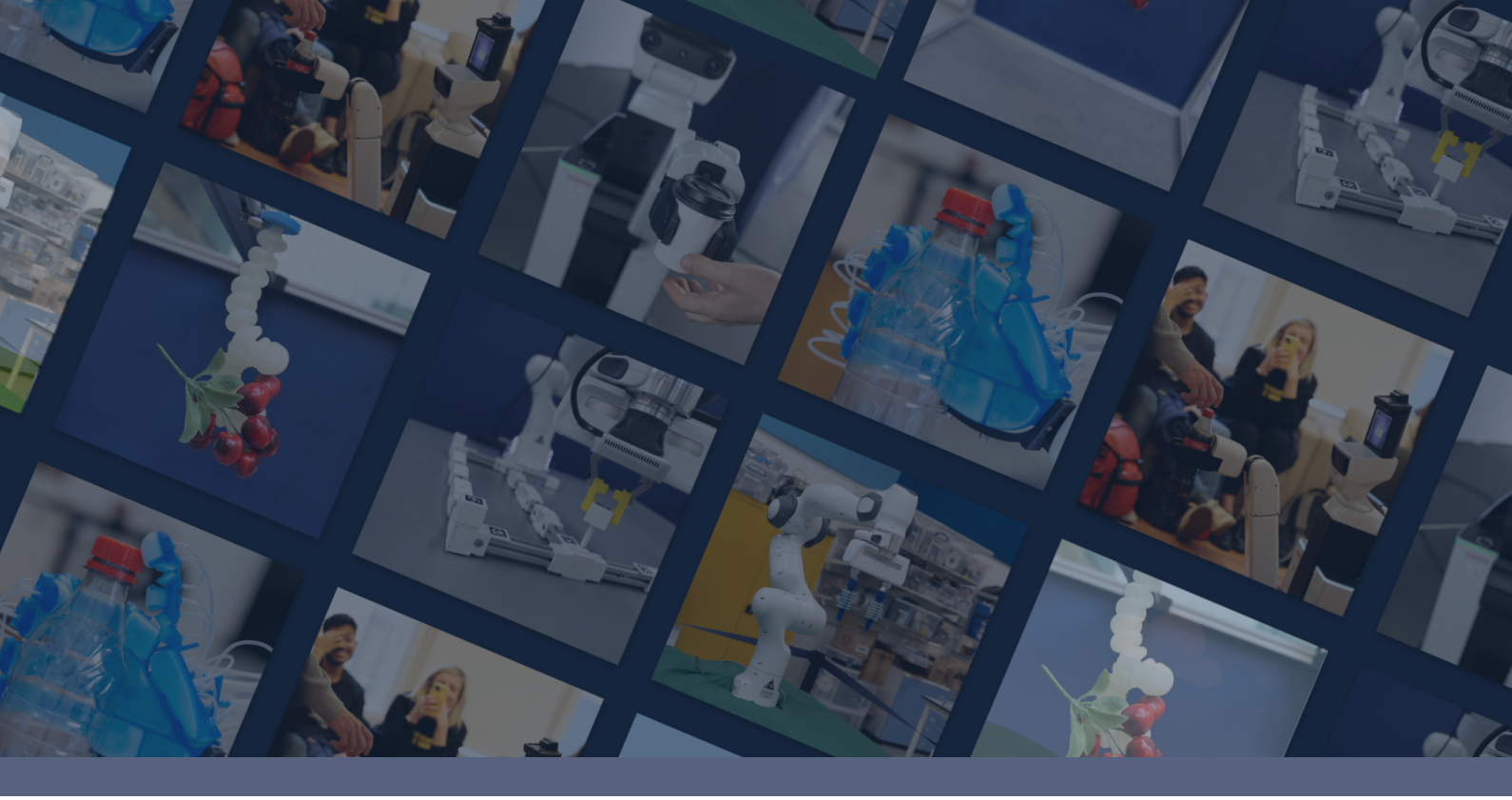

5th UK Robot Manipulation Workshop 2024

Full Programme

11th & 12th January

UNIVERSITY OF OXFORD

ORI OXFORD ROBOTICS INSTITUTE

EMBODIED INTELLIGENCE

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	10:15: **Edward Johns** - Imperial College London *Zero-shot, One-shot, and Few-shot Robot Learning of Everyday Tasks*	
	10:30: **Maria Koskinopoulou** - Heriot-Watt University *Vision-guided Robotic Manipulation and Industrial Autonomy*	
	10:45: **Ioannis Havoutis** - University of Oxford *Building the manipulation part of loco manipulation for quadrupedal robots*	
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Posters Schedule

