

TAROS
LONDON 2024



Brunel
University
London

25th Towards Autonomous Robotic Systems (TAROS) Conference

📅 21 - 23 August 2024

📍 Eastern Gateway, Brunel University London



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Dear TAROS 2024 Conference Delegates,

It is with great pleasure and a sense of pride that I, on behalf of the organising committee, welcome you all to the 25th TAROS Conference 2024 at Brunel University London. We are honoured to host this prestigious conference on its Silver Jubilee and to bring together such a distinguished group of researchers, academics, research students, professionals, and thought leaders from around the globe.

TAROS is the longest-running UK-hosted international conference on robotics and autonomous systems (RAS), dedicated to the presentation and discussion of the latest results and methods in autonomous robotics research and applications. The conference offers a welcoming environment for robotics researchers and industry professionals to assess current developments and plan for future progress. It is a platform that embraces both senior researchers and research students, providing unique opportunities to present their work to the scientific community.

We have carefully curated a programme that includes a diverse array of keynote speeches, panel discussions, oral and poster presentations, industry exhibitions, robot demonstrations, and social events—all designed to stimulate thought, encourage collaboration, and inspire innovation. This year, the conference also includes a PGR-ECR day, featuring contributions from Brunel's Robotics and AI for Healthcare group and the EPSRC Centres for Doctoral Training (CDTs): AgriFoRwArDs, ALBERT, and FARSCOPE.

I encourage each of you to fully engage with the sessions, share your insights, and connect with fellow delegates. Let's make this event a collaborative and enriching experience for everyone.

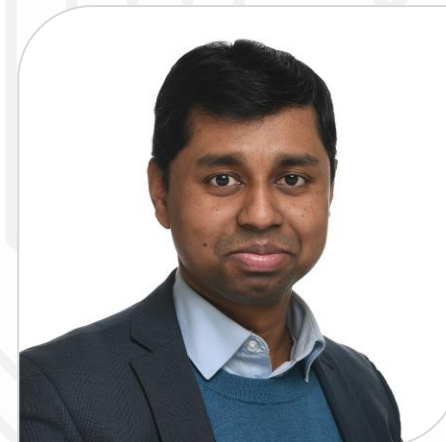
As the Chair of this conference, I want to express my sincere gratitude to our invited speakers, authors, reviewers, partners, sponsors, and the organising committee for their tireless efforts in making this event possible.

Once again, welcome to TAROS 2024, and thank you for joining us. I hope you find the next few days both productive and enjoyable.

Thank you.

M Nazmul Huda

General Chair - TAROS 2024



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WILEY

DAY 0: TUESDAY, 20 August 2024

17:00	Ground Floor, ESGW Building	Registration & Welcome
21:00		

DAY 1: WEDNESDAY, 21 August 2024

08:30 - 09:00	Ground Floor, ESGW Building	Registration & Welcome
09:00 - 09:15	ESGW Auditorium	Welcome and Introduction
09:15 - 10:15		Keynote 1 - Prof Rob Deaves <i>University of Birmingham</i>
10:15 - 11:15		Oral session 1 (5 talks) - Robotic Learning, Mapping, and Planning I
11:15 - 11:30	ESGW Beldam + ESGW Atrium	Coffee Break
11:30 - 12:20	ESGW Auditorium	Oral session 2 (4 talks) - Mechanism Design and Soft Robotics
12:20 - 13:20		Lighting Talks for Posters <i>Chair: Dr Mingfeng Wang</i>
13:20 - 14:20	ESGW Beldam/003/003A	Lunch/Poster session/Exhibition
14:20 - 15:20	ESGW Auditorium	Keynote 2 - Prof Ana Cavalcanti <i>University of York</i>
15:20 - 16:20		Oral session 3 (5 talks) - Robotic Modelling, Sensing, and Control I
16:20 - 16:40	ESGW Beldam + ESGW Atrium	Coffee Break
16:40 - 17:40	ESGW Auditorium	Oral session 4 (5 talks) - Human-Robot Interaction/Collaboration and Multi-Agent Systems
18:00 - 20:00		IET Public Talk - Prof Asoke Nandi <i>Brunel University London</i>

DAY 2: THURSDAY, 22 August 2024

08:30 - 09:00	Ground Floor, ESGW Building	Registration & Welcome
09:00 - 10:00	ESGW Auditorium	Keynote 3 - Dr. Josie Hughes <i>EFPL</i>
10:00 - 11:00		Oral session 5 (5 talks) - Robotic Learning, Mapping, and Planning II
11:00 - 11:15	ESGW Beldam + ESGW Atrium	Coffee Break
11:15 - 12:15	ESGW Auditorium	Oral session 6 (5 talks) - Robotic Modelling, Sensing, and Control II
12:15 - 13:05		Lighting Talks for Posters <i>Chair: Dr Mingfeng Wang</i>
13:05 - 14:30	ESGW Beldam/003/003 A	Lunch/Poster session/Exhibition
	ESGW 001	TAROS Steering Committee Meeting
14:30 - 15:30	ESGW Auditorium	Keynote 4 - Professor Kaspar Althoefer <i>Queen Mary University London</i>
15:30 - 16:05		Queen Mary UK Best PhD in Robotics (Presentation)
16:05 - 16:20	ESGW Beldam + ESGW Atrium	Coffee Break
16:20 - 17:30	ESGW Auditorium	Panel Discussion: Recent Advances and Challenges in Robotics and AI
18:30 - 21:30	Newton Room, Hamilton Conference Centre	Drink Reception & Formal Dinner
		TAROS Awards
		Announcement of TAROS 2025

