UKRI Trustworthy Autonomous Systems Hub

ALL HANDS MEETING 2022

Bringing the TAS Community together to Showcase | Reflect | Strategise

WELCOME TO BMA HOUSE

Tavistock Square, London WC1H 9JP

- Welcome refreshments will be served in the Courtyard Suite (ground floor)
- The presentations will take place in the Great Hall (first floor.).

No smoking anywhere in the venue, this includes the gardens, courtyards, and parking areas. Please leave the premises completely if you wish to smoke.

Vaping is also NOT permitted, and the same rules apply as per smoking.

BMA Main Entrance

Reception

Accessibility

The following is drawn from BMA's accessibility guide.

Enabling dogs

Enabling dogs are welcome. Reception will be able to provide water for your enabling dog. Please inform reception on your arrival at BMA House.

Induction loops

The meeting rooms (including reception) are equipped with induction loops (fixed or portable). Portable induction loops need to be requested in advance. If you have any queries, please contact the BMA reception team: 020 7874 7030 or 020 7874 7031.

Accessible toilets

Accessible toilets are available on both the ground and first floors (see maps on page 7.)

Accessible lift

There is an accessible lift (no 11) between the ground and first floor. Dimensions: 1.10m width, 1.40m depth, 2.00m height Door width: 0.80m

Fire and security

Please ensure that you register at reception upon your arrival at BMA House. If you have any accessibility needs your details will be passed on to security so that we are aware of your presence in the building in case of an emergency.

If there is an emergency, signs will direct you towards the nearest fire exit, fire wardens will be on hand to direct you.

CODE OF CONDUCT

Policy Against Harassment at UKRI Trustworthy Autonomous Systems Hub Activities

The open exchange of ideas is central to the UKRI Trustworthy Autonomous Systems Hub (TAS) mission. This requires an environment that embraces diversity and provides a safe, welcoming environment for all.

This policy applies to all TAS activities, including:

- Conferences, symposia, workshops, and events sponsored, co-sponsored, or in cooperation with TAS
- TAS member meetings
- Exchanges among committees or other bodies associated with TAS activities publications and communications sent through communication channels associated with TAS, including social media.

1. Expected Behaviour

We expect all participants in TAS activities to abide by this policy in all venues, including ancillary events and unofficial social gatherings:

- Exercise consideration and respect in your speech and actions;
- Refrain from demeaning, discriminatory, or harassing behaviour and speech;
- Be mindful of your surroundings and of your fellow participants;
- Alert an Ally, as outlined in section 3, if you notice a dangerous situation, someone in distress, or violations of this policy, even if they seem inconsequential.

2. Unacceptable Behaviour

Unacceptable at any TAS activity is:

- Abuse: Any action directed at an individual that (a) interferes substantially with that person's participation; or (b) causes that person to fear for his/her personal safety. This includes threats, intimidation, bullying, stalking, or other types of abuse.
- Discriminatory Harassment: Any conduct that discriminates or denigrates an individual based on race, ethnicity, religion, citizenship, nationality, age, sexual or gender identity, disability, or any other characteristic protected by law in the location where the TAS activity takes place.

CODE OF CONDUCT

Sexual Harassment: Unwelcome sexual advances, requests for sexual favours, or other verbal/physical conduct of a sexual nature. Examples include (but are not limited to):

- Unwelcome advances or propositions, particularly when one individual has authority over the other;
- Inappropriate touching of an individual's body;
- Degrading or humiliating comments about an individual's appearance;
- Using an activity-related communication channel to display or distribute sexually explicit images or messages.

Alert an Ally, as outlined in section 3, if you notice a dangerous situation, someone in distress, or violations of this policy, even if they seem inconsequential.

Harassment can occur when there is no deliberate intention to offend. Be careful in the words that you choose. Harassment committed in a joking manner or disguised as a compliment still constitutes unacceptable behaviour. Remember that sexist, racist, and other exclusionary jokes can be offensive to those around you.

3. How to Report Unacceptable Behaviour

Any individual who experiences harassment (as described above) at any TAS organised event should contact an Equality, Diversity and Inclusion (EDI) Ally wearing a **yellow** lanyard. You may also contact the TAS Hub's interim EDI Officer at the following email address: edi@tas.ac.uk.

All correspondence will be treated in the strictest confidence.

We acknowledge that the Association for Computing Machinery (ACM)'s Policy Against Harassment has been adapted to form the UKRI TAS Hub's Code of Conduct.

LOCATIONS

Accessing the Courtyard and Lutyens suites

The Courtyard suite is accessed by turning left after passing by the Hastings lounge and going through the courtyard, or by taking the corridor to the far end, turning left (past the Lutyens Suite) and left again.

Corridor from reception to the Lutyens Suite

Please note that some parts of the courtyard are uneven due to cobbled stones.

The Snow and Paget rooms can be accessed by taking the corridor from reception. These rooms combined form the Lutyens suite.

A ramp enables access to the Snow room.

The accessible entrance to the Paget room is at the end of the North East-South East corridor, on the North East side.

Lutyens Suite corridor

Accessible toilets are available on the ground floor close to the Lutyens Suite (see the map)

Corridor leading to Courtyard Suite

Accessing the Great Hall

The Great hall is on the first floor and may be accessed by taking lift no.11. This is the preferred route as the lift can accommodate a wheelchair. Dimensions: 1.10m width, 1.40m depth, 2.00m height Door width: 0.80m

Please be aware that there is a slight slope on both sides of the Great hall.

The hall has its own toilets including one which is accessible.