Day 1 - 11:00 - 11:30 & 15:30 - 16:00

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#2	**TacTipBio: A Soft Biomimetic Optical Tactile Sensor for Efficient 3D Contact Localization and 3D Force Estimation** Haoran Li, Saekwang Nam, Zhenyu Lu, Chenguang Yang, Efi Psomopoulou, Nathan F. Lepora *University of Bristol*
#3	**Learning garment manipulation policies toward robot-assisted dressing** Fan Zhang and Yiannis Demiris *Imperial College London*
#4	**TacFR-Gripper: A Reconfigurable Fin Ray-Based Compliant Robotic Gripper with Tactile Skin for In-Hand Manipulation** Qingzheng Cong, Wen Fan, Dandan Zhang *University of Bristol*
#5	**Extending DOF for Soft Fingers with Embedded Synergies** Yuxuan Wang and Emanuel Nunez Sardinha *King's College London*
#6	**Softness Prediction with a Soft Biomimetic Optical Tactile Sensor** Saekwang Nam, Toby Jack, Loong Yi Lee, Nathan F. Lepora *University of Bristol*
#7	**Feeling Good: Validation of Bilateral Tactile Telemanipulation for a Dexterous Robot** Gabriele Giudici, Bukeikhan Omarali, Aramis Augusto Bonzini, Kaspar Althoefer, Ildar Farkhatdinov, and Lorenzo Jamone *Queen Mary University of London*
#8	**Manipulating Lettuce seedlings in Hydroponic farms- From expert humans to adaptive robots** Roberto Mendivil-Castro, Rodolfo Cuan-Urquizo, Tianyue Qin, Fuli Wang, Mohan Vishwanathan *University of Essex*
#9	**Soft Robotic Fabric Actuator With Elastic Bands for High Force and Bending Performance in Hand Exoskeletons** Cem Suulker, Sophie Skach, and Kaspar Althoefer *Queen Mary University of London*
#10	**RAMP: A Benchmark for Evaluating Robotic Assembly Manipulation and Planning** Jack Collins, Mark Robson, Jun Yamada, Mohan Sridharan, Karol Janik, Ingmar Posner *University of Oxford*
#11	**Naturalistic Robot-to-Human Bimanual Handover in Complex Environments Through Multi-Sensor Fusion** Salih Ertug Ovur, and Yiannis Demiris *Imperial College London*

#12	**QMCube - A Tactile Cube to Explore Hand Interaction Forces in Human Manipulation** Zain Murtaza, Aramis Augusto Bonzini, Kaspar Althoefer, Lorenzo Jamone *Queen Mary University of London*
#13	**Automated Robotic Needle Puncture for Percutaneous Dilatational Tracheostomy** Yuan Tang, Brendan McGrath, Andrew Weightman and Bruno V. Adorno *University of Manchester*
#14	**Goal-Conditioned Model Simplification for Deformable Object Manipulation** Shengyin Wang, Matteo Leonetti, Mehmet Dogar *University of Leeds*
#15	**Template-free Non-revisiting Uniform Coverage Path Planning on Curved Surfaces** Tong Yang, Jaime Valls Miro, Minh Nguyen, Yue Wang, and Rong Xiong *Zhejiang University*
#16	**InstaGrasp: An Entirely 3D Printed Adaptive Gripper with TPU Soft Elements and Minimal Assembly Time** Xin Zhou, and Adam J. Spiers *Imperial College London*
#17	**Exploiting Mechanical Intelligence for Dexterous Manipulation: On Kinematic Bifurcation and Hinge Compliance of Thick-Panel Origami** Chenying Liu Liang He Sihan Wang Albert Williams Zhong You, Perla Maiolino *University of Oxford*
#18	**SkillMaN — A skill-based robotic manipulation framework based on perception and reasoning** Mohammed Diab, Mihai Pomarlan, Daniel Beßler, Aliakbar Akbari, Jan Rosell, John Bateman, Michael Beetz *Imperial College London*
#19	**Advanced Human-Robot Collaborative Assembly Using Electroencephalogram Signals of Human Brains** Abdullah Mohammed, Lihui Wang *Aston University*
#20	**Laser-Sculptured Hierarchical Spinous Structures for Ultra-High-Sensitivity Iontronic Sensors with a Broad Operation Range** Zhuo Chen, Yang Zhang, Bin Zhu, Yigen Wu, Xiaohui Du, Liwei Lin, and Dezhi Wu *King's College London*
#21	**Development of a Robotic Surgery Training System** Robin Julia Trute, Carlos Suárez Zapico, Andreas Christou, Daniel Layeghi, Stewart Craig and Mustafa Suphi Erden *Heriot Watt University*
#22	**Language Models as Zero-Shot Trajectory Generators** Teyun Kwon, Norman Di Palo, Edward Johns *Imperial College London*
#23	**Control Strategies for the Task Definition of Constrained Bimanual Manipulation** Seyonne Leslie-Dalley, Keir Groves, Bruno Vilhena Adorno *University of Manchester*