DAY 3 (PGR-ECR Day): FRIDAY, 23 August 2024

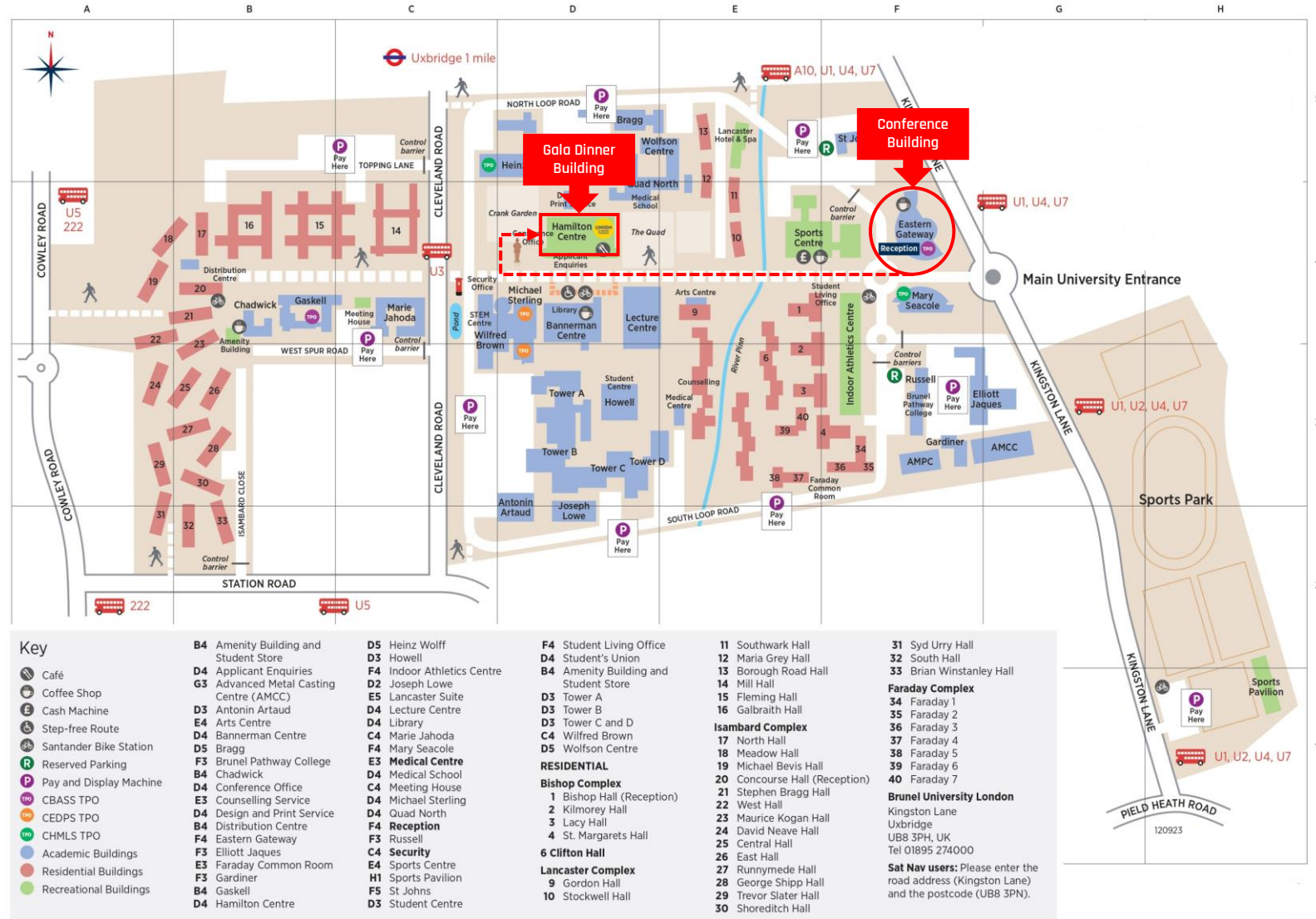
	Parallel Session 1: Lab Automation	Parallel Session 2: Robotic or Automated Phenotyping	Parallel Session 3
08:30 - 09:15	Registration & Welcome (DAY 3) Ground Floor, Eastern Gateway Building		
09:15 - 09:30	Welcome ESGW Auditorium		
09:30 - 10:30	Oral Presentation on Lab Automation 1 <i>ALBERT CDT, University of York</i> ESGW Auditorium	Robotic or Automated Phenotyping 1 <i>AgriForwards CDT, University of Lincoln</i> ESGW Beldam	Perspectives on Robotics: An Interactive Debate <i>FARSCOPE CDT, University of Bristol</i> ESGW 001
10:30 - 11:00	Coffee Break/ Poster Session/ Exhibition ESGW Atrium/ 003A/ 003		
11:00 - 12:00	Oral Presentation on Lab Automation 2 <i>ALBERT CDT, University of York</i> ESGW Auditorium	Robotic or Automated Phenotyping 2 <i>Wageningen University & Research</i> ESGW Beldam	Oral Presentation on Smart Healthcare with Robotics and AI <i>Robotics and AI for Healthcare Group, Brunel University London</i> ESGW 001
12:00 - 13:00	Lunch/ Poster Session/ Exhibition ESGW Atrium/ ESGW 003A/ ESGW 003		
13:00 - 13:25	Invited Speaker 1 (Academia) : Professor Marc Hanheide - <i>University of Lincoln</i> ESGW Auditorium		
13:25 - 14:50	Invited Speaker 2 (Industry) : Dr Radhika Gudipati - <i>Advanced Research + Invention Agency (ARIA)</i> ESGW Auditorium		
14:50 - 15:00	Best CDT presentation awards ESGW Auditorium		
15:00 - 15:10	Coffee Break ESGW Atrium		
15:10 - 15:35	Invited Speaker 3 (Academia & Industry) : Dr Cigdem Sengul - <i>Brunel University London</i> ESGW Auditorium		
15:35 - 16:00	Invited Speaker 4 (Entrepreneur) : Dr Zaki Hussein - <i>Touchlab, National Robotarium</i> ESGW Auditorium		
16:00 - 17:00	Panel Discussion (Members: Prof M Hanheide, Dr R Gudipati, Dr C Sengul, Dr Z Hussein) ESGW Auditorium		
17:00 - 18:00	Networking activity ESGW Atrium		

