:00	<b>Registration</b> Courtyard Marquee & LT4 /Department of Engineering
DAY 2 ACTIV	ITIES: Dr Constance Tipper Lecture Theatre
09:00 - 09:45	Keynote 3: Amanda Prorok University of Cambridge
09:45 - 10:45	SHORT TALKS: MULTI-ROBOT Chair:
10:45 – 11:15	Coffee Break & Poster Session Courtyard Marquee/ LT1 & 2
11:15– 12:15	SHORT TALKS: APPLICATIONS Chair:
12:15 – 14:00	LUNCH & Poster Session Courtyard Marquee & LT 4 / LT1 & 2 /Agriforwards CDT Steering Committee Meeting/
14:00 - 14:45	<b>Keynote 4: Gert Kootstra</b> Wageningen University Chair: Prof Marc Hanheide
14:45 – 15:45	Industry/Government/UK-RAS Forum Chair: Manuel Giuliani
15:45 – 16:30	Coffee Break & Poster Session Courtyard Marquee/ LT1 & 2
16:30 – 17:00	<b>QMUL UK PhD Awards</b> Chair: Lorenzo Jamone
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17:30 – 19:00	Women in Robotics Chair: Isabelle Ormerod LT1 & 2
19:30 – 21:00	Academics & Industry Networking (Corpus Christi)

Cambridge Pub Tour (Student activity)

	Xiaoping ZHANG	Multi-agent Collaborative Target Search Based on Curiosity Intrinsic Motivation
	Fan YE	Simulation of Collective Bernoulli-Ball System for Characterizing Dynamic Self- stability and State Transitions
	PRESENTER	PRESENTATION
Short Talks: Applications Chair:	Harry ROGERS	An Automated Precision Spraying Evaluation System
	Roopika RAVIKANNA	Smart Parking System Using Heuristic Optimization For Autonomous Transportation Robots In Agriculture
	Jierui SHI	Closed-Loop Robotic Cooking of Soups with Multi-modal Taste Feedback
	Dominic MURPHY	Folding Morphing-wheg Duct-entry Robot for Nuclear Characterisation



SHORT TALKS: Multi – Robot

CHAIR:







	PRESENTER	POSTER
	Rachel TRIMBLE	Skid-steer friction calibration protocol for digital twin creation
	Barry William MULVEY	Traversing Visually-Similar Physically-Different Obstacles with DeforMoBot, a Bio-Inspired Deformable Mobile Robot
	Laura ALVAREZ-HIDALGO	Human evaluation of robotic grippers for berry picking
POSTER SESSION 1 LECTURE THEATRE 1 (LT1)	Kedar SUTHAR	Casting vs injection moulding: a comparison study for in-lab low-cost soft robot fabrication
	Saloni HAJARE	Suction Cup Detachment Mechanism based on Fluidic Soft Actuators Strain for In-vivo Applications
	Kavyan ZOUGHALIAN	Access Control Mechanism Framework for Assistive Robots in Healthcare
	Leone COSTI	Comparative study of hand-tracking and traditional control interfaces for remote palpation
	Chapa SIRITHUNGE	Estimation of Soft Body Deformation by Using Light
	Srikishan VAYAKKATTIL	Plant phenotyping using DLT method: Towards retrieving the delicate features in a dynamic environment
	Huijiang WANG	Reduced-Order Modeling of a Soft Anthropomorphic Finger for Piano Keystrokes
	Joseph SOGUNRO	Multi-axis Force and Tactile Sensor Sleeves for Micro Catheters & Cannulas
	Rafi HOSSAIN	Prototyping Mechanical Design of a Robotic Tail for Human Balance Support
	Elijah ALMANZOR	Rapid Development and Performance Evaluation of a Potato Planting Robot











	PRESENTER	POSTER
<b>POSTER SESSION 2</b> Lecture Theatre 2 (LT2)	Andrew WEST	Sonification of Ionising Radiation Data for Robot Operators
	Burak KIZILKAYA	5G-based Low-Latency Teleoperation: Two-way Timeout Approach
	Nasiru ABOKI	Automating a Telepresence Robot for Human Detection, Tracking, and Following
	Hyeonggeun YUN	Generative Model-based Simulation of Driver Behavior when Using Control Input Interface for Teleoperated Driving in Unstructured Canyon Terrains
	Seth ROBERTS	Human Machine Interface for a Pick-and-Place Task Using Extended Reality Devices
	Aaron SMILES	Implementation and Validation of a Stereo Vision System for Robotic Teleoperation Simulator
	Emanuele DE PELLEGRIN	Towards Multimodal Sensing and Interaction for Assistive Autonomous Robots
	Imene TARAKLI	Personalised Interactive Reinforcement Learning with Multi-Task Pre-training











Edinburgh Centre for Robotics	PRESENTER	PRESENTATION
	Sabrina McCALLUM	
	Houman MEHRAFARIN	
CHAIR: Marc Hanheide	Meriam MOUJAHID	
	Paul BAISAMY	
	PRESENTER	PRESENTATION
Farscope (Bristol) Chair:	Helen McGLOIN & Ella MAULE	Sustainability in Robotics workshop
	Isabelle ORMEROD	Women in Robotics
	PRESENTER	PRESENTATION
AIMS (Oxford) Chair:	Yash BHALGAT	
	Benjamin ELLIS	
	Cong LU	
AGRIF	<b>ORWARDS CDT POSTER SE</b>	SSION & FAREWELL RECEPTION









#### POSTER SESSION 1

#### LECTURE THEATRE 1 (LT1)

PRESENTER	POSTER
Afsaneh KARAMI	
Alex ELIAS	
Amie OWEN	
Andrew PERRETT	
Andrew SIMPSON	
Bethan MONCUR	Deciding to Implement Emerging Technologies: the Use of Digital Technologies in Planning the Implementation of Robotics and Autonomous Systems (RAS) in Food Manufacturing Firms
Callum LENNOX	
Calvin JOHN	
Charalampos MATSANTONIS	Characteristic Multivector Fitting of Two 3D Point Sets
Grey CHURCHILL	
Elijah ALMANZOR	Shape Control of Soft Continuum Robots Using Drawn Images
Emlyn WILLIAMS	
Garry CLAWSON	Designing Food Supply Chain for Nutritional Delivery and Traceability
Grzegorz SOCHACKI	Improving Robotic Taste Performance in Classification Task with Mastication
Hai Hui YAN	Printing Soft Robotic Gripper for Automated Strawberry Harvesting
Harry ROGERS	









PRESENTER	POSTER
Jack BRADLEY	
Jack FOSTER	Uncertainty-Guided Multi-Agent Continual Learning for Food Supply-Chain Knowledge Graph Completion
James BENNETT	
James HESELDEN	
Karoline HEIWOLT	Statistical shape representations for temporal registration of plant components in 3D
Kyle FOGARTY	Neutral Geometry Processing for 3D Natural Structure Modelling
Mazvydas GUDELIS	
Paul-David ZUERCHER	Optimising Immersive Assistance Systems for Managing Automated Manufacturing Operations with Limited Resources
Prabuddhi WARIYAPPERUMA	
Rachel TRIMBLE	Integrating Epidemiological Modelling with Reinforcement Learning for Effective Controls of Invasive Plant Disease
Roopika RAVIKANNA	
Vijja WICHITWECHKARN	Making MACARONS
William ROHDE	Precision Agriculture: Controlling Crop Growth
Willow MANDIL	Combining Visual and Tactile Sensation to Enhance Physical Robot Interactions
Xumin GAO	
Yi ZHANG	



#### LECTURE THEATRE 2 (LT2)