#24	**DINOBot: Robot Manipulation via Retrieval and Alignment with Vision Foundation Models** Norman Di Palo and Edward Johns *Imperial College London*
#25	**Keypoints, Tokens, Action! On the Use of Language Models for In-Context Robot Imitation Learning** Norman Di Palo, Edward Johns *Imperial College London*
#26	**PandaPoser: Composing Multiple Pre-trained Models and DMPs for Robotic Manipulation** Yifan Li, Chengguo Liu, Ning Wang *University of Bristol*
#27	**Autonomous localization and grasping for object buried within granular material** Zhengqi Chen *Queen Mary University of London*
#28	**Beyond Grip Force: Investigating Trajectory Modulation for Slip Control in Human and Robot Manipulation Tasks** Kiyanoush Nazari, Willow Mandil, Marco Santello, Seongjun Park, Amir Ghalamzan E *University of Lincoln*
#29	**A Two-Fingered Robot Gripper with Variable Stiffness Flexure Hinges Based on Shape Morphing** Hareesh Godaba, Aqeel Sajad, Navin Patel, Kaspar Althoefer, and Ketao Zhang *Queen Mary University of London*
#30	**Digital Twin-Driven Mixed Reality Framework for Immersive Teleoperation With Haptic Rendering** Wen Fan , Xiaoqing Guo, Enyang Feng , Jialin Lin , Yuanyi Wang, Jiaming Liang , Martin Garrad Jonathan Rossiter , Zhengyou Zhang, Nathan Lepora, Lei Wei , and Dandan Zhang *University of Bristol*
#31	**A Soft Robotic Gripper with Active Palm for In-Hand Object Reorientation** Thomas Mack, Ketao Zhang, Kaspar Althoefer *Queen Mary University of London*

Day 2 - 10:30 - 11:00 & 15:00 - 15:30

#32	**AntGrip - Boosting Parallel Plate Gripper Performance Inspired by the Internal Hairs of Ant Mandibles** Mohamed Sorour, Barbara Webb *University of Edinburgh*
#33	**Increasing contact area for enhancing Gecko-inspired Adhesion** Lihaoya Tan, Loong Yi Lee, Tianqi Yue, Alex Kulykov, Jonathan Rossiter, and Andrew T. Conn *University of Bristol*
#34	**TWIST: Teacher-Student World Model Distillation for Efficient Sim-To-Real Transfer** Jun Yamada, Marc Rigter, Jack Collins, Ingmar Posner *University of Oxford*
#35	**A Soft Continuum Robot with Self-Controllable Variable Curvature** Xinran Wang, Qiujie Lu, Dongmyoung Lee, Zhongxue Gan, and Nicolas Rojas *Imperial College London*
#36	**AI-Enhanced High-Density Surface Electromyography for Improving Prosthetic Functionality** Sarah Hussain *Queen Mary University of London*
#37	**Divide and Conquer: Managing large action space of Dexterous hand by taking a modular approach** Hamid Mohammad *University College London*
#38	**One-Shot Imitation Learning: A Pose Estimation Perspective** Pietro Vitiello, Kamil Dreczkowski, Edward Johns *Imperial College London*
#39	**Down the Rabbit Hole: Exploiting Airflow Interactions for Morphologically Intelligent Retracting Vacuum Grippers** Loong Yi Lee, Silvia Terrile, Ajmal Roshan, Tianqi Yue, and Jonathan Rossiter *University of Bristol*
#40	**Touching a NeRF: Leveraging Neural Radiance Fields for Tactile Sensory Data Generation** Shaohong Zhong, Alessandro Albini, Oiwi Parker Jones, Perla Maiolino, Ingmar Posner *University of Oxford*
#41	**Adapting M-LEAD for Robotic Arm Behavior Analysis in Autonomous Robots** Shivoh Chirayil Nandakumar, Mustafa Suphi Erden, Theodore Lim *Heriot Watt University*
#42	**VAT-CMR: Visual-Audio-Tactile Cross-Modal Retrieval with Multi-Modal Fusion and Dominant Modality Selection** Jagoda Wojcik, Jiaqi Jiang, Jiacheng Wu and Shan Luo *King's College London*
#43	**Imitation Learning from a Single Demonstration and Self-Supervision in Manipulation** Georgios Papagiannis and Edward Johns *Imperial College London*

#44	**Attention for Robot Touch: Tactile Saliency Prediction for Robust Sim-to-Real Tactile Control** Yijiong Lin, Mauro Comi, Alex Church, Dandan Zhang, Nathan F. Lepora *University of Bristol*
#45	**Fit-NGP: Fitting Object Models to Neural Graphics Primitives** Marwan Taher, Ignacio Alzugaray and Andrew J. Davison *Imperial College London*
#46	**PnuTac: A vision-based pneumatic tactile sensor for slip detection and object classification** Prasad Rayamane, Peter Herbert, Francisco Munguia-Galeano and Ze Ji *Cardiff University*
#47	**Towards smooth human-robot handover with a vision-based tactile sensor** Prasad Rayamane, Francisco Munguia-Galeano, Seyed Amir Tafrishi, and Ze Ji *Cardiff University*
#48	**Scaling Population-Based Reinforcement Learning with GPU Accelerated Simulation** Asad Ali Shahid, Yashraj Narang, Ankur Handa, Dieter Fox, Marco Pavone, Loris Roveda *Dalle Molle Institute for Artificial Intelligence*
#49	**Amazon Robotics Targeted Shelf Picking Dataset** Kiru Park, Kshitij Dwivedi, Can Erdogan *Amazon Robotics*
#50	**On a Generative Perception Model for Soft Manipulators Control** Enrico Donato, Egidio Falotico and Thomas G. Thuruthel *Sant'Anna School of Advanced Studies*
#51	**Dream2Real: Zero-Shot 3D Object Rearrangement with Vision-Language Models** Ivan Kapelyukh, Yifei Ren, Ignacio Alzugaray, Edward Johns *Imperial College London*
#52	**Haptic-guided shared control for tele-navigation and telemanipulation** Venkatesh Sripada, Muhammad Arshad Khan, Julia Focker, Horia Maior, Amir Ghalamzan, and Soran Parsa *University of Lincoln*
#53	**Computationally tractable manipulation in clutter via approximated derivatives** David Russell, Rafael Papallas, and Mehmet Dogar *University of Leeds*
#54	**Iterative Refinement of Two-Fingered Robotic Grasps** Nissy Abraham and Martin Rudorfer *Aston University*
#55	**Exploring Nature's solutions to object grasping** Florent Le Moël, Barbara Webb *University of Edinburgh*