Conference: Eastern Gateway Building
Gala Dinner: Newton Room, Hamilton Centre

Eastern Gateway



Hamilton Centre

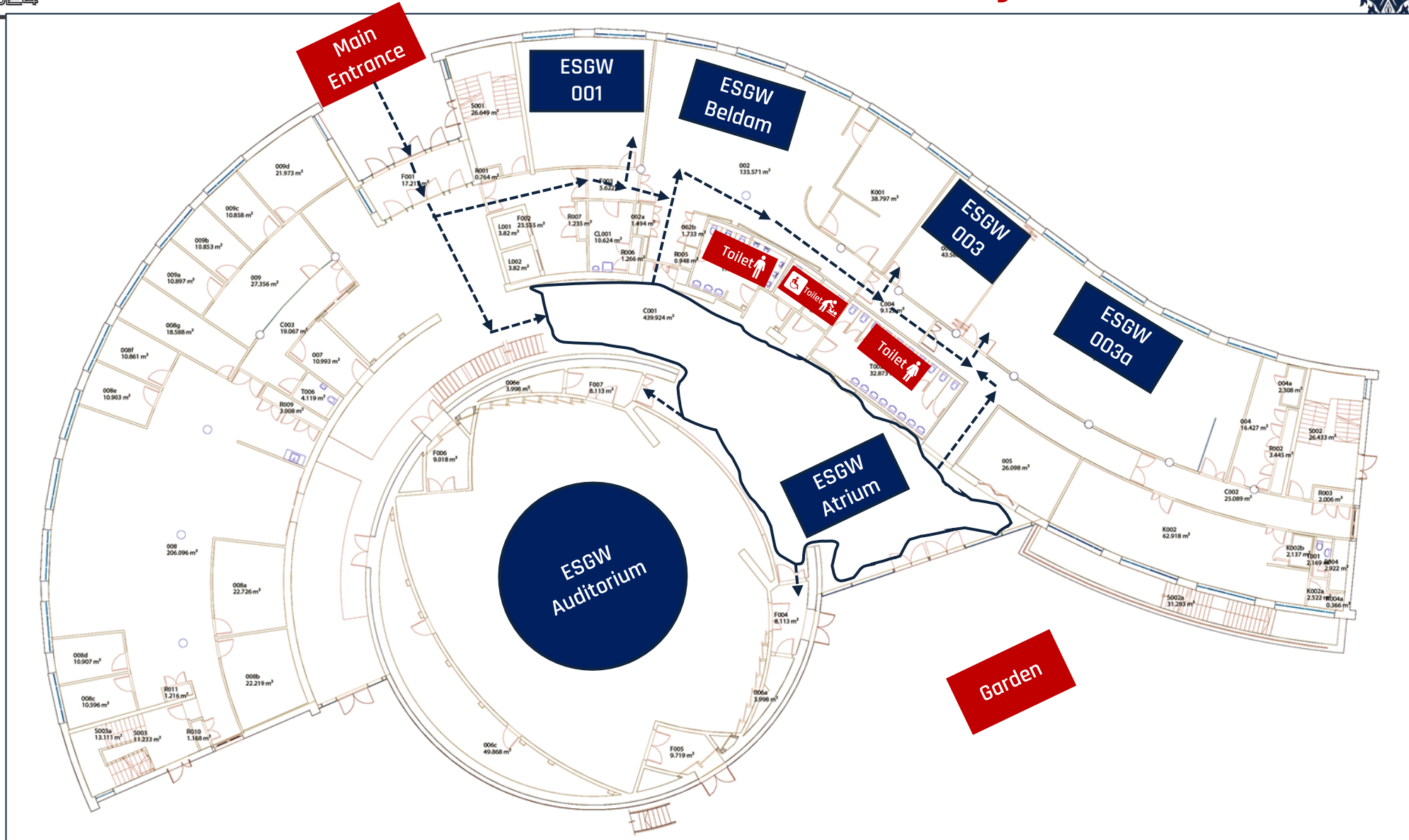


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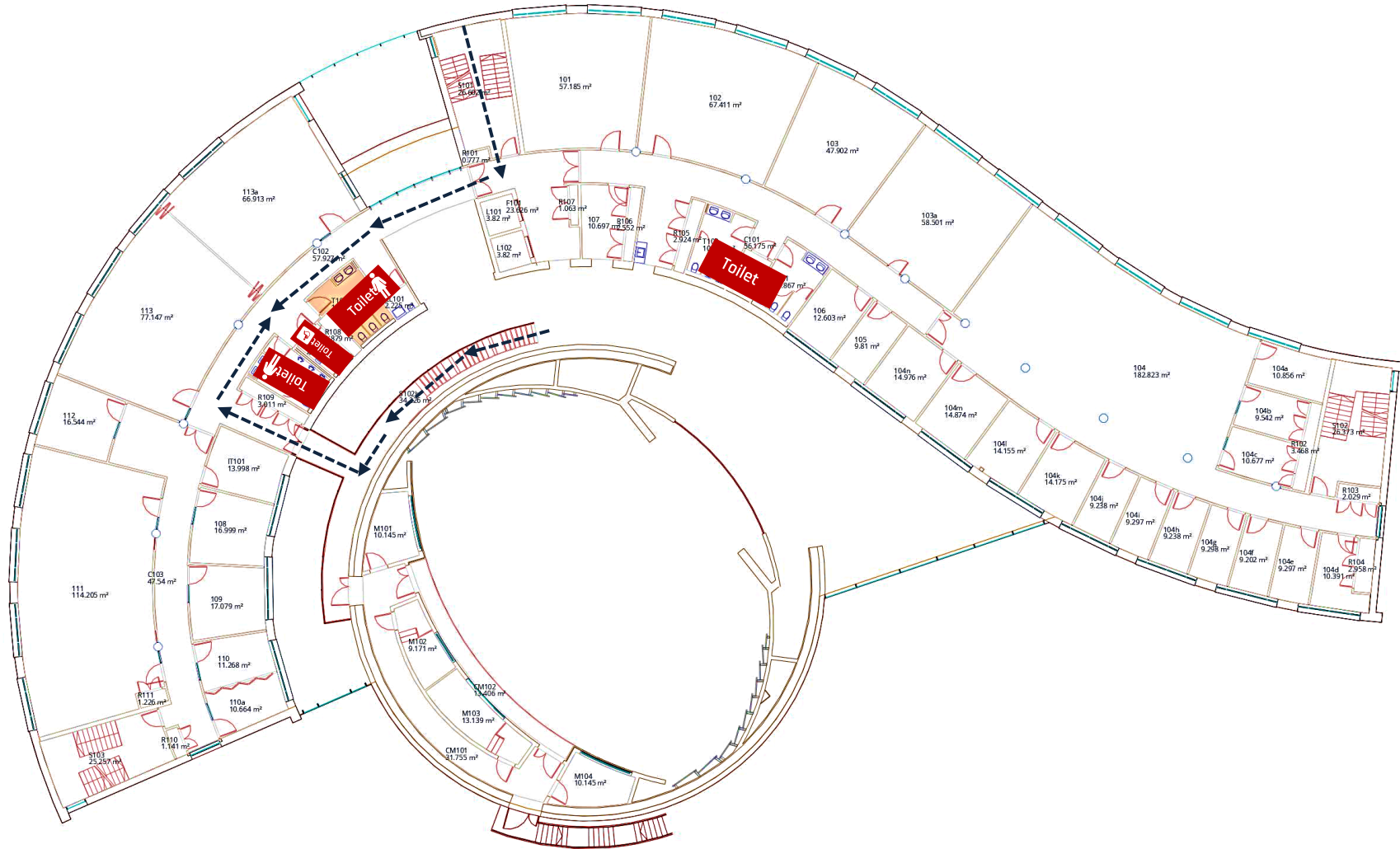


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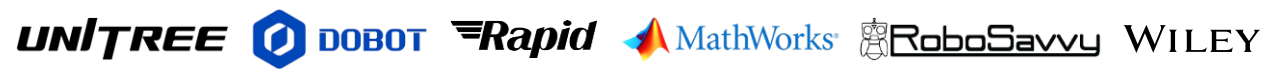




Partners:



Sponsors:



Oral Presentation	Time	Authors	Presentation
SESSION 1: ROBOTIC LEARNING, MAPPING, AND PLANNING I CHAIR BY DR VICTOR ADOLFO ROMERO CANO	10:15	Kai Lascheit, Joseph Agrane, Oliver Neill, James Carty, Jamie Robb, Gerardo Aragon Camarasa	<i>A performance comparison of SLAM-algorithms for formula student autonomous driving</i>
	10:27	Zhixin Zhang, Yichen Liang, Alexandru Stancu	<i>Improved computation efficiency 2D visual SLAM based on particle filter with distance sliding window</i>
	10:39	Alan Lindsay, Andrés Ramírez-Duque, Bart Craenen, Andrea Munafò, Laurence Boé, Adam Campbell, Ron Petrick	<i>Supporting explainable planning and human-aware mission specification for underwater robots</i>
	10:51	Juan Pablo Espejel Flores, Abdurrahman Yilmaz, Luis Arturo Soriano Avendaño, Grzegorz Cielniak	<i>Comparative analysis of unity and Gazebo simulators for digital twins of robotic tomato harvesting scenarios</i>
	11:03	Fama Ngom, Huaxi (Yulin) Zhang, Lei Zhang, Karen Godary-Dejean, Marianne Huchard	<i>IntelliMove: enhancing robotic planning with semantic mapping</i>
SESSION 2: MECHANISM DESIGN AND SOFT ROBOTICS CHAIRED BY DR ABU BAKAR DAWOOD	11:30	Ollie Wiltshire, Seyed Amir Tafrishi	<i>Design and Motion Analysis of a Reconfigurable Pendulum-Based Rolling Disk Robot with Magnetic Coupling</i>
	11:42	Mark Krysov, Seyed Amir Tafrishi	<i>Development of Underactuated Geometric Compliant (UGC) Module with Variable Radial for Robotic Applications</i>
	11:54	Laurenz Elstner, Erik Kyrkjebø, Martin F. Stoelen	<i>Contact-Rich Task Learning on an Articulated Soft Robot Arm through Simulation</i>
	12:06	Danyaal Kaleel, Benoit Clement, Kaspar Althoefer	<i>Modelling of Buoyancy Based Actuation of an Inflatable Underwater Soft Robot</i>

Partners:



Sponsors:



Oral Presentation	Time	Authors	Presentation
SESSION 3: ROBOTIC MODELLING, SENSING, AND CONTROL I CHAIRED BY DR PEDRO MACHADO	15:20	Joshua Bettles , Andrew West, Jeremy Andrew, Iain Darby, Barry Lennox	<i>Accessibility Framework for Determining Collisions and Coverage for Radiation Scanning</i>
	15:32	Bandar Aldhafeeri , Joaquin Carrasco-Gomez, Bruno Vilhena Adorno, Erwin Lopez	<i>A New Hybrid Teleoperation Control Scheme for Holonomic Mobile Manipulator Robots Using a Ground-based Haptic Device</i>
	15:44	Mohd Norhakim Bin Hassan , Simon Watson, Cheng Zhang	<i>Resonant inductive coupling power transfer for mid-sized inspection robot</i>
	15:56	Michele Moroni, Ana Elvira Huezco Martin , Leonard Kluepfel, Ashok Sundaram, Werner Friedl, Francesco Braghin, Maximo Roa	<i>Robotic Tight Packaging using a Hybrid gripper with Variable Stiffness</i>
	16:08	Ningzhe Hou , Marco Pontin, Leone Costi, Perla Maiolino	<i>Design, Fabrication and Calibration of an Embroidery Textile Tactile Sensor Array</i>
SESSION 4: HUMAN-ROBOT INTERACTION/COLLABORATION AND MULTI-AGENT SYSTEMS CHAIRED BY DR FANTA CAMARA	16:40	Yang You , Vincent Thomas, Francis Colas, Rob Skilton, Olivier Buffet	<i>Online Robust Robot Planning for Human-Robot Collaboration</i>
	16:52	Weiyong Si , Jiale Dong, Ning Wang, Chenguang Yang	<i>A Perception Enhanced Human-robot Skill Transfer Method for Reactive Interaction</i>
	17:04	Qi Lu , Ryan Luna	<i>Robust Mitigation Strategy for Misleading Pheromone Trails in Foraging Robot Swarms</i>
	17:16	Ibrahim Alispahic , Adnan Tahirović	<i>Path Planning for Multi-Agent Systems Using Deep Q-Networks Reinforcement Learning</i>
	17:28	Michael Watson, Hanchi Ren, Farshad Arvin (Mazen Bahaidarah) , Junyan Hu	<i>Predator-Prey Q-Learning Based Collaborative Coverage Path Planning for Swarm Robotics</i>