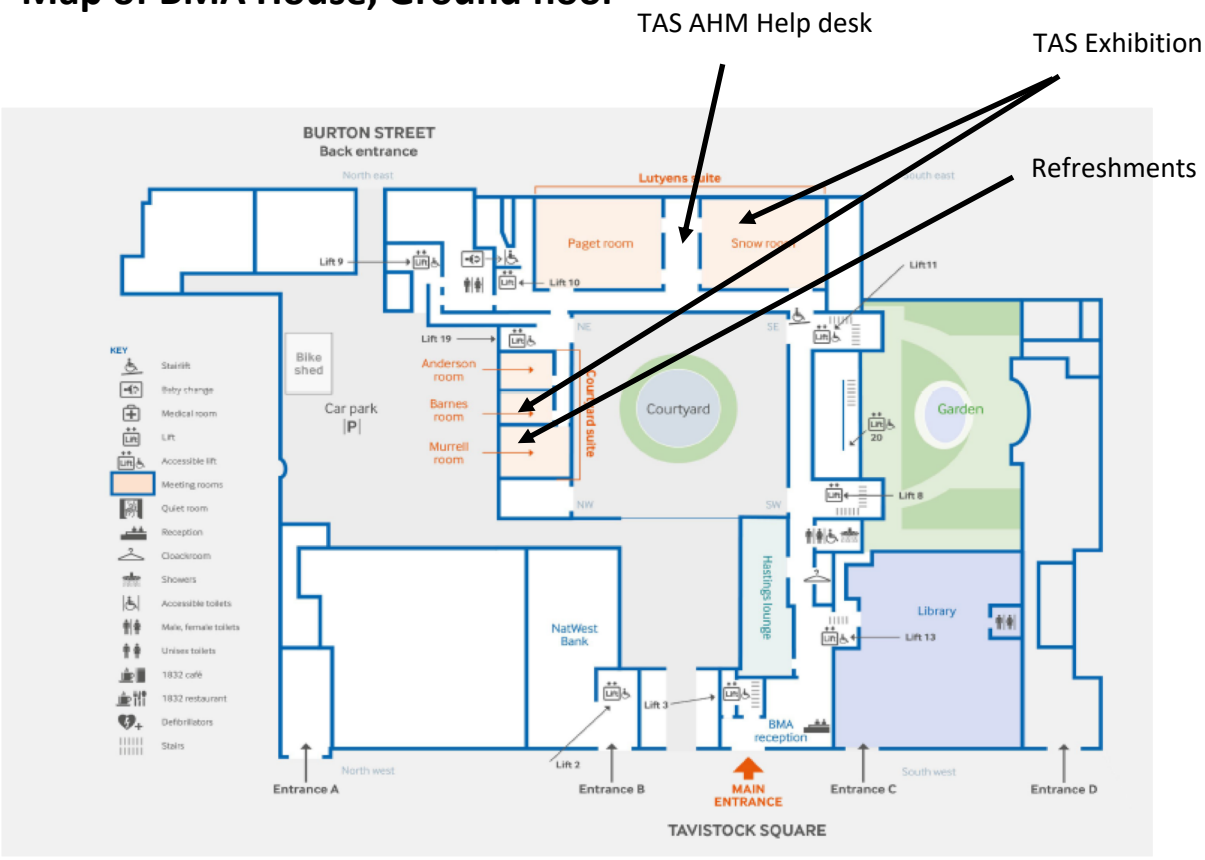
Lift no.11 on the ground floor

Accessing the 1832 Restaurant

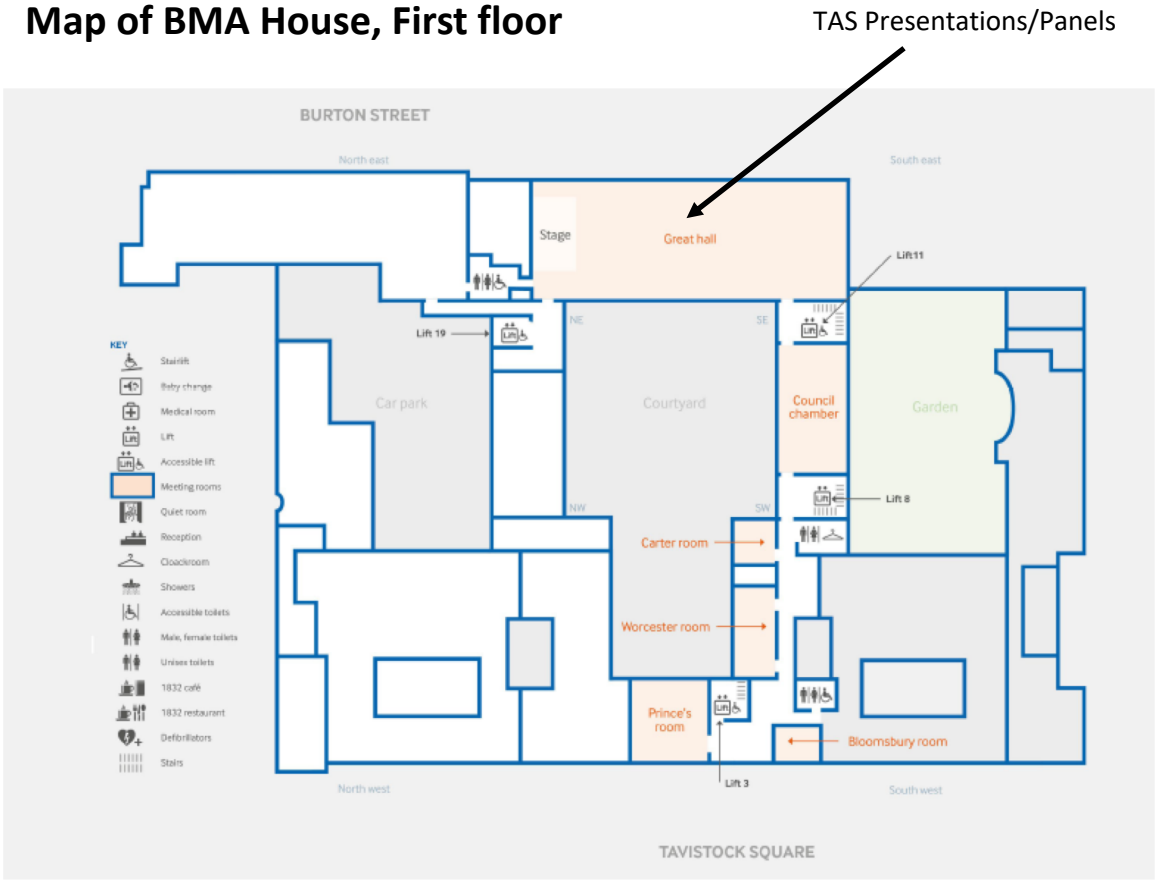
Lunch will be served in the 1832 restaurant is located on the basement level , below the Lutyens suite, and may be accessed via lift 9 from the first floor.

Entrance to the Great Hall

Map of BMA House, Ground floor



Map of BMA House, First floor



UKRI TAS AHM MORNING SESSION

Time	Session	Location
09:00-9:30	Registration and refreshments Collect your security pass at reception and your TAS goodie bag in the Courtyard Suite	Courtyard Suite
09:30-10:00	Welcome, Professor Sarvapali Ramchurn, TAS Director	Great Hall
10:00-10:15	Overview by UKRI Head of Artificial Intelligence and Robotics, Dr James Dracott	Great Hall
10:15-10:30	Introduction to the TAS Research Programme, Professor Joel Fischer, TAS Research Director	Great Hall
10:30-11:00	Research Highlights – presentations from Dr Lars Kunze and Mohammad Divband Soorati.	Great Hall
11:00-11:15	Coffee break	Courtyard Suite
11:15-12:00	Research Highlights –presentations from Dr Maria Galvez Trigo, Professor Radu Calinescu, and Dr Justyna Lisinska.	Great Hall
12:00-12:30	TAS Research Programme Panel chaired by Professor Joel Fischer, TAS Research Director. Professor Radu Calinescu, Carly Kind, Professor Carles Sierra, and Dr Kate Devlin.	Great Hall

UKRI TAS AHM MORNING SESSION

Professor Gopal Ramchurn

Sarvapali Ramchurn is a Professor of Artificial Intelligence, Turing Fellow, and Fellow of the Institution of Engineering and Technology. He is the Director of the UKRI Trustworthy Autonomous Systems (TAS) hub and Co-Director of the Shell-Southampton Centre for Maritime Futures. He is also a Co-CEO of Empati Ltd, an AI startup working on decentralised green hydrogen technologies. His research is about the design of Responsible AI for socio-technical applications including energy systems and disaster management.