#56	**Wearable robotics for Motor Neurone Disease: 'Split hand' motivation and kinematics (preliminary study)** Edith-Clare Hall, Antonia Tzemanaki, Laura Evans,Pamela Shaw, Jonathan Rossiter *University of Bristol*
#57	**Tactile-enhanced Predictive Learning of Robotic Physical Interaction** Luchen Li, Thomas George Thuruthel *University College London*
#58	**Generating Future Observations to Estimate Grasp Success in Cluttered Environments** Daniel Fernandes Gomes, Wenxuan Mou, Paolo Paoletti and Shan Luo *King's College London*
#59	**Bi-Manual Manipulation of Multi-Component Garments towards Robot-Assisted Dressing** Stelios Kotsovolis and Yiannis Demiris *Imperial College London*
#60	**GenHand: Generalized Human Grasp Kinematical Retargeting for Intuitive Teleoperation** Liyuan Qi, Olaoluwa Popoola, Muhammad Ali Imran, and Wasim Ahmad *University of Glasgow*
#61	**EquivAct: SIM(3)-Equivariant Visuomotor Policies beyond Rigid Object Manipulation** Jingyun Yang, Congyue Deng, Jimmy Wu, Rika Antonova, Leonidas Guibas and Jeannette Bohg *Stanford University*
#62	**Immersive Teleoperation: An Interface for Advanced Remote Object Manipulation** Liangyue Yu, Olaoluwa Popoola, Shuja Ansari, Muhammad Imran, Wasim Ahmad *University of Glasgow*
#63	**Hybrid planning and control for changing contact manipulation** Yanrong Wang, Mohan Sridharan, and Dirk Ruiken *University of Edinburgh*

Invited Speakers

In order of appearance

Yanlong Huang (bio)
University of Leeds

Talk: Kernelized movement primitives: a nonparametric paradigm for learning from demonstrations

In the community of robot learning, learning from demonstrations (LfD) has been studied widely due to its convenient solution for transferring human skills to robots. A myriad of applications of LfD were reported in previous literature, e.g., robot manipulation and human-robot collaboration. In this talk, I will discuss a nonparametric imitation learning framework kernelized movement primitives (KMP), which can address several crucial issues such as learning multiple demonstrations, reproduction and adaptation, and learning trajectories associated with high-dimensional inputs. Later, I will show some extensions of KMP, including the learning of robot orientations and stiffness matrices, uncertainty-aware human-robot interactions, stable and constrained learning, as well as fast adaptation and closed-loop learning for KMP.

Edward Johns (bio)
Imperial College London

Talk: Zero-shot, One-shot, and Few-shot Robot Learning of Everyday Tasks

Robot learning offers a flexible and general approach for robots to learn new skills. However, the typical methods used by the field, such as Reinforcement Learning and Behavioural Cloning, are highly inefficient. In this talk, I will present research from the past year in our lab which deviates from these typical trends, and aims towards more practical robot learning without huge data requirements. For example, we have studied and developed (1) methods which can work zero-shot — using pre-trained Vision-Language Models without requiring any task-specific data, (2) methods which can work one-shot — requiring only a single demonstration for each new task, and (3) methods which can work few-shot — requiring 3 or 4 demonstrations per task and subsequently enabling generalisation across object shapes. As a common theme through all of these projects, we are studying general methods which work in real-world environments with real camera observations, and which can teach robots typical everyday tasks, such as scooping up an egg from a pan, pouring from a teapot into a cup, and opening a lock with a key.

Maria Koskinopoulou (bio)
Heriot-Watt University

Talk: Vision-guided Robotic Manipulation and Industrial Autonomy

Robotic manipulation is a critical aspect of autonomous applications across various industries, ranging from manufacturing and logistics to healthcare and agriculture. Vision-guided robotic manipulation leverages Computer Vision and Artificial Intelligence to enable robots to perceive and interact with their environment with a high degree of autonomy and precision. We believe that vision-guided robotic manipulation holds significant promise for enhancing autonomy, shared awareness, and precision across various industries, making it a critical area of study and development for the future of robotics and industrial autonomy. In this talk, we will provide an overview of our latest advancements on vision-guided robotic manipulation, the core concepts, and technologies, highlighting its significance in the era of autonomous industrial systems. We will highlight the importance of vision-driven robotic manipulation to tackle complex tasks and delve into key challenges and ongoing research areas shaping the future of this field, with the goal of enhancing efficiency and autonomy in various domains.