Partners:



Sponsors:



No.	Authors	Poster Title
1	Mriganka Biswas , John Murray	<i>"Incomplete Without Tech": Emotional Responses and the Psychology of AI Reliance</i>
2	Matthew Parris , Dr Hisham Al Assam, Dr Mohammad Athar Ali	<i>Suspicious Activity Detection for Defence Applications</i>
3	Andy Perrett , James Brown, Petra Bosilj	<i>The benefits of ordinal regression under domain shift</i>
4	Chapa Sirithunge, Kedar Suthar , Mingfeng Wang	<i>Using Barometric Pressure Sensors in Soft Robots</i>
5	Fraser McGhan , Ze Ji, Raphael Grech	<i>Localisation-Aware Fine-Tuning for Realistic Point Goal Navigation</i>
6	Christina Stimson, Rebecca Raper	<i>Participatory AI: A Method for Integrating Inclusive and Ethical Design Considerations into Autonomous System Development</i>
7	Charlotte Jones , Darren Reed, Fanta Camara	<i>Who Is The Chameleon? A party game to explore trust and biases towards Alexa, Pepper and ChatGPT</i>
8	Vishnu Rajendran Sugathakumary , Kiyanoush Nazari, Simon Parsons, Amir Ghalamzan Esfahani	<i>Enabling tactile feedback for robotic strawberry handling using AST skin</i>
9	Robert Stevenson , Dimitris Paparas, Omar Faris, Xiaoxian Xu, Catherine Merchant, Elliot Smith, Benjamin Nicholls, Charles Fox	<i>Open-source hardware whisker sensor</i>
10	Syeda Nadiah Fatima Nahri , Shengzhi Du, Barend J. van Wyk, Tawanda Denzel Nyasulu	<i>Mitigating the Time Delay and Parameter Perturbation by a Predictive Extended State Observer-based Active Disturbance Rejection Control</i>

Partners:



Sponsors:



No.	Authors	Poster Title
11	David Batty, Andrew West, Ipek Caliskanelli, Paolo Paoletti	<i>Real-World Testing of Ultrasonic Beacons for Mobile Robot Radiation Emulation</i>
12	Abu Bakar Dawood, Zhenyu Zhang, Martin Angelmahr, Alberto Arezzo, Kaspar Althoefer	<i>Variable Stiffness & Dynamic Force Sensor for Tissue Palpation</i>
13	Liyu Zhou, Emmanuel Arnaud Soumo, Eden Attenborough, Jacob Swindell, George Davies, Charles Fox, Omar Ali	<i>3D printer based open-source calibration platform for whisker sensors</i>
14	Michael Swann, Pedro Machado, Andreas Oikonomou, Farbod Zorriassatine, Salisu Yahaya, Salisu Yahaya, Kennedy Ihianle, Kennedy Ihianle	<i>SmartAntenna: Enhancing Wireless Range with Autonomous Orientation</i>
15	Matthew Gazzard, Helen Hicks, Md Mahmudul Hasan, Pedro Machado, Jordan Bird, Kennedy Ihianle, Kennedy Ihianle	<i>WeedScout: Real-Time Autonomous blackgrass Classification and Mapping using dedicated hardware</i>
16	Ahmet Serhat Yildiz, Hongying Meng, Mohammad Rafiq Swash	<i>YOLOv8-LiDAR Fusion: Increasing Range Resolution Based on Image Guided-Sparse Depth Fusion in Self-Driving Vehicles</i>
17	Qingmeng Wen, Seyed Amir Tafreshi, Ze Ji, Yu-Kun Lai	<i>What Criteria Define an Ideal Skeletonisation Reference in Object Point Clouds?</i>
18	Yuanzhi He, Christopher Wallbridge, Juan Hernández, Gualtiero Colombo	<i>Few-shot Transfer Learning for Deep Reinforcement Learning on Robotic Manipulation Tasks</i>
19	Seemal Asif, Yuliya Hryshchenko, Martin Holden, Matteo Contino, Ndidiamaka Adiuku, Bryn Hughes, Angelos Plastropoulos, Nico Avdelidis, Phil Webb	<i>Advancements in 3D X-Ray Imaging: Development and Application of a Twin Robot System</i>
20	Fahad Khan, Seemal Asif, Phil Webb	<i>Human Facial Emotion Recognition for Adaptive Human Robot Collaboration in Manufacturing</i>

Partners:



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KEYNOTE SPEAKER 1

Professor Rob Deaves, FEng

*Senior Principal Engineer, Dyson
Honorary Professor, University of Birmingham*



Robots in the Home: A 'clean sweep'!

Abstract: A review of the Dyson autonomous cleaner roadmap and the major functionality introduced at each stage will be provided. This will lead to a more detailed description of the 360VisNav launched in 2023; with an overview of the product's main functions, including the power system, cleaning system, and User interface. We will then delve into the robotic elements of the 360VisNav discussing the sensors, processing, and actuation for the automated cleaner. A personal review of the evolution of SLAM will then be given as a great example of a technology coming out of academic research and into commercial products. The presentation will conclude with a short description of how technologies from in-home autonomous products are being used in robots supporting sustainability!

Bio: Rob has over 35 years of engineering experience gained at 3 iconic companies: BAE Systems, STMicroelectronics, and Dyson respectively. At Dyson, Rob was a Robotician working on the full product lifecycle. He was the Product Technical Lead for the 360Heurist and System Architect for the 360VisNav; an autonomous vacuum cleaner that has achieved mass market and worldwide sales. He was awarded a RAEng Visiting Professorship at ICL in 2017 enabling teaching support for 29 national/international universities. Further, he is an Honorary Professor at the School of Engineering, Birmingham University. He has also chaired EPSRC/ERDF research projects with a total funding of £25M (including PAMELA, Brains-on-Board, CRADLE, and IRDHMS). Rob is a chartered engineer (CEng) and has achieved fellowships at the Institution of Engineering Technology (FIET) and the Higher Education Academy (FHEA). He has also been awarded fellowships from the Learned Society of Wales (FLSW) and the Royal Academy of Engineering (FREng).

KEYNOTE SPEAKER 2

Professor Ana Cavalcanti

*Professor, University of York, UK
Director, RoboStar Center, Software Engineering for Robotics*



Systematic testing of a drone for emergency relief

Abstract: Recent surveys suggest that, within the field of robotics, there is a prevailing tendency to employ a manual ad hoc testing approach, heavily reliant on the expertise of developers. However, this method proves to be costly and comes with various drawbacks, including the inability to assess the fault-detection capabilities of the test set, potential errors in test specification and execution, and the possibility of expert disagreement on test outcomes. In this presentation, we share our experience with the adoption of the innovative RoboStar systematic testing approach for a firefighting UAV, developed using the widely adopted ROS middleware. The RoboStar framework advocates a model-based approach in control software development for robotics, offering domain-specific tool-independent notations for modeling and simulation, along with techniques for the automatic generation of artifacts. Our focus in this talk, centers on the RoboStar techniques for automated test generation. Through our approach, we effectively reduce testing expenses and can provide guarantees regarding the absence of faults within specified classes.

Bio: Ana Cavalcanti is a Professor at the University of York, UK, and holds a Royal Academy of Engineering Chair in Emerging Technologies. In that role, she is the Director of the RoboStar Centre on Software Engineering for Robotics. She previously held a Royal Society Industry Fellowship, which provided her with the ideal opportunity to understand and contribute to the practice of formal methods working with QinetiQ. Her main scientific achievements have been on the design and justification of sound refinement-based program development and verification techniques. She has covered theoretical and practical integration with industry-strength technology: concurrency, object orientation, and testing, dealing now with mobile and autonomous robots.