Dr James Dracott

Head of AI and Robotics at the Engineering and Physical sciences Research Council, part of UK Research and Innovation. James has worked across the research councils in various roles including setting up the Future Leader Fellowships scheme and as head of the Information and Communications Technologies theme.

Professor Joel Fischer

Joel Fischer is a professor at the School of Computer Science, University of Nottingham, where he is a member of the Mixed Reality Lab. His research takes a human-centred view on AI-infused technologies to understand and support human activities and reasoning. His research is frequently concerned with how interactive technology can be designed to support collocated people interacting face-to-face.

Dr Lars Kunze

Lars Kunze is a Lecturer in Robotics in the Oxford Robotics Institute (ORI) at the University of Oxford.. He is a Programme Fellow of the Assuring Autonomy International Programme (AAIP) and a Co-Editor of the German Journal of Artificial Intelligence. At ORI, Lars leads the Cognitive Robotics Group (CRG).

Dr Mohammad Divband Soorati

Mohammad Divband Soorati is a lecturer at the University of Southampton. Mohammad is interested in human-swarm interaction, swarm robotics, trust in human-swarm teaming, aerial swarms, and evolutionary/ bio-robotics.

Dr Maria Galvez Trigo

Maria Galvez trigo is a Lecturer (Assistant Professor) in Computer Science at The University of Lincoln. Maria is interested in Robotics, Human-Robot Interaction, Human-Computer Interaction and applications of Machine Learning in those areas.

UKRI TAS AHM MORNING SESSION

Professor Radu Calinescu

Radu Calinescu is Professor of Computer Science at the University of York, PI on the UKRI Trustworthy Autonomous Systems Node in Resilience, the Assuring Autonomy International Programme Safety of AI Theme Lead. His research interests include formal modelling, analysis, verification and controller synthesis for autonomous and self-adaptive systems and processes, parametric and probabilistic model checking, automated and model-driven software engineering and the application of the theories, approaches and techniques specific to the above research areas to *robotic, cyber-physical, embedded and service-based systems*.

Dr Justyna Lisinska

Justyna is a Research Fellow at King's College London, working on developing a policy programme for the Trustworthy Autonomous Systems (TAS) Hub. She has experience of working within the Cabinet Office and working within a knowledge brokerage at the nexus of evidence and policy with a deep understanding of opportunities and challenges.

Dr Kate Devlin

Kate Devlin is Senior Lecturer in Social and Cultural Artificial Intelligence, King's College London. Coming from an Arts and Humanities background (as an archaeologist) with a subsequent PhD in Computer Science, Kate has a demonstrable track record of combining diverse fields and methods of research. Her work investigates how people interact with and react to technology, to understand how emerging and future technologies will affect us and the society in which we live. Kate is Advocacy and Engagement Director for the TAS Hub.

Professor Carles Sierra

Carles Sierra is a Research Professor of the CSIC and Director of the Artificial Intelligence Research Institute (IIIA-CSIC) in Barcelona. He is a Fellow of the European Association of AI, EurAI. Director of IIIA at CSIC.

Carly Kind

A human rights lawyer and leading authority on the intersection of technology policy and human rights, Carly has advised industry, government and non-profit organisations on digital rights, privacy and data protection, and corporate accountability in the technology sphere. She has worked with the European Commission, the Council of Europe, numerous UN bodies and a range of civil society organisations. She was formerly
Legal Director of Privacy International, an NGO dedicated to promoting data rights and governance.

UKRI TAS AHM EXHIBITION - DEMOS

All demos are located on the ground floor – see maps on pages 21-24

Demo ID	Title	Abstract
1	Soft Trustworthy autonomous systems	It is a popular belief in the soft robotics community that soft robots possess 'intrinsic safety' features because it is soft. While it is generally true that soft robots can be considered safer from a mechanical point of view, there are several safety loopholes that render soft robots untrustworthy, such as material failure and the whiplash effect when a soft robot is in dynamic mode. These examples suggest that soft robots may not be as safe or trustworthy as people might think. Our aim is to explore and quantify what is trustworthiness in soft robots in a systematic way. For example, through a collection of design rules or a calculus which describes the trustworthiness of specific soft robots through mathematical functions. One focus is the relationship between functionality (often linked to degrees of freedom) and trustworthiness. In this demonstration, we are showcasing the marionetting of our cubie grip modular robotic system and demonstrating its reconfigurable design. By varying the number of blocks and hinges, and the connection angles between the cube units, we are able to explore the impact of increasing – yet constrained – degree of freedom. We show that how different configurations affect the trustworthiness of the system through fundamental measurements such as reliability, predictability and adaptability. This suggests ways one could describe the trustworthiness in a soft gripping system through modularisation, similar to how Lego pieces are assembled to form complex structures. In addition, we would like to introduce a novel method to recycle elastomer materials (silicon) in soft robots. This work explores the sustainability aspect required for a trustworthy soft system and introduces the concept of 'design for recycling' in which engineers and designers are expected or 'trusted' to operate in the interest of environments. This is a part of our design for trustworthiness framework where developers should follow specific procedures to produce trustworthy systems. Through interaction with the audience, we are hoping to gather opinions regarding our methodologies and gauge interest in our projects.

UKRI TAS AHM EXHIBITION - DEMOS

Demo ID	Title	Abstract
2	Do you trust your robot maze guide?	The ability to impute mental states to oneself or others, or Theory of Mind (ToM), has been intrinsically linked to trust between humans. However, less is known about how a robot mimicking ToM affects users' trust and behaviour. Through a web-based interactive activity that we will provide on-site, participants of the All Hands Meeting will have the chance to complete a puzzle game together with a virtual social robot, Pepper, as their guide. They will have the opportunity to try to escape a maze, by completing a set of smaller mini-mazes, while engaging with one of three robot personas: one neutral, one that explains its reasoning in technical terms, and one that mimics ToM. In each mini-maze two exits are available. Sometimes only one exit is reachable from the indicated starting point and sometimes both are reachable. In the latter situation, participants will have to find the closest exit from the indicated starting point. For each mini-maze they will: try and solve the maze themselves (if they want to), see and listen to Pepper giving its suggestion on which exit to aim using one of the three personas, decide whether to follow Pepper's suggestion or not. Participants will have a maximum of 20 moves to complete the game. Every time they choose the correct exit path, they use one move and every time they choose the wrong exit, they use two moves. Participants will also be facing a faulty robot. That is, Pepper will give a wrong suggestion in a particularly ambiguous mini-maze, costing them that extra move. By completing the game, they will experience first-hand how ToM influences their trust towards the robot guide and their decision-making process when faced with a complicated and ambiguous task.
3	Situational Awareness and trust during Shift between Autonomy levels in automated Vehicles	In the race towards the first commercially available fully Autonomous Vehicles, the number of highly AVs on roads will dramatically increase. Humans are challenged to change between autonomy levels causing safety concerns. Our TAS Hub Pump Priming project set out to understand the effect of Situational Awareness and take-over request procedures on trust between drivers and highly AVs. We analysed physiological and behavioural data as well as self-reporting SA and trust ratings in driving scenarios based on real-world incidents involving highly AVs. During the exhibition, we will give a demonstration on how future highly automated vehicles could inform the driver to take back control. Visitors can experience the IM@UCL mobile driving simulator (www.im-ucl.com) receiving different type of feedback including audio and haptic feedback. For a successful rollout of fully AVs, it is of paramount importance to address safety gaps in highly AVs until fully automated driving becomes feasible. This TAS Hub Pump Priming project was a project in close collaboration with King's College London, the University of Southampton, Ansible Motion, HORIBA MIRA and Reed Mobility.