Ioannis Havoutis (bio)
University of Oxford

Talk: Building the manipulation part of loco manipulation for quadrupedal robots

Legged robots are now taking their first steps in a range of domains and in challenging applications. Their key advantage is the unmatched mobility that legged locomotion provides and the versatility this offers as a platform for both sensing and manipulation. These, however, require control solutions that are able to recover from unexpected perturbations, adapt to variations in system and environment dynamics, and execute tasks safely and reliably. In this talk I will give an overview of my groups' work on optimization- and learning-based approaches to locomotion and manipulation on legged robots. In addition, I will briefly touch on our adventures in building hardware to meet the needs of challenging manipulation tasks.

Daniel Wolpert (bio)
Columbia University

Keynote: Computational principles underlying the learning of sensorimotor repertoires

Context is widely regarded as a major determinant of animal learning and memory across numerous domains, including classical and instrumental conditioning, episodic memory, economic decision-making, and motor learning. However, studies across these domains remain disconnected due to the lack of a

unifying framework formalizing the concept of context and its role in learning. I will present a principled theory of human motor learning based on the key insight that memory creation, updating, and expression are all controlled by a single computation – contextual inference. Unlike dominant theories of single-context learning, our repertoire-learning model accounts for key features of motor learning that had no unified explanation and predicts novel phenomena, which we confirm experimentally. Although this model was developed for motor learning the principles underlying the model are domain general. Our results suggest that contextual inference is a key principle underlying how a diverse set of experiences is reflected in behavior.

Kaspar Althoefer (bio)
Queen Mary University of London

Talk: Measuring Object Stiffness for Enhanced Manipulability

In the pursuit of creating intelligent manipulation devices adept at expertly interacting with grasped objects, the essential task arises to innovate sensing technologies capable of precisely estimating relevant interaction parameters. Researchers face the challenge of creating sensor devices that satisfy the requirements for integration with the increasingly sophisticated robot hands and grippers being developed and, at the same time, allow a truthful haptic perception of the objects being handled.
Our research focuses on creating miniature sensors specifically designed for seamless integration within the fingers and palms of robot hands. These sensors serve the crucial function of perceiving and interpreting pertinent features of interaction, enabling the determination of object stiffness during grasping.

In my presentation, I will emphasise the significance of robot-hand integrated sensors in measuring both interaction forces and the deformation experienced by handled objects during a grasp. Utilising optical methods, we gauge interaction forces and object deformation, arguing that a comprehensive understanding of an object's stiffness enhances manipulability. The talk will provide a comprehensive overview of the design and integration challenges inherent in our sensor development, showcasing the successful implementation of multi-axis force and proximity sensors embedded in robot hands.

Antonio Forte (bio)
King's College London

Talk: Non-linear interaction via disordered structures for complex picking

Entanglement often occurs in a cluster of objects that stochastically interact with each other. This interaction is particularly influenced by the object's geometric features and material properties. A tangled media can be considered a disordered and discrete mechanical composition with highly random attributes and interactions. Here, we employ an external electromagnetic field as stimulus to form a structure consisting of U-shaped ferromagnetic particles which are inherently prone to tangle. We then harness such disordered composition to create non-linear interactions

with non-ferromagnetic objects. The results show a rich domain of physical engagement behaviour between the structure and a variety of fabricated objects, which have specific geometric features and a range of bending stiffnesses. We use this new concept in complex robotic picking tasks, where conventional grippers struggle. We further enhance our set up by manufacturing 3D-printed dissolvable ferromagnetic particles, which are able to pick entangled objects such as fresh herbs and spaghetti, and decompose once the task is completed.

Jihong Zhu (bio)
University of York

Talk: Manipulating Deformable Objects: Challenges and Opportunities

What makes the manipulation of deformable objects challenging? In this talk, I will discuss some fundamental challenges introduced by object deformation and ways to tackle these challenges in my research. I will also present some of the promising applications of deformable object manipulation in both industrial and domestic settings.

Nathan Lepora (bio)
University of Bristol

Talk: Tactile Robot Dexterity

In this talk I summarize some goals for robot dexterity and their critical dependence on an artificial sense of touch. I cover recent progress from the University of Bristol/Bristol Robotics Laboratory on 3d-printed high-resolution tactile sensing based on the human sense of touch, the integration into robot hands of various types such as industrial grippers and anthropomorphic hands, and the control of robots using tactile sensing.

Jenny Read (bio)
Aria

Talk: “How might we push the limits of achievable dexterity with a £50M programme in embodied intelligence”?

In this session, Prof Jenny Read will invite insights and feedback from the UK robotic manipulation community regarding a programme of research in robotics being developed by the Advanced Research + Invention Agency. A short document outlining the proposed opportunity space is here.