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IET PUBLIC TALK

Professor Asoke K. Nandi

Professor, Electronic & Computer Engineering, Brunel University London



Robots: Past, Present, and Future

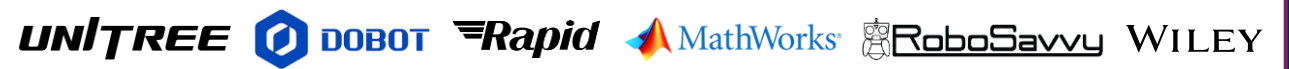
Abstract: Over the last three decades, robots have become common in our conceptions, our conversations, and, often unknowingly, our life. With the availability of faster computers, cheaper data storage, cheaper computer memory, many types of sophisticated sensors, much data, pervasive networks, novel theoretical developments, signal processing, and machine learning, the world has begun a new technological revolution. We have come on a very long journey in terms of conceptualizations, creations, and developments; it has taken not decades, not centuries, but millennia. It is clear that this journey will continue. This lecture is in two parts. The first part will sketch a brief history of robots, starting with conceptualizations, followed by mechanical robots. In the mid-twentieth century, electronic/mechanical robots became available. In the twenty-first century, robots embracing machine learning have become available. The second part will outline a few of the diverse and significant developments in machine learning and data processing. Hopefully, it will inspire researchers to imagine how a combination of mechanical, electronic, and machine learning can be utilized to develop sophisticated robots for different types of applications for the good of our world.

Bio: Professor Nandi received the PhD degree in Physics from the University of Cambridge. He held academic positions in several universities, including Oxford, Imperial College London, Strathclyde, and Liverpool as well as Finland Distinguished Professorship. In 2013 he joined Brunel University London. In 1983 Professor Nandi co-discovered the three fundamental particles known as W^+ , W^- and Z^0 , providing the evidence for the unification of the electromagnetic and weak forces, for which the Nobel Prize for Physics in 1984 was awarded to two of his team leaders for their decisive contributions. His current research interests lie in signal processing and machine learning, with applications to image segmentation, machine fault diagnoses, functional magnetic resonance data, gene expression data, communications, and biomedical data. He made fundamental theoretical and algorithmic contributions to many aspects of signal processing and machine learning. He has much expertise in "Big Data". Professor Nandi has authored over 600 technical publications, including 300 journal papers as well as six books, entitled Image Segmentation: Principles, Techniques, and Applications(2022), Condition Monitoring with Vibration Signals: Compressive Sampling and Learning Algorithms for Rotating Machines (2020), Automatic Modulation Classification: Principles, Algorithms and Applications (2015), Integrative Cluster Analysis in Bioinformatics (2015), Blind Estimation Using Higher-Order Statistics (1999), and Automatic Modulation Recognition of Communications Signals (1996). The H-index of his publications is 91 (Google Scholar) and the ERDOS number is 2. Professor Nandi is a Fellow of the Royal Academy of Engineering and a Fellow of six other institutions including the IEEE. In 2023, he was honored by the Academia Europaea and the Academia Scientiarum et Artium Europaea. He has received many awards, including the IEEE Heinrich Hertz Award in 2012, the Glory of Bengal Award for his outstanding achievements in scientific research in 2010, the Water Arbitration Prize of the Institution of Mechanical Engineers in 1999, and the Mountbatten Premium of the Institution of Electrical Engineers in 1998. Professor Nandi is an IEEE Distinguished Lecturer (EMBS, 2018-2019).

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Oral Presentation	Time	Authors	Presentation
<p>SESSION 5: ROBOTIC LEARNING, MAPPING, AND PLANNING II</p> <p>CHAired BY DR ALAN LINDSAY</p>	10:00	Juan Sebastian Mosquera Maturana, Juan David Hernández, Victor Romero Cano	<i>Sampling-based Motion Planning for Guide Robots Considering User Pose Uncertainty</i>
	10:12	Philippa Ryan, Arjun Badyal, Samuel Sze, Benjamin Hardin, Hasan Bin Firoz, Paulina Lewinska, Victoria Hodge	<i>Safety assurance challenges for autonomous drones in Underground Mining Environments</i>
	10:24	Markus Weißflog, Stefan Schubert, Peter Protzel, Peer Neubert	<i>Towards Revisiting Visual Place Recognition for Joining Submaps in Multimap SLAM</i>
	10:36	Sarfraz Ahmed, Jizhang Li, Md Nazmul Huda	<i>Investigation of Gated-CNN and Self-attention Mechanism for Historical Handwritten Text Recognition</i>
	10:48	Khairidine Benali, Praminda Caleb-Solly	<i>The Dilemma of Decision-Making in the Real World: When Robots Struggle to Make Choices Due to Situational Constraints</i>
<p>SESSION 6: ROBOTIC MODELLING, SENSING, AND CONTROL II</p> <p>CHAired BY DR THILINA LALITHARATNE</p>	11:15	Katherine James, Grzegorz Cielniak	<i>Unsupervised clustering with geometric shape priors for improved occlusion handling in plant stem phenotyping</i>
	11:27	Zhihao Guo, Peng Wang	<i>Depth Priors in Removal Neural Radiance Fields</i>
	11:39	Haowen Liu, Mark Post, Andy Tyrrell	<i>Efficient 2D and 3D Corresponding Object Identification using Deep Learning Models</i>
	11:51	Sairaj R Dillikar, Cameron Leslie, Saurabh Upadhyay, Leonard Felicetti, Gilbert Tang	<i>A ROS-Based Control Framework for Simulating Locomotion of a Multi-Arm Space Assembly Robot</i>
	12:03	Jingcheng Sun, Chengxu Zhou	<i>Advancing Robotic Jumping with CVT Enhanced SEA</i>

DAY 2: THURSDAY, 22 AUGUST 2024

Partners:



Sponsors:



No.	Authors	Poster Title
1	Helen McGloin, Matthew Studley, Richard Mawle, Alan Winfield	<i>Consulting an oracle; repurposing robots for the circular economy</i>
2	Hannah Gofton, Daniel Baker, Fanta Camara	<i>Controlling a robotic arm through neural activity</i>
3	Alexandra Lee, Matthew Studley	<i>Do People Ascribe Similar Emotions to Real and Robotic Dog Tails?</i>
4	Faraz Rahvar, Abdurrahman Yilmaz	<i>Size Matters: Exploring the Impact of Scaling on Quadruped Robot Dynamics</i>
5	Youssef Alboraei, Chayada Thidrasamee, Paul O'Dowd	<i>Ground-truth based Calibration for a Two Wheel Differential Drive Robot</i>
6	Seyonne Leslie-Dalley, Bruno Vilhena Adorno, Keir Groves	<i>Control Strategies Using the Extended Cooperative Dual Task Space</i>
7	Tianhu Peng, Lingfan Bao, Joseph Humphreys, Andromachi Maria Delfaki, Dimitrios Kanoulas, Chengxu Zhou	<i>Learning Bipedal Walking on a Quadruped Robot via Adversarial Motion Priors</i>
8	Xiangyu An, Mayo Adetoro, Mingfeng Wang	<i>Effects of passive ankle on bipedal robot walking locomotion</i>
9	Harrison Elliott, Xiangyu An, Mingfeng Wang	<i>A Bio-Inspired Jumping Robot: Design, Modelling and Experimental Tests</i>
10	Henry Hickson, Andrew Conn, Hemma Philamore	<i>BlimpleBee: The helium assisted indoor inspection drone</i>

Partners:



Sponsors:



No.	Authors	Poster Title
11	Yael Sznaidman, Maya Krakovski, Shirley Handelzalts, Yael Edan	<i>Design of a Robotic Trainer for Upper Body Physical Therapy</i>
12	Ted Winter-Glasgow, Pablo Borja	<i>Designing and Manufacturing Low-cost, Tendon-driven Soft Robots</i>
13	Emlyn Williams, Athanasios Polydoros	<i>Pretrained Visual Representations in Reinforcement Learning</i>
14	Alex Clark, Liam Goodsell-Carpenter, Pia Buckow, Daniel Hewett, Francis White, Adil Imam, Nabila Naz, Breeshea Robinson, Soumya Kanti Manna, Abdullahi Ahmed	<i>Bio-inspired Soft Pneumatic Gripper for Agriculture Harvesting</i>
15	James Heselden, Gautham Das	<i>Duckling Platooning - Safety Guarantees through Controlled Information Disclosure</i>
16	Mazen Bahaidarah, Ognjen Marjanovic, Fatemeh Rekabi-bana, Farshad Arvin	<i>A Leader-Follower Collective Motion in Robotic Swarms</i>

Partners:



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KEYNOTE SPEAKER 3

Dr Josie Hughes

Tenure Track Assistant Professor, Computational Robot Design & Fabrication Lab, EPFL



Towards Robust Robots by Building Embodied Intelligence

Abstract: To develop robust robots for manipulation, locomotion, and more we need to understand how to leverage principles of Embodied Intelligence from bio-inspiration, and combine them advances in AI and control in a synergistic way. This talk will explore a number of approaches to designing and fabricating robots that can robustly interact with the environment with a focus on anthropomorphic manipulation and multi-modal locomotion and swimming. The applications and new capabilities enabled by these robots will be discussed, with a focus on sustainability and agricultural applications.