UKRI TAS AHM EXHIBITION - DEMOS

Demo ID	Title	Abstract
4	Trustworthy Autonomous Fire Fighting Unmanned Aerial Vehicle: A case study	We will exhibit a completely assembled hardware model of the fire-fighting UAV with the aim to demonstrate the visual feedback from the RealSense D435i Depth Sensor camera & thermal camera on the laptop monitor and the working of a specially designed spraying nozzle mechanism. The UAV platform used is DJI M600 pro and the on-board companion computer that handles vision-based perception and wireless communication is Intel NUC running Ubuntu OS for autonomous operation. Two sensors, a RealSense D435i depth sensor and an MLX90640 thermal camera are integrated for visual feedback. The UAV is equipped with a custom designed water pump subsystem to extinguish fires. The customised fire extinguishing system is designed using carbon fibre tubes to meet the required size and weight constraints while assuring rapid integration with the UAV system. The RealSense D435i and MLX90640 cameras as well as the gimbal and nozzle were mounted on a custom designed 3D printed adapter that was attached to the bottom of the UAV. The mount is designed to ensure that the camera and nozzle assembly are unaffected by the UAV rotor downdraft. The maximum payload carried by the DJI M600 is 6kg. The full 4L water bag accounted for ~4kg and the remaining components on of the fire extinguisher assembly weighed 2kg. The system is designed to enable an autonomous search, track and extinguish operation based on prior knowledge of the building location and the orientation of the walls. This variant of the system looks for the first fire it can find and then empties its fire suppressant load onto the fire location. A key part of this system is to develop a vision-based perception system with the help of depth and thermal camera sensors to accurately detect sources of fire. The vision system is required to provide consistent and accurate feedback to allow the UAV to navigate close to the fire and align itself with the centre of the fire to perform the extinguishing operation.
5	The Shape of Trust	Put yourself in the seat of an autonomous taxi and ask yourself “How safe is this? Who is responsible for me? Do I know enough to figure out if I trust this taxi?”. That’s what The Shape of Trust ties to do, via the medium of a digital comic strip. After each short chapter you will be asked to respond to a series of questions. By the end you will have created your own Shape of Trust’ - a visual trust fingerprint that is unique to you.

UKRI TAS AHM EXHIBITION - DEMOS

Demo ID	Title	Abstract
6	HutSim - A Human-centered Multi Agent Simulator	This interactive demo displays a scenario where a user acts as the planner, controlling a swarm of 20 agents in a realistic Google maps interface, dictating regions and paths to search and patrol as well as having the option to use an automated allocation algorithm to assign agents to tasks, or to take over and manually assign them in the case that they do not trust the strategy. The goal is to find as many casualties as possible within the time limit using the swarm. Random agent failures and wind disruption will force the planner to account for the unexpected, and dynamically consider redundancy and pre-planning. You may also like to try out the variety of user interface lenses, such as path prediction arrows, uncertainty information, and heatmaps of explored areas to find their effect on your trust and understanding of the swarm. If desired, another user may also join as the analyst, assisting the planner by viewing simulated image scans taken by the agents, manually searching them for casualties. This gives us an opportunity to observe the action choices and priorities of both users, as well as their interaction and cooperation with each other.
7	Inclusive autonomous vehicles: When would you use a higher level of AV automation?	Autonomous Vehicles are starting to be implemented on our roads. AVs' greatest and most appealing benefit is road safety, as 95% of accidents are caused by human error. Although AVs appear to be the next future of car manufacturing, many consumers are still reluctant to use this technology. People are still hesitant and to delegate critical decisions, such as driving cars, either partially or fully to AI and machines. Their concerns are related to loss of control, loss of freedom, distrust and perceived risk. The public concerns regarding AVs can even be amplified under uncertain and critical situations, e.g., delegating the driving task of AVs under hard weather conditions. To this end, this project investigates peoples' intention to use and trust different levels of AVs automation under different driving scenarios. We consider a simplified space of AV levels of automation in which the drivers' role in controlling the AV is conveyed clearly to the public: (a) Driver in charge, (b) Driver is the supervisor and (c) Driver is not in charge. We also consider three main types of driving scenarios: (a) simple where it is easy to drive without making mistakes, (b) challenging which requires a level of competence to drive without mistakes, (c) complex scenarios are those that would need novel inferences and they rarely happen. This demo will ask AHM2022 participants to interact with AV driving scenarios and rate their trust and intention to use.

UKRI TAS AHM EXHIBITION - DEMOS

Demo ID	Title	Abstract
8	Cobot Maker Space	The Cobot Maker Space (CMS) is a readily reconfigurable research facility based at the University of Nottingham dedicated to exploring human-robot interaction and collaboration. It supports a multidisciplinary network of researchers from Computer Science, Engineering, Medicine and the Social Sciences, interested in exploring applications for collaborative robots – or cobots – in the home, the workplace, health and social care contexts, and beyond. We have assembled a cast of human-scale robots with which to probe and challenge the limits of current understanding and available technologies. Central to the idea of humans and robots working together collaboratively to perform tasks is embedding trust in the relationship between a human operator/collaborator and their robot partner, particularly when considering semi- or fully autonomous robots. Through the TAS Hub Research Programme, researchers at Nottingham are using the CMS to investigate fundamental questions around trust in human-robot relationships. At the TAS All Hands Meeting, the CMS will present research supported by the TAS programme and demonstrate the capabilities of our robots to the TAS network.
9	Kaspar explains: a causal explanation model to enhance Visual Perspective Taking skills in children with Autism Spectrum Disorders	Children with Autism Spectrum Disorder (ASD) often struggle with their Visual Perspective Taking (VPT) skills, which relate to the ability to see the world from another person's perspective, taking into account what they see and how they see it. One of the methods that could help develop these skills is by introducing causal explanations into social interactions. By using social robots as tools, care givers (e.g. therapists, teachers, parents etc) can build on the interest and attraction children with autism display towards the robots and use the robots as mediators, tailoring the interaction to the specific needs of the children at any given time. Keeping this in mind, we designed several games for autistic children to play with the social robot Kaspar introducing explicit causal explanations related to VPT skills both in the understanding that other people might have a different line of sight to themselves, and in the understanding that two people viewing the same item from different points in space may see different things.