Shan Luo (bio)
King's College London

Talk: TacLearner - Object perception and manipulation with tactile sensing and Sim2Real learning

The role of tactile sensing in robot dexterous manipulation is indispensable, yet challenges persist in developing tactile sensors and collecting real-world manipulation data. This talk introduces sensorised robot fingers and their simulation, illustrating their importance in enhancing tactile perception. Additionally, we explore the transition of simulated agents with tactile sensing to real-world scenarios, emphasising the transformative potential of Sim2Real learning. By bridging the gap between simulation and reality, these advancements hold the key to empowering robots with agile manipulation skills, reshaping their ability to interact with the environment intuitively and adaptively.

Nicolas Rojas (bio)
Imperial College London

Talk: On mechanical intelligence and efficient learning techniques for manipulation and grasping

This talk discusses our recent progress in developing and leveraging mechanical intelligence and data, time efficient learning techniques for grasping and manipulation in uncertain environments. This includes autonomous grasping with unknown grippers, continuous control of prosthetic hands, soft manipulator and robot hand design, and cloth manipulation.

Amir Ghalamzan Esfahini (bio)
University of Surrey

Forward Predictive Model and Data-driven Model Predictive Control

Tactile predictive models can help robots perform many manipulation tasks, such as pushing, grasping, avoiding slips, and moving objects in their hands. We developed new action-conditioned tactile predictive models that are better at predicting tactile signals during real-world robot interactions. Our models outperformed existing models in qualitative, quantitative, and slip prediction scores.

We developed new tactile predictive models and control approaches that can help robots perform manipulation tasks more dexterous and robustly. Our work has the potential to improve the performance of robots in a wide range of applications, such as manufacturing, logistics, and healthcare.

Mohan Sridharan (bio)
University of Birmingham

Talk: An Integrated Cognitive Architecture for Robot Manipulation

This talk will describe a vision and philosophy for research in robot systems, with a focus on robot manipulation. I will do so by drawing on my prior expertise in designing integrated cognitive architectures for knowledge representation, reasoning, control, and learning in robotics. These architectures computationally encode key principles such as step-wise iterative refinement and ecological rationality, and leverage the complementary strengths of knowledge-based and data-driven reasoning and learning methods. I will illustrate the capabilities of these architectures in the context of robot manipulation and (if time permits) some other fundamental problems in robotics. In particular, I will emphasise the benefits of exploiting the interplay between reasoning, learning, and control.

Fumiya Iida (bio)
University of Cambridge

Tutorial: How to become paper machine with soft manipulation

Niels Lohse (bio)
Intelligent Automation Centre

Industry talk: Intelligent automation in loughborough

Jeremy Wyatt (bio)
Amazon

Industry talk: Robotic Manipulation at Amazon

Amazon has challenging robotic manipulation problems in terms of scale, item variability and process variability. In the past four years we have invented our own approaches to a variety of pick and place tasks. I will talk, at a high level, about the visual perception, grasp learning, failure

detection, continual learning and automated A/B testing that we have used to deploy hundreds of robots that pick millions of packages every day. I will also cover the even more challenging problem of manipulating the hundreds of millions of products we have in our catalogue, including fast pick and place, damage prevention and stowing to dense storage.

Miika Satori (bio)
Cambrian Robotics

Industry talk: Solving manufacturing tasks with AI vision: Current applications and future challenges

Combining robotics and AI we are building a massively productive tool so that we don't need to involve human hands in anything we produce. Therefore helping to drive down the cost of stuff and freeing people to do more meaningful endeavours. Right now at Cambrian we're building for this vision first by solving a subset of low hanging fruit problems and helping all manufacturers in the world to benefit from intelligent automation.

Henry Lau (bio)
UK Atomic Energy Authority

Industry talk: Robotics challenges in fusion energy

Robotics is one of the key technologies to realising the goal of commercially viable fusion energy. Operations such as safe handling of hazardous materials, maintaining the operation of the power plant, and repurposing of waste require substantial effort in research and development in robotics to achieve this goal safely and reliably. Robotics and remote operated tools are a fundamental part of operating fusion power plants. The presentation looks at some of these top challenges including rapid response, inspection and in-situ repair, and handling of challenging components, shedding light to possible deployable solutions derived from ongoing research effort.

Dhruva Tirumala (bio)
Deepmind

Replay Across Experiments - A natural extension of off-policy RL.

Industry talk: In this talk I will present our recent work that showcases the power of data reuse in Reinforcement Learning (RL) for robotics applications. The core idea behind our approach is surprisingly simple and can be summarized as: turn it off and on again. I will discuss how simply mixing in data from previous experiments can lead to asymptotic performance improvements across a wide range of domains including state-of-the-art results ons some existing