Bio: Josie Hughes is an Assistant Professor at EPFL where she established the CREATE Lab in the Institute of Mechanical Engineering in 2021. She undertook her undergraduate, master's, and PhD studies at the University of Cambridge, joining the Bio-inspired Robotics Lab (BIRL). Her PhD focused on examining the role of passivity in bio-inspired manipulators, and methodologies for exploiting morphology soft large area soft sensing. Following this, she worked as a postdoctoral associate at the Computer Science and Artificial Intelligence Laboratory, Massachusetts Institute of Technology in the USA in the Distributed Robotics Lab. Her research focuses on developing novel design paradigms for designing robot structures that exploit their physicality and interactions with the environment. This includes the development of robotic hands, soft manipulators, and automation systems for applications focused on sustainability and science. She has several best paper awards and was awarded the IEEE RAS Early Career Award in 2024.

KEYNOTE SPEAKER 4

Professor Kaspar Althoefer

Director, Centre of Excellence Advanced Robotics @ Queen Mary (ARQ)



Physical Robot-Environment Interaction: The Continued Quest for Tactile-Grounded Manipulation

Abstract: Despite the extraordinary progress seen in the field of robotics in recent years, the goal of safe, refined, and reliable physical interaction between robots and humans remains elusive. In this keynote, we will examine how tactile-based manipulation could solve this problem and significantly extend the boundaries of robotic capabilities. We will provide an overview of state-of-the-art developments in tactile sensor technology, focusing on those innovations that enable robots to detect and interpret subtle physical cues, so that they can handle delicate objects with human-like dexterity, perform complex precision tasks, and operate safely alongside humans.

Bio: Professor Althoefer is an experienced roboticist leading competitively funded research on soft robotics, intelligent micro-sensing systems, and interaction dynamics modeling with applications in minimally invasive surgery, assistive technologies, and human-robot interaction at Queen Mary University of London. He acquired over £10M as Principal Investigator from national/international funding bodies. His research team is involved in funded collaborative research with leading London hospitals, European research organizations, and international companies creating novel robot-assisted solutions for theragnostic in the colon employing growing robots, tissue diagnosis using miniaturized sensors, cardiac catheterization, fetal ultrasound monitoring, nuclear waste decommissioning, and ergonomically-optimized human-robot interaction in the manufacturing sector. Over the last decade, the team has built a large portfolio of projects with funding from organizations such as ERC, the European Commission, EPSRC, Innovate UK, Wellcome Trust, and UK-based charities, exceeding £30M and producing more than 450 peer-reviewed papers.

Partners:



Sponsors:



Session	Time	Presenter	Topic
ALBERT SESSION 1: LAB AUTOMATION	9:30	Ana Cavalcanti, Ian Fairlamb	<i>Introduction to Albert and state of the art</i>
	9:50	Arjun Badyal	<i>Consistency Between Simulation and Proof for a Mobile Robotic Chemist</i>
	10:00	Barney Franklin	<i>Visualization and data analysis of chemical reaction outcomes deduced by chemistry robotic systems</i>
	10:10	Marina Gladkik	<i>Automation Solves Chemical Cold Case: The synthesis and isolation of Copper Bis-Silylamide</i>
	10:20	Holly Hendry	<i>Human-Robot Interaction in the Verification and Design of Robotic Lab Technicians</i>
ALBERT SESSION 2: LAB AUTOMATION	11:00	Ying Jiang	<i>Autonomous Biomimetic Solid Dispensing Using a Dual-Arm Robotic Manipulator</i>
	11:10	Hadi Beyzaee Juneghani	<i>Reducing Misalignment Errors in Autonomous Robotic Chemistry Tasks Using Perception</i>
	11:20	Annabelle Partis	<i>Upholding Social, Legal, Ethical, Empathetic, and Cultural Requirements for Robotic Lab Technicians</i>
	11:30	Nikola Radulov	<i>Advancing Laboratory Automation through Robotic Simulation: A Case Study for Powder Weighing</i>
	11:40	Jacob Walter	<i>Robotic Systems for Molecular Synthesis: Have We Developed the Right Technologies?</i>
	11:50	Jacopo Zero	<i>Convergence of solid-phase peptide synthesis with digital chemistry</i>

Partners:



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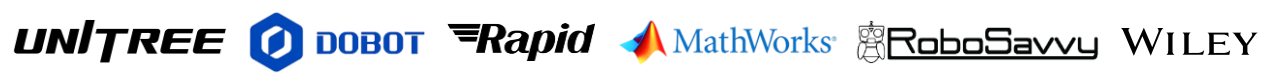
Session	Time	Presenter	Topic
AGRIFORWARDS SESSION: ROBOTIC OR AUTOMATED PHENOTYPING CHAIR: PROF MARC HANHEIDE, UNIVERSITY OF LINCOLN	9:30	Marc Hanheide	<i>Introduction to AgriFoRwArDs and the Summer School</i>
	9:40	Robert Stevenson, Emmanuel Soumo, David Rapado-Rincon, Industry (TBC)	<i>Panel discussion: Challenge-driven Postgraduate Training</i>
	10:10	David Rapado-Rincon & Robert Stevenson	<i>Talk: Crop Mapping and Robot Navigation</i>
WUR SESSION: ROBOTIC OR AUTOMATED PHENOTYPING CHAIR: DAVID RAPADO-RINCON, WAGENINGEN UNIVERSITY & RESEARCH	11:00	Dimitris Paparas and Catherine Merchant	<i>Talk: Interactive Perception; a heuristic approach to overcoming physical occlusions in tomato picking</i>
	11:20	James Heselden	<i>Talk: Exploration of LLMs for Planning Robot Actions</i>
	11:40	Benjamin Nicholls and Omar Ali	<i>Talk: Technology & Phenotyping Perception beyond 2D Colour</i>

DAY 3: FRIDAY, 23 AUGUST 2024

Partners:



Sponsors:



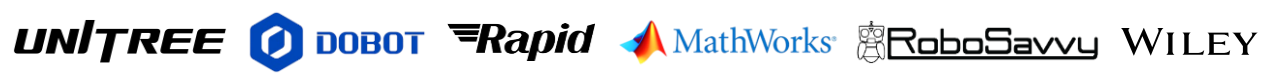
Session	Time	Presenter	Topic
FARSCOPE SESSION: PERSPECTIVES ON ROBOTICS: AN INTERACTIVE DEBATE	9:30	-	<i>Introduction to FARSCOPE</i>
	9:45	-	<i>Interactive debate games : 'How do we define intelligence?' and 'Balancing environmental sustainability with research progress'</i>
BRUNEL UNIVERSITY SESSION: SMART HEALTHCARE WITH ROBOTICS AND AI CHAIR: RUIHENG WU	11:00	Dalia Osman	<i>Miniature Fibre-Optic based Shape Sensing for Robotic Applications using Curved Reflectors</i>
	11:10	John Paolo Ramoso	<i>Multiplexed Pathogen Detection using Graphene and Machine Learning Techniques</i>
	11:20	Hoda Ibrahim	<i>Artificial Intelligence for the Early Diagnosis of Upper GI (Gastro-intestinal) Cancer</i>
	11:30	Farzana Mou	<i>Early and differential diagnosis of dementia using deep learning</i>
	11:40	Yijun Hu	<i>Facial Features Controlled Smart Wheelchair/Vehicle</i>
	11:50	Oneeba Ahmed	<i>Integration and testing of a Cochlear Implant insertion robot</i>

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INVITED SPEAKER 1

Professor Marc Hanheide

Professor of Intelligent Robotics & Interactive Systems, University of Lincoln, UK

Director, Lincoln Centre for Autonomous Systems



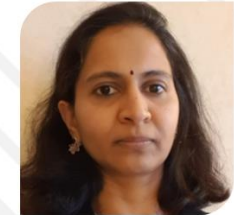
Robotics Research in the Wild - Perspectives on an Academic Career in Robotics

Big: Marc Hanheide is a Professor of Intelligent Robotics & Interactive Systems in the School of Computer Science at the University of Lincoln, UK, and the director of the University's cross-disciplinary research center in Robotics, the Lincoln Centre for Autonomous Systems (L-CAS). He received a Diploma in computer science from Bielefeld University, Germany, in 2001 and a Ph.D. degree (Dr.-Ing.) also in computer science also from Bielefeld University in 2006. In 2001, he joined the Applied Informatics Group at the Technical Faculty of Bielefeld University. From 2006 to 2009 he held a position as a senior researcher in the Applied Computer Science Group. From 2009 until 2011, he was a research fellow at the School of Computer Science at the University of Birmingham, UK.