UKRI TAS AHM EXHIBITION - DEMOS

Demo ID	Title	Abstract
10	Audio Occupancy Detection for Smart Building Services	Smart buildings have the potential to not only reduce the consumption of resources, such as electricity, but also to vastly improve the quality of life for individuals. An important aspect of creating "smart" buildings includes the ability to sense multiple aspects of human occupancy, including how many people are inside, their personal comfort preferences, how they are distributed throughout a building, and their levels of movement or activity. This information can then be used to optimise energy consumption, e.g., by regulating heating, ventilation or lighting. Previous work has relied on sensors such as passive infrared (PIR) sensors attached to doorways or CO2 sensors. While those sensors are affordable, they do not capture the granularity of information that is required to influence resource management or to create controllable and personalized comfort settings. To address this, and capitalising on recent advances in AI, there is an opportunity to revisit the use of audio sensors (such as microphones) to analyze the "indoor scene" of buildings. Here, the AI techniques effectively create a detailed concept of real-time occupancy and activity in different areas inside of a building. While audio sensing is accurate, cost-effective, and easy to retrofit, audio has not yet been widely adopted as an information source due to privacy concerns. Here, we tackle two interrelated challenges: using AI to detect occupancy/activity and developing the AI to simultaneously preserve individual privacy including concealing conversational speech content. Audio privacy impacts the trustworthiness of smart building services because many people will object due to fears of surveillance or violations of their privacy and security. This work addresses the trust issues by demonstrating that aspects of human speech cannot be obtained from the audio features that are used for occupancy and activity detection.
11	Museum of the Mirrored Self	The Museum of the Mirrored Self displays a series of four prototype interactive mirrors. Each of these artifacts take us on a journey through the history of mirrors, raising questions about trust in response to recent developments in interactive mirror technology. The Museum of the Mirrored Self has been developed alongside the TAS for Health Project. Delegates will be able to view and interact with the prototypes, alongside text written by the lead artist/researcher, presented as part of the display. The four prototypes are: 'A Divination Mirror' that explores how early reflective surfaces were often occluded and used to reveal what was not physically present 'A Diagnostic Mirror' that directly explores the concept of a trustworthy mirror that captures health data about the person in the reflection; 'A Mirrored Warrior Costume' exploring how mirrors can impact beyond the 'self' and have been used in conflict, protest and war as a way to reveal things that can't easily be seen; and the 'Labyrinth of the Mirrored Self' a table sized model and 3D walkthrough showing a hall of mirrors that acts as an immersive experience where we can explore our physical and psychological wellbeing, bringing together these different facets of the mirrored self.

UKRI TAS AHM EXHIBITION - DEMOS

Demo ID	Title	Abstract
12	Trust In Many Forms of Intelligent Assistants	When the mainstream philosophy in fostering trust in autonomous systems (AS) is to improve transparency through explanations. what about autonomous tools (like planners), that are inherently difficult to explain? In this demonstration, the visitor will get an opportunity to experience the many facets of trustworthiness in a fun, game-like setting. The visitor will interact with two systems embodying autonomous planners. In System A, the visitor engages with a planner presented as an online software tool. The visitor interacts with the system by clicking on buttons and reading messages appearing on a computer screen. In System B, the planner is embodied in a TurtleBot (a physical robot). During the demonstration, the visitor will be asked to use the systems A and/or B as a team mate and solve a path planning task. The cost of the solution will be evaluated by a point score. A and B will suggest directions. The visitor (operating the system) has the option to accept or reject the suggestions. This demonstration will allow the visitor to experience the challenges in building trust through explanations, when the human user is collaborating with an AS in real time. It will give an opportunity to reflect on the following research questions: “Does cost-based explanations help build trust between a human and an autonomous system in a collaborative task?”, “When an autonomous decision maker is presented as an online software tool and the same decision maker is presented as a team mate, embodied in a physical robot, does the human’s perceptions of trustworthiness in the autonomous system change?”, “Which presentation of the AS will compel the user to accept the decisions more voluntarily?” “When should the autonomous system transition between giving a justification for a decision into more abstract levels of explanations, such as providing an example or providing evidence.”
13	Automated Commentary Driving	Commentary driving is a technique in which drivers verbalise their observations, assessments and intentions. By speaking out their thoughts, both learning and expert drivers are able to create a better understanding and awareness of their surroundings. In this demonstration, we showcase how automated commentary driving can provide intelligible explanations about driving actions, and thereby assist a passenger or a driver during driving operations in challenging and safety-critical scenarios. To this end, we show how factual and counterfactual natural language and visual explanations are automatically generated based on observations and actions of an intelligent vehicle. While driving, logged data of selected events will be verbalised and/or visualised to make drivers and/or passengers aware of their surroundings and the actions taken by an AV. The verbalisations are generated in a similar way to commentary driving.

UKRI TAS AHM EXHIBITION - DEMOS

Demo ID	Title	Abstract
14	Simulation Environment for Smart Cars	The demo will show an environment where different smart cars will interact within a city. This will be performed inside of the Carla simulators for smart cars.
15	Dancing with Robots	Industrial robot arms are usually associated with functional design; they do not have a face or humanoid features that are synonymous with social robots. Our work and research explores an imaginative interpretation of the industrial robotic arm to make it into a playful kinetic sculpture that becomes something unexpected, which performs and encourages its user to follow suit. We experiment with how variables, such as a costume can change the status of a robotic arm and how fiction can create a 'willing suspension of disbelief' where audiences begin to trust and give themselves permission to reimagine a new reality. Visitors will have a chance to interact with our experimental sculpture made for children and families. NED, the 'Never Ending Dancer' is a costumed robotic arm developed with researchers at Mixed Reality Lab and the Co-bot Maker Space, University of Nottingham. The system uses facial tracking for the robotic arm to follow the audience's actions, it is accompanied by three different musical scores and encourages participants to dance. Our TAS artist residency permitted us the time to think about and develop a deeper engagement with robotics, children and families. To this end, we will present a series of posters displaying the results of our activities with children, our exploration of trust and its relationship to the willing suspension of disbelief, and our design ideas for a new robotic installation.
16	Examining the causality of network state variables on autonomous system decision making	The demo will consist of a graphic illustration of our experiment in its initial phase. We are examining the relationship between network state variables in an ad hoc context and autonomous system decision making. Our demo will illustrate nodes performing random walks on a 2-dimensional lattice communicating using protocols defined in the IEEE 1609 vehicle to everything (V2X) standard in conjunction with GPS and IMU data in order to navigate. Following this we will give a brief overview of preliminary results and discuss the work thus far. TAS/Trust justification: our work is intrinsically linked to the idea of trust in autonomous systems as it examines the components of these systems that build and reinforce the idea of trust humans have in them.