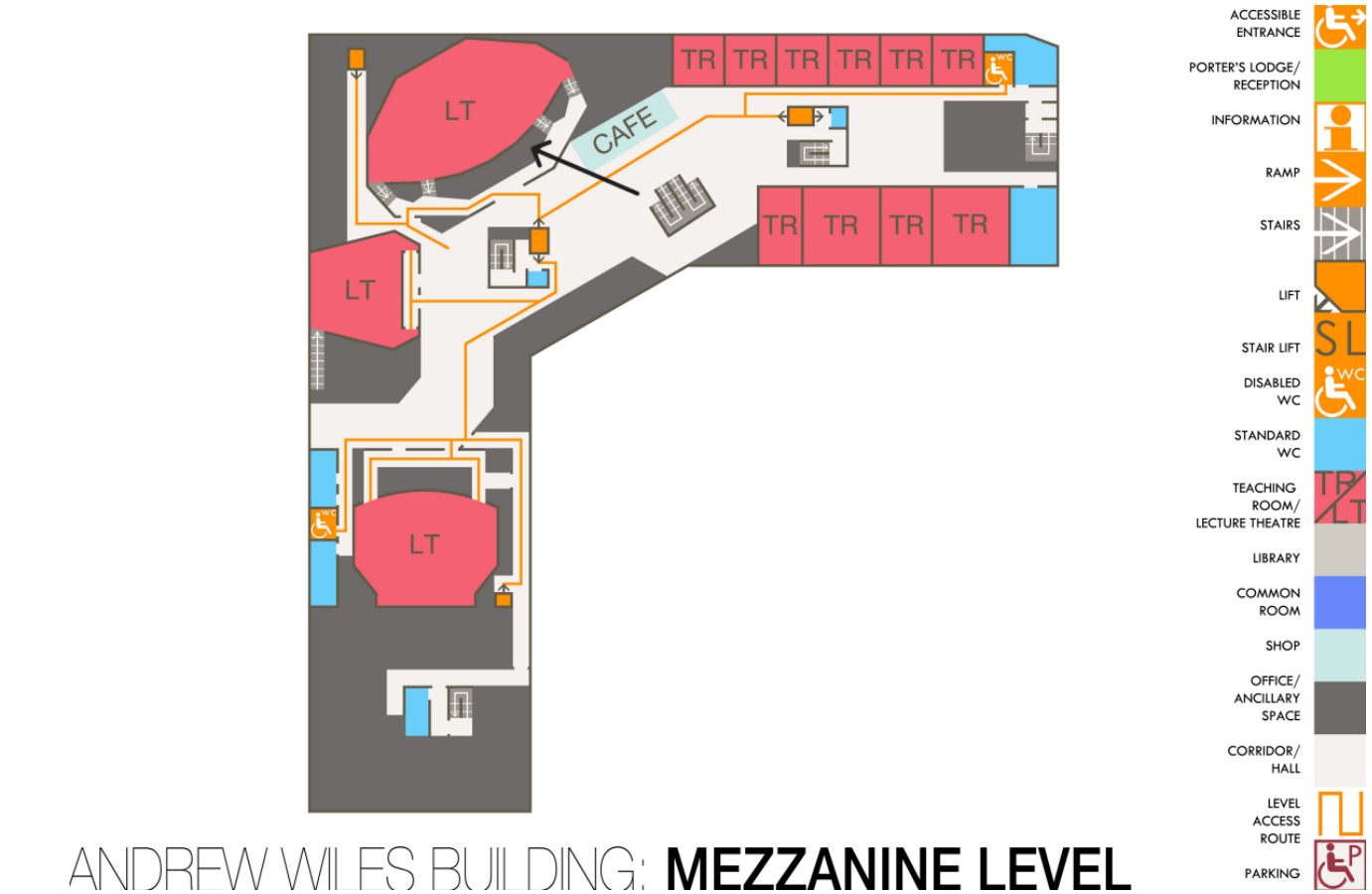
offline benchmarks. Finally I will discuss a practical demonstration of this pipeline where two humanoid robots learn to play soccer using only proprioceptive and egocentric visual information. We are excited by the promise of this line of research since it can be easily integrated into off-policy RL workflows, can be iteratively used throughout the lifetime of a project and shows strong results in practical real world applications.

Rich Walker (bio)
Shadow Robot

Industry talk: Dexterous Manipulation - an Industry Perspective

Floorplans

ANDREW WILES BUILDING: **GROUND FLOOR**



ANDREW WILES BUILDING: **MEZZANINE LEVEL**

Getting to the Venue

Mathematics Institute
Andrew Wiles Building
Radcliffe Observatory Quarter (550)
Woodstock Road
Oxford
OX2 6GG

Map link

For the precise location of either entrance nominated on above floor plans of the ground floor use this website link: https://what3words.com/
Then search the words nominated for either entrance below

🔵 ///tuck.latest.guards

🔴 ///policy.rises.bets

To reach the lecture theatres (for those who cannot manage stairs): pass through the large glass doors nearest reception and access the lifts to go to the mezzanine (-1) level. The reception staff can release the door lock and/or escort occasional visitors. The doors are not powered.

To reach the lower levels of the lecture theatres for seating at the front or to speak there are individual platform lifts located down corridors alongside the theatre - as these lifts are 'behind the scenes' you will need to be escorted to them. Please arrange access via the events team in advance where possible, or otherwise ask reception staff.

Driving & Parking

Please be aware there is limited public parking available in the centre of Oxford and almost no parking at the Radcliffe Observatory Quarter. There are two dedicated accessible parking places for blue badge holders which require pre-booking. Please give as much notice as possible for such requests to ORIadmin@robots.ox.ac.uk should you require a space.