INVITED SPEAKER 2

Dr Radhika Gudipati

Senior Research and Innovation Coordinator (Robotics & AI), Ocado Technology



Talk: Career Journey

Big: Dr Radhika Gudipati has been in the world of Robotics, AI and Deeptech for the last 15 years in various roles as Business solutions Manager, Research Consultant, Subject Matter Expert and Innovation Lead. She holds a PhD in Robotics for rehabilitation from University of Hertfordshire. Radhika found her strength in taking high TRL research into commercialisation and launched her career after research, with robotic startups. At Ocado Technology she is continuing in corporate R&D as a Senior Research Coordinator leading collaborative R&D engagements with academia and research. Radhika is also a committee member of technology forums, mentor, business advisor and angel investor in tech startups.

INVITED SPEAKER 3

Dr Cigdem Sengul

Reader, Computer Science, Brunel University London



Talk: Career Journey

Big: Cigdem has more than ten years of experience in research and development in mobile and wireless networks in both academia and industry. She has been working on standards for building privacy and trust in the Internet of Things during her time at Nominet as a Senior Researcher (2015-2019). Between 2012-2015, she worked as a Senior Lecturer at Oxford Brookes University, where she lectured and conducted research on wireless and mobile networks, with a particular focus on energy and interference efficiency, and Internet of Robotic Things. From 2008-2012, she was with Telekom Innovation Labs (the main research unit of Deutsche Telekom) as a Senior Research Scientist leading projects on Wireless Mesh Networks. Her work has been published in more than 50 journal and conference publications. She is a Fulbright, Department of Computer Science, UIUC and Vodafone fellow.

INVITED SPEAKER 4

Dr Zaki Hussein

Founder & CEO, Touchlab



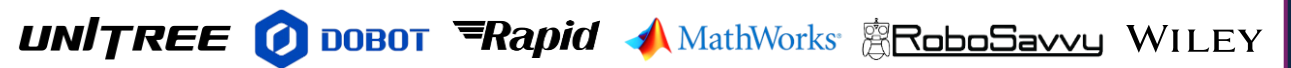
Talk: Career Journey

Big: Since the age of 14, growing up in Finland, Zaki dreamed of working in nanotechnology and robotics. Fascinated by the concept of tiny robots that could enter the human body to cure diseases, he pursued this passion despite others calling him crazy. His determination led him to secure a place at the University of York, where he studied Electronics Engineering with Nanotechnology. During his undergraduate years, he was introduced to the start-up scene, gaining valuable experience as an intern and later becoming the full-time lead software developer for a VR stroke rehabilitation spinout. Following his undergraduate studies, he moved to Scotland to pursue a PhD in 'Intelligent Sensing and Measurement' at the University of Edinburgh and Glasgow, specializing in micro- and nano-fabrication. By the time he completed his PhD, he was already involved in his second start-up, Touchlab. As the former CTO, he provided Touchlab with a solid foundation, securing an initial FTSE 100 customer.

Partners:



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ALBERT CDT

Autonomous Robotic Systems for Laboratory Experiments (ALBERT)

ALBERT is an autonomous robot that conducts laboratory experiments that are cleaner, greener, safer, and cheaper than anything achievable with today's conventional techniques and technologies. York's Institute for Safe Autonomy provides international leadership for this research area. ALBERT programme has the potential to revolutionize experimental laboratory techniques. One application is in experimental chemistry, where a major research challenge is to build a machine that can synthesise any organic compound, on-demand. Currently, robotic chemistry uses only high-end, typically with low-autonomy, robotic units.



EPSRC Centre for Doctoral Training in Agri-Food Robotics

EPSRC Centre for Doctoral Training in Agri-Food Robotics

AgriFoRwArds CDT has been established by the University of Lincoln in collaboration with the University of Cambridge and the University of East Anglia. AgriFoRwArds CDT provides a unique blend of technical expertise, an outstanding research environment, and, most importantly, integral industry collaboration in Agri-food robotics. AgriFoRwArds CDT teams up with many industrial companies including the Dyson Foundation who are kindly providing PhD studentships for their students. AgriFoRwArds CDT is currently closing its application portal as they do not plan more recruitment rounds this year.

FARSCOPE CDT

EPSRC Centre for Doctoral Training in Robotics and Autonomous Systems

Any technical research that supports intelligent machines physically interacting with the world is in scope. Their PhD programme is designed to get students thinking beyond a robot's technology and about its environment. This demands multidisciplinary thinking, as enabling technologies of computer science and engineering interface with questions of natural and life sciences, policy, ethics, law, and more. They aim to give FARSCOPE students both the multidisciplinary tools and contextual knowledge to tackle today's Robotics and Autonomous Systems (RAS) research challenges and in doing so train the next generation of RAS innovators.

Partners:



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BY BUS

From Heathrow Central: A10 "Heathrow Fast", every 15 minutes, (alight Hillingdon Rd at 'The Greenway and use the footpath to campus).

From Stockley Park: "Heathrow Fast" as above.

From West Drayton railway station: U3 (alight Cleveland Road), U1 (alight Kingston Lane), 222 (alight Cowley Road and use the path to campus).

From Uxbridge (underground) station: U3 (alight Cleveland Road), U1, U4, and U7 (alight Kingston Lane), 222 and U5 (alight Cowley Road and use the footpath to campus).

BY UNDERGROUND

Uxbridge Station (Transport for London) takes the Metropolitan Line from central London (and Piccadilly Line during peak hours). Then take a taxi, or bus U1, U3, U4 or U7. (Alternatively, there is a 1 mile walking route.)

BY RAIL

West Drayton (First Great Western Link) is the nearest main-line station (approx 1.5 miles from the campus). Services from London Paddington or the West (Bristol). From West Drayton station take a bus towards Uxbridge: 222 (alight Cowley Road), U5 (alight Station Road), U3 (alight Cleveland Road), or U1 (alight Kingston Lane).

West Ruislip Station (Chiltern Railways) is the main-line service from London Marylebone and the North (Aylesbury, Banbury and Birmingham) and is approximately 4 miles from the campus. From West Ruislip Station take the U1 bus towards West Drayton, alight Kingston Lane.