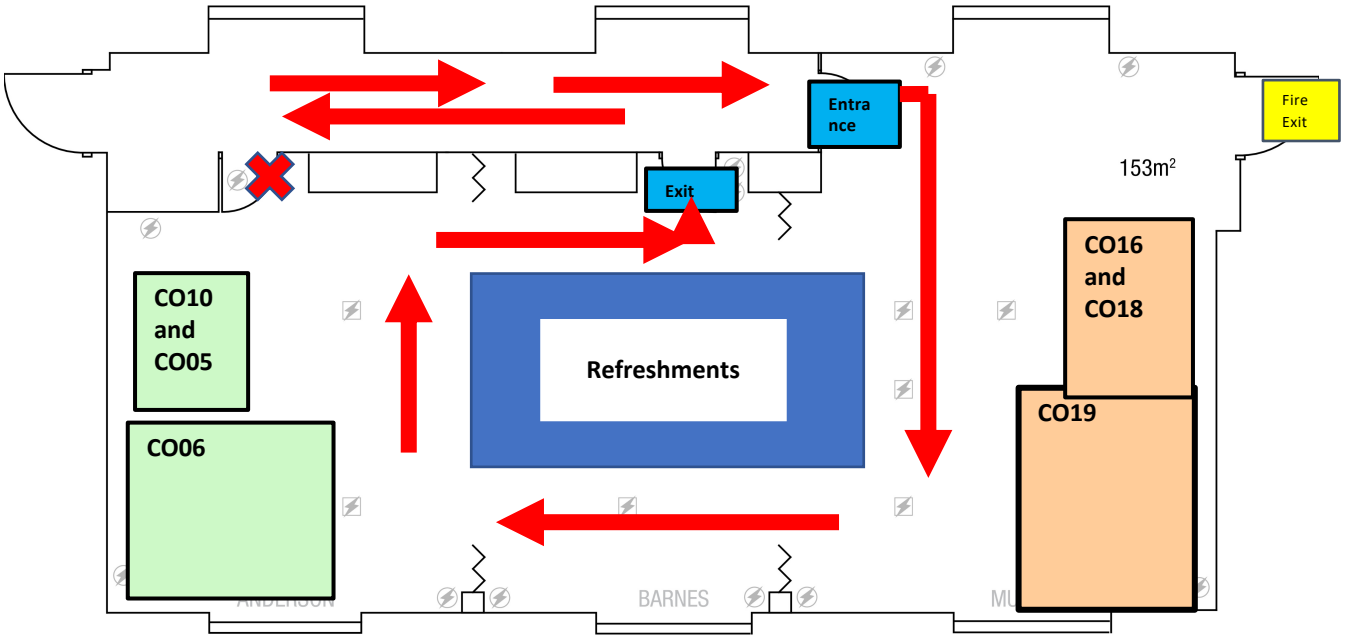
UKRI TAS AHM EXHIBITION - DEMOS

Demo ID	Title	Abstract
17	Autonomy Demo	A demonstration on Integrated Mission Management System (IMMS). IMMS is a highly modular system for the transmission of data from autonomous vehicles and serves as a platform for research in this area. The system is a lightweight framework for experimentation comprised of a series of known, extendable and interchangeable components / modules Future Autonomous Systems will likely have variable levels of delegated control, and will require the human user to trust the system in order to create a safe and effective human-autonomy partnership. Within this partnership, trust needs to be calibrated with the capabilities of the system to ensure that the system is used within the limitations of its function to prevent misuse, but also that the system is trusted enough by the user to prevent disuse. This means understanding how the user trusts the system in different contexts and scenarios, however current techniques for measuring human-autonomy trust are almost exclusively subjective or behavioural. In contrast, functional near infrared spectroscopy (fNIRS) is a novel neuroimaging technique that allows real-time assessment of cortical activity in real-world environments, and could provide an objective measure of brain function relating to trust. This demonstration will provide an overview of how fNIRS works, and will allow users to place the head-cap on and view cognitive data traces in real-time. There is also a demo on Agent Based Planning system , Lego mindstorms activity and a talk on roadmap activities.
18	A U T O C A R	Delegates can generate an interactive fiction which encourages critical engagement with the question: does it mean to trust an autonomous vehicle? The complicated system of human agency vs automation is grappled with. There are two hundred and sixteen unique stories to explore which engages thought, conversation and may challenge pre-conceptions. Delegates can also watch a short compilation of depictions of autonomous cars in popular culture from 1930 to now.
19	COdesigning Trustworthy Autonomous Diabetes Systems (COTADS)	COTADS has demonstrated that machine learning models have the potential to help people with diabetes navigate uncertainties in chronic conditions through short term risk prediction, whilst offering decision support to clinicians. We have shown that using machine learning, patients at most risk can be identified along with contributing critical risk factors. Such information can form the basis for automated personalised recommendations, clinical therapies, and treatments, whilst the awareness of risk can support informed consultation between patients and clinicians.

UKRI TAS AHM EXHIBITION - POSTERS

Title	Lead
Affective XAI for Trustworthy Human-Robot Interaction	Chuang Yu
Attacking Analysis on Wireless Communications of Autonomous Systems	Zhuangkun Wei
Automatic Simulation, Verification, & Testing for Robotic Systems	Craig Innes
Computational Agent Responsibility	Louise Dennis
Computational Tools to Ensure Trustworthiness	Yuhui Lin
Designing Interaction for Trustworthy Swarms	James Wilson
Explainable AI for Digital Histopathology	Joseph Early
Developing Privacy-Preserving: Audio Capture for Smart Buildings	Jennifer Williams
How should we regulate the first-in-human nanoswarm cancer clinical trial?	Matimba Swana
Robust Federated Meta Learning Framework Against Adversaries	Zhengxin Yu
Seven Wicked(ish) Problems of Regulating Autonomous Systems	Peter Winter
TARICS: Trustworthy Accessible Robots for Inclusive Cultural experienceS	Francesco Del Duchetto
TAS in the Field: Studying governance challenges in high-risk autonomous systems	Glenn McGarry
TICK–A Knowledge Processing Infrastructure for Cognitive Trust in Human Robot Interaction	Mohammed Diab
T-SWARM: A method for eliciting user trust requirements	Katie Parnell
Verifiably Safe Human Robot Assisted Dressing	Yasmin Rafiq
Proactive Robot Assistance: Affordance-Aware Augmented Reality User Interfaces	Rodrigo Chacon
Transparency and Human Oversight Regarding Medical Diagnostic Systems	Daria Onitiu

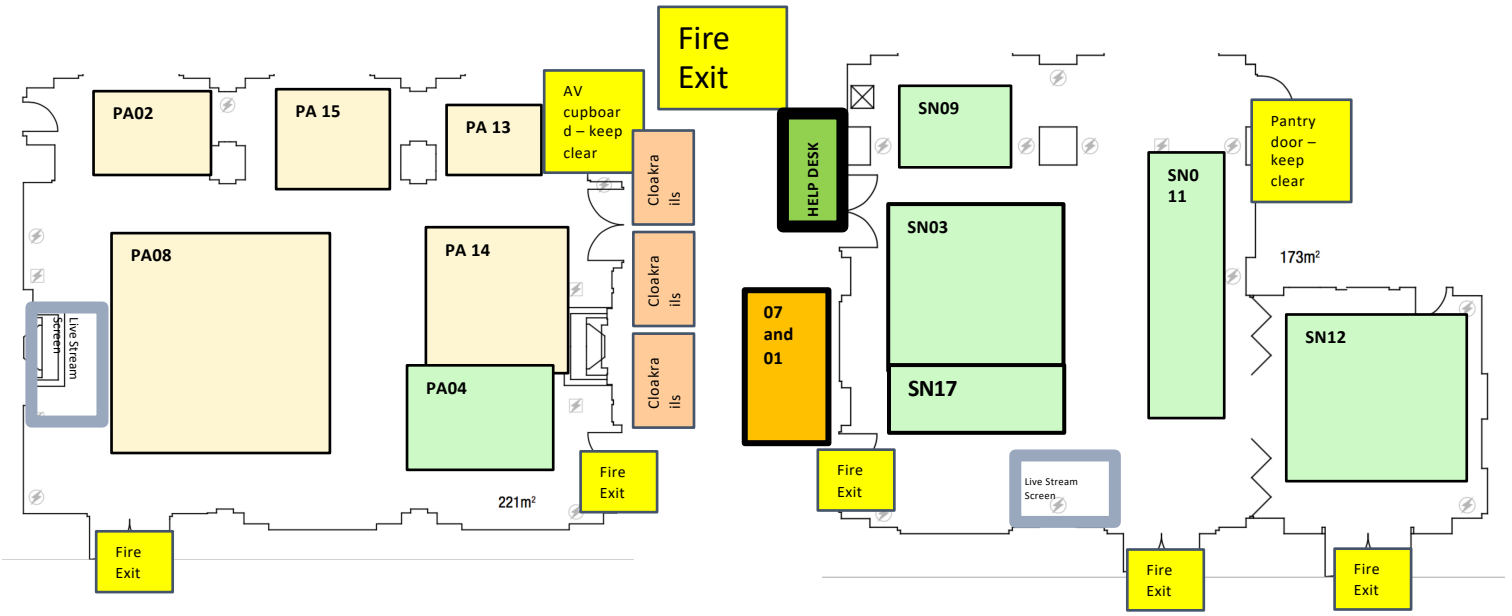
COURTYARD SUITE



Demo key

- **CO05** The Shape of Trust
- **CO06** HutSim - A Human-centered Multi Agent Simulator
- **CO10** Audio Occupancy Detection for Smart Building Services
- **CO16** Examining the causality of network state variables on autonomous system decision making
- **CO18** AUTOCAR
- **CO19** COTADS

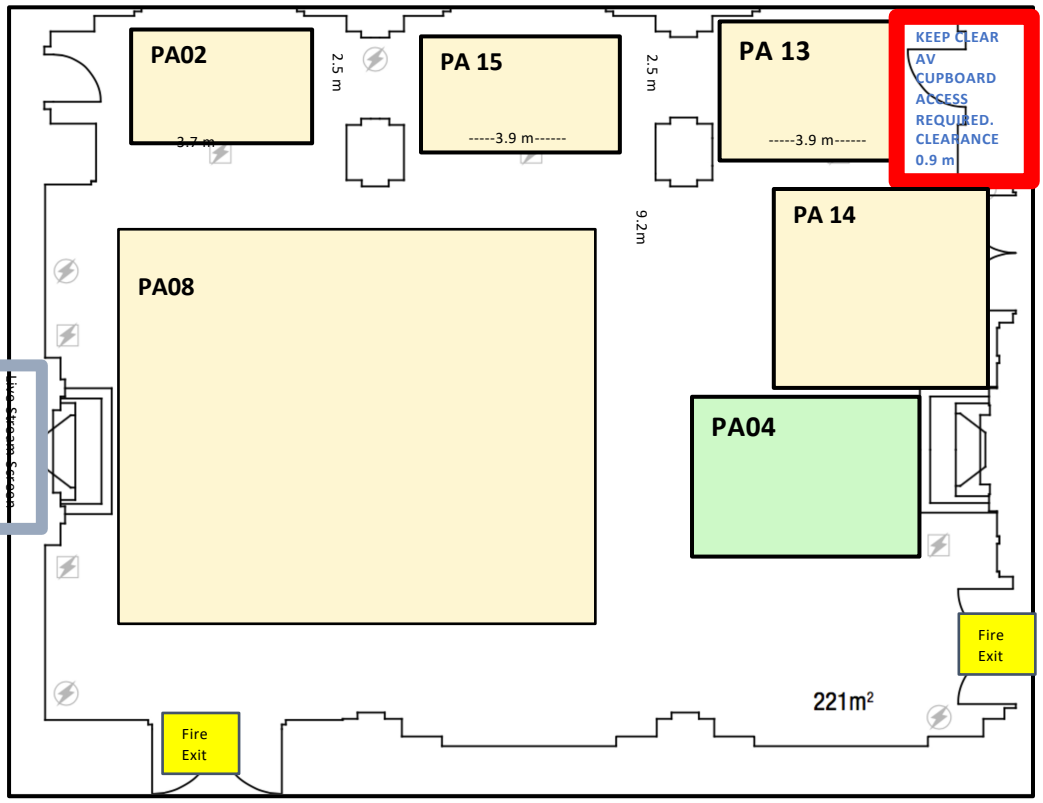
LUYTENS SUITE OVERVIEW (Snow and Paget Rooms)



Demo key

- **01** Soft Trustworthy autonomous system
- **07** Inclusive autonomous vehicles: When would you use a higher level of AV automation?

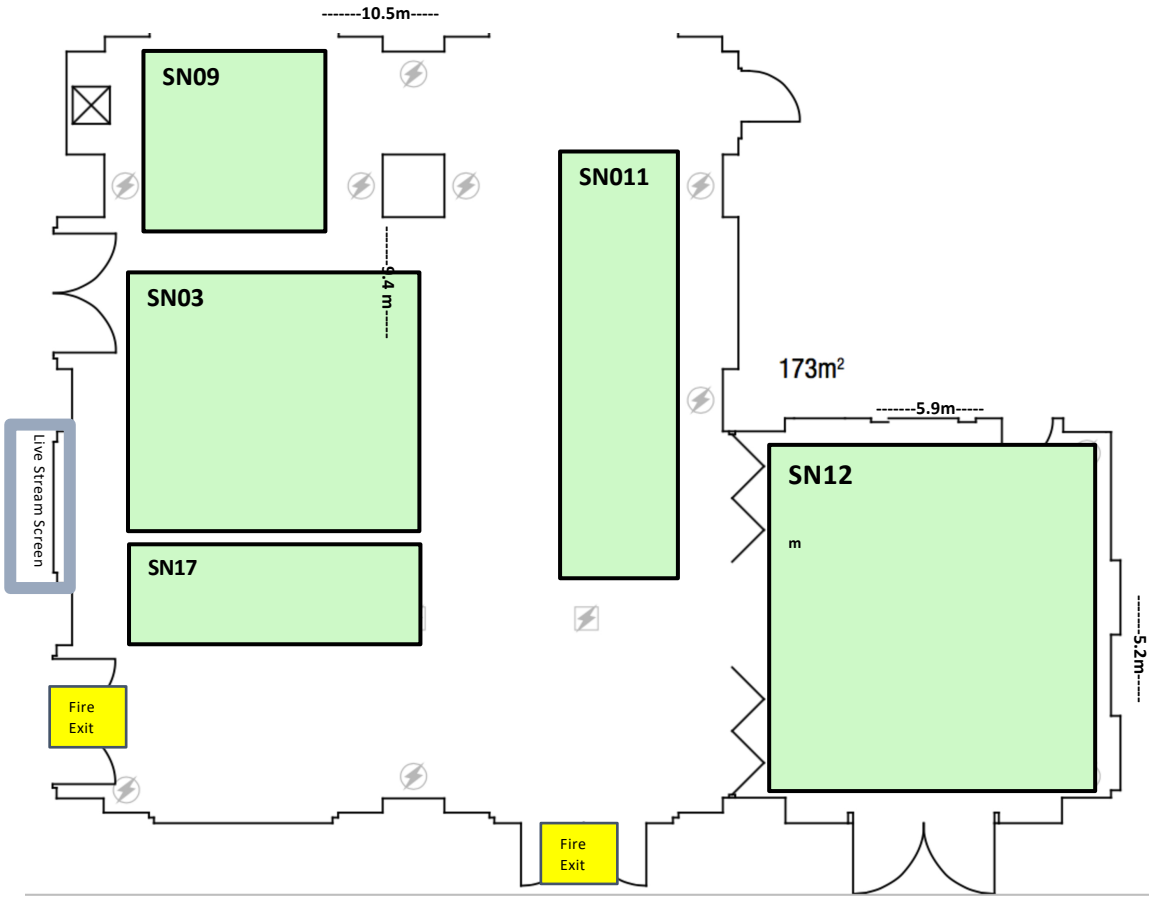
PAGET ROOM



Demo key

- **PA02** Do you trust your robot maze guide?
- **PA04** Trustworthy Autonomous Fire Fighting Unmanned Aerial Vehicle: A case study
- **PA08** Cobot Maker Space
- **PA13** Automated Commentary Driving
- **PA14** Simulation Environment for Smart Cars
- **PA15** Dancing with Robots

SNOW ROOM



Demo key

- **SN03** Situational Awareness and trust during Shift between Autonomy levels in automated Vehicles
- **SN09** Kaspar explains: a causal explanation model to enhance Visual Perspective Taking skills in children with Autism Spectrum Disorders
- **SN11** Museum of the Mirrored Self
- **SN012** Trust In Many Forms of Intelligent Assistants
- **SN17** Autonomy Demo

UKRI TAS AHM AFTERNOON SESSION

Time	Session	Location
14:30-14:45	TAS Creative Ambassadors: Blast Theory	Great Hall
14:45-15:45	“Translating TAS Research.” Panel chaired by Professor Derek McAuley, TAS Deputy Director. Professor Dame Wendy Hall, Dr Ben Pritchard (Thales), Miranda Marcus (BBC) and Professor Tom Rodden (DCMS)	Great Hall
15:45-16:15	Tea and coffee break	Courtyard Suite
16:15-17:15	“International Perspectives on TAS” chaired by Professor Sarvapali Ramchurn, TAS Director. Professor Subramanian Ramamoorthy, Professor Milind Tambe, Dr Cara LaPointe and Professor Sharon Strover.	Great Hall
17:30	Close	

AFTERNOON SESSION - SPEAKERS AND PANELLISTS

Blast Theory

Blast Theory make interactive art to explore social and political questions. The group's work places the public at the centre of unusual and sometimes unsettling experiences, to create new perspectives and open up the possibility of change. Led by Matt Adams, Ju Row Farr and Nick Tandavanitj, the group draw on popular culture and new technologies to make performances, games, films, apps and installations.

Professor Derek McAuley

Derek McAuley is Professor of Digital Economy at the University of Nottingham and Director of Horizon an interdisciplinary research institute and Deputy Director of the TAS Hub. His interdisciplinary interests include issues of ethics, identity, privacy, information policy, regulation and economics within a digital society.

Professor Dame Wendy Hall

Dame Wendy Hall, DBE, FRS, FREng is Regius Professor of Computer Science, Associate Vice President (International Engagement), and is an Executive Director of the Web Science Institute at the University of Southampton and Skills Director of the TAS Hub.

Ben Pritchard

Ben Pritchard is the Chief Technologist, Autonomy at Thales and also holds an Industrial Fellowship from the Royal Academy of Engineering. This research will understand how human supervisors can best interact with squads of mixed maritime autonomous systems - in the air, on the surface and under the water - to maximise human-system team performance.

Miranda Marcus

Miranda Marcus is Head of BBC News Labs . Prior to joining the BBS in 2019 she worked at the Open Data Institute heading up their R&D programme which focused on the social, political and technical implications of data and data access..

Professor Tom Rodden

Tom Rodden is Chief Scientific Adviser for the UK Government's Department for Culture, Media and Sport. He was previously Deputy Chief Executive of the Engineering and Physical Sciences Research Council

AFTERNOON SESSION - SPEAKERS AND PANELLISTS

Professor Subramanian Ramamoorthy

Subramanian Ramamoorthy is Professor of Robot Learning and Autonomy in the School of Informatics, University of Edinburgh, where he is also the Director of the Institute of Perception, Action and Behaviour. He is an Executive Committee Member for the Edinburgh Centre for Robotics and Turing Fellow at the Alan Turing Institute. His research focus is on robot learning and decision-making under uncertainty, with particular emphasis on achieving safe and robust autonomy in human-centred environments.

Professor Milind Tambe

Milind Tambe is Gordon McKay Professor of Computer Science and Director of Center for Research on Computation and Society at Harvard University; he is also Director "AI for Social Good" at Google Research India.

Dr Cara LaPointe

A futurist who focuses on the intersection of technology, policy, ethics, and leadership, Cara LaPointe is the co-director of the Johns Hopkins Institute for Assured Autonomy, which works to ensure that autonomous systems are safe, secure, and trustworthy as they are increasingly integrated into every aspect of our lives.

Professor Sharon Strover

Sharon Strover is the Philip G. Warner Regents Professor in Communication at the University of Texas, where she teaches communications and telecommunications courses. Sharon is also the Director of Good Systems. Her most recent publications examine disinformation strategies associated with Russian Facebook ads; local broadband deployment strategies around the world; and the role of broadband in rural regions.

Professor Gopal Ramchurn

Gopal Ramchurn is a Professor of Artificial Intelligence and Director of the TAS Hub and Co-Director of the Shell-Southampton Centre for Maritime Futures. He is also a Co-CEO of Empati Ltd, an AI start-up working on decentralised green hydrogen technologies. His research is about the design of Responsible Artificial Intelligence for socio-technical applications including energy systems and disaster management.

USEFUL TO KNOW:

Help Desk

You can find the help desk in the corridor between the Snow and Paget rooms in the Lutyens Suite on the ground floor (see Map 1 on page 7.) A member of the organizing team will be there throughout the day.

Social media

Please tag @tas_hub in any tweets, or our page on LinkedIn.

You may also tag the venue: @bmahousevenue

Email

contact@tas.ac.uk.

Thank you for joining us and please let us know what you thought of the AHM

TAS AHM Evaluation Survey

Scan to leave your feedback

https://www.tas.ac.uk/