We advise using the Park & Ride services, parking at Pear Tree and taking the #300 bus which stops opposite the entrance to the Mathematical Institute on Woodstock Road.

Rail

See Rail Timetable Information for details of trains to Oxford and to purchase train tickets.

Coach

From London, take the Oxford Tube coach to Oxford.
See the National Express website for details of coaches from other major cities.
Tickets can usually be purchased on the linked travel company websites.

Bus

The local Oxford bus companies are Oxford Bus Company and Stagecoach Oxford. The closest stops to the Andrew Wiles Building are:

Radcliffe Observatory Quarter - generally servicing 300 Park & Ride, S1, S2, S3 gold, ST2 connector, NS1 and 6 City

Keble Road - generally servicing 2, 2A, 14, 24, N2, NS5 gold, S4 gold, S5 gold, S7, ST2 connector, X4

Do check the bus timetables to ensure accurate information

Taxi

For local taxi firms check the Electronic Yellow Pages listings

Accommodation

Those travelling from outside of Oxford may wish to spend the night in Oxford on Wednesday 10th. We plan to finish by 6pm on Friday 12th.

The venue is a walkable distance from the city centre and well accessed via bus from outer areas should you need to reduce cost. Below are a few suggestions:

Old Parsonage Hotel (£££)
2 min walk to venue

The Randolph Hotel (£££)
8 min walk to venue

Malmaison Oxford (££)
16 minute walk to venue or 10 minute bus ride

Mercure Oxford Eastgate Hotel (££)
16 minute walk to venue

easyHotel Oxford (£)
12 minute bus ride

Leonardo Royal Hotel Oxford - Formerly Jurys Inn (£)
22 minute bus ride

Venue WiFi Access

Eduroam is accessible throughout the venue.

Alternatively, there is a 'The Cloud' network.

How to connect to the Cloud WiFi:

1. Switch on your smartphone, tablet or laptop and check that WiFi is enabled.
2. Select '_The Cloud' from the available network list.
3. Open your internet browser – the venue landing page will appear. If it does not, type in bbc.co.uk to prompt the browser to load the landing page.
4. If it is your first time using The Cloud WiFi, you will need to create your own personal log-in. Follow the simple one-time registration process by sharing some details.
5. Once registered you can access the internet via The Cloud.

Refreshments & Water Access

Refreshments will be available during all breaks, including hot tea and coffee. Some water will be available but in order to reduce our environmental impact, we would like to encourage as many

attendees as possible to bring a reusable water bottle to refill. Water refill stations are located throughout the venue; please find their locations marked by the water drop on this map.

Photos & Social Media

Find us on social media @oxfordrobots. Please tag us & share your content using #UKRobotManipWS!

Thank you for sharing your photo permission requests via your online registration. Our event photographers will use white lanyards to distinguish those who have not shared permission; please ensure your lanyard is visible at all times.

Delegate Photos:
We're excited to create a vibrant community space for sharing memories from the UK Robot Manipulation Workshop. To facilitate this, we have set up a Google Drive where you can contribute photos taken during the event.

Purpose of Photo Collection:
The photos shared will be used to create a visual representation of our conference community, showcasing the shared experiences and highlights.

Usage in Online Materials:
Please note that by contributing photos, you grant us permission to use them in online materials, such as social media posts, website content, or promotional materials related to the UK Robot Manipulation Workshop.

Your Consent:
Your participation in photo sharing is entirely voluntary. By contributing photos, you implicitly consent to their use as described above. Any members who have already expressed a non-consent to photography will be blurred in any photographs used.

Data Protection and GDPR:
We are committed to respecting your privacy. If you have any concerns or questions about the use of your photos, please contact us at rmw@robots.ox.ac.uk.

ORI Lab & Walking Tours

Some attendees have signed up to attend either the Oxford Robotics Institute (ORI) Lab Tour or the guided Oxford Walking Tour on either Day 1 or Day 2 of the workshop.

Day 1: 13:30 - 15:30

Day 2: 13:00 - 15:00

Information about joining these tours will be shared in the preceding speaker session. Registered tour attendees are asked to gather at their assigned meeting location at least 5 minutes before the end of the lunch break.

Please see 'Things to Do in Oxford' below for suggestions of alternative activities if you have not been able to sign up for the tours.

Things to Do in Oxford

There is a 2-hour post-lunch session on each day to allow time for the ORI Lab Tour and Guided Walking Tour to take place. These events are sign-up only (due to limited space).
Day 1: 13:30 - 15:30
Day 2: 13:00 - 15:00
Lecture Theatre 1, the Atrium and the Pi Cafe will remain accessible for all delegates during the 2-hour post-lunch session each day.
If you wish to see more of Oxford, please see the list below for suggestions within walking distance of the venue.

- Ashmolean Museum
- Oxford Castle & Prison
- University Church of St Mary the Virgin
- The Radcliffe Camera and Bodleian Libr
- The Covered Market
- Museum of Natural History
- Visiting the Colleges
- Pitt Rivers Museum
- History of Science Museum
- Carfax Tower
- Westgate Shopping Centre
- Oxford Botanic Gardens
- Modern Art Oxford

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