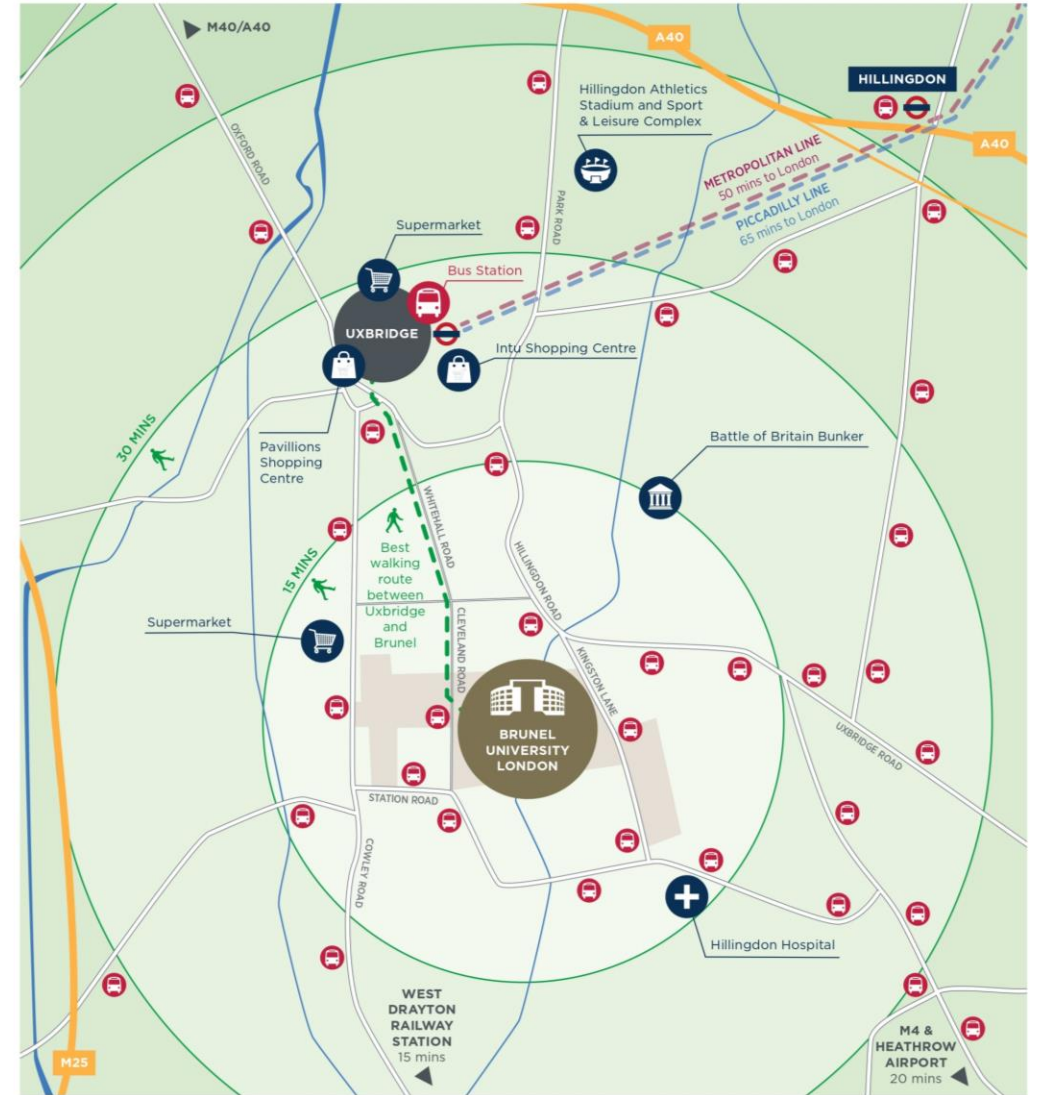
BY ROAD

Entry by car is via Kingston Lane only. Sat Nav users: Please enter the road address (Kingston Lane) and the postcode (UB8 3PN). You will be directed to Kingston Lane, close to our main entrance. From there, please follow the signs. Parking on the Uxbridge Campus and in the local area is very restricted. Barriers control access to the site and all vehicles must display a valid permit. On arrival, pay-and-display parking is available. In addition, parking may also be pre-booked (restrictions apply).

Parking Charge Notices will be issued for illegally parked vehicles and vehicles not registered for a Brunel Virtual permit. If not registered for a Brunel Virtual permit all vehicles must use the Pay & Display.

VISITOR PARKING FOR DISABLED BLUE BADGE HOLDERS

Accessible parking bays are available at various locations around campus. Please register for a virtual permit with the Main Reception in the Eastern Gateway Building and display your Blue Badge.



Partners:



Sponsors:



Visitor Parking: Visitors are required to be registered by their Brunel contact otherwise they are required to Pay and Display and pay the appropriate fee.

For more information, please visit [here](#).



Brunel Campus Parking Map

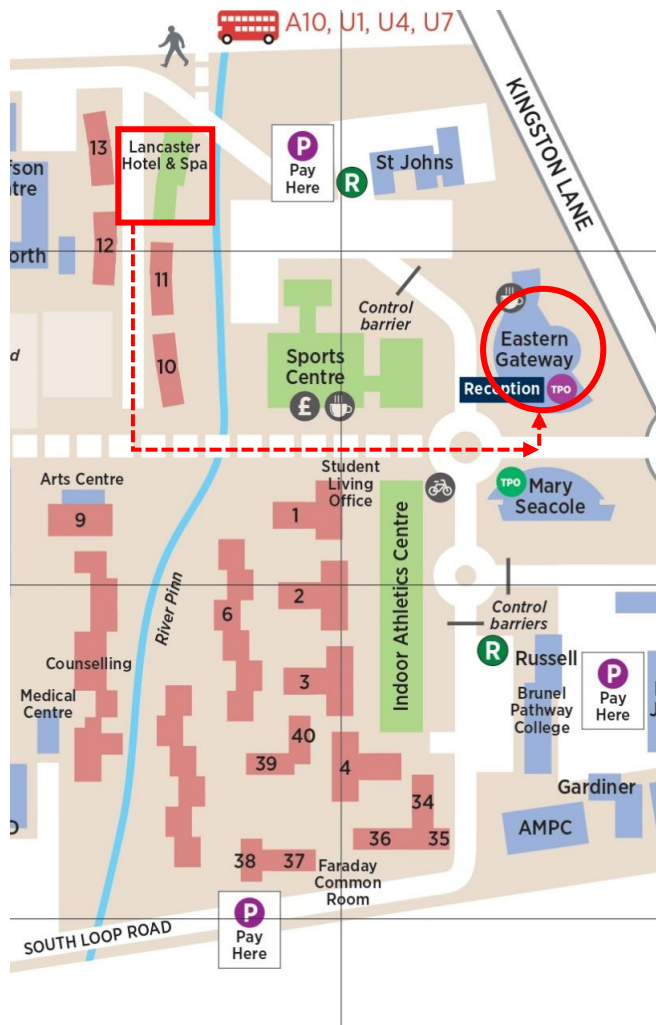
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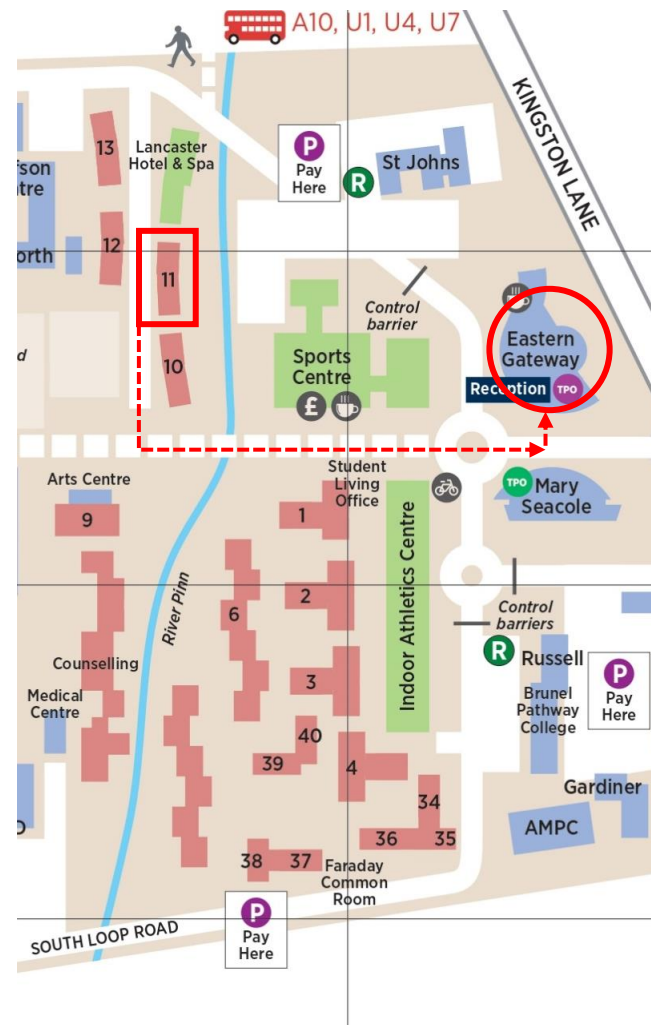
Sponsors:



Lancaster Hotel to Eastern Gateway



Southark Hall to Eastern Gateway



Partners:



Sponsors:

