

Celebrating the achievements of the £33M UKRI Trustworthy Autonomous Systems Programme

TAS SHOWCASE 2024



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Welcome

A very warm welcome to the UKRI Trustworthy Autonomous Systems (TAS) Showcase 2024.

This event hosts discussions, talks, and demos of autonomous systems and shares the fruits of the programme's research into the development of socially beneficial autonomous systems that are both trustworthy in principle and trusted in practice by the public, government, and industry.

Focusing on the impact of the TAS programme and future horizons for artificial intelligence and robotics in:

- Cultural and Creative Industries
- Defence and Security
- Energy and Environment
- Governance and Regulation
- Health and Wellbeing
- Transport



Professor Michael Boniface, TAS Impact Director from the University of Southampton explained: "From improving acceptance of autonomy in healthcare through to regulation for safeguarding AI, novel public engagement in research and increasing participation in creative experiences for people living with disabilities, the TAS programme has shown how autonomous systems can improve lives, create a more inclusive society and contribute to a productive economy.

Professor Sarvapali (Gopal) Ramchurn, Director of the TAS Hub added: "This showcase is a window into the early results of the TAS programme and an opportunity to engage with the TAS community we have created over the last 3 years. I encourage attendees to join the discussions and challenge us where there are gaps and collaborate with us on opportunities they see. I look forward to meeting all the attendees and celebrate the successes of the programme together!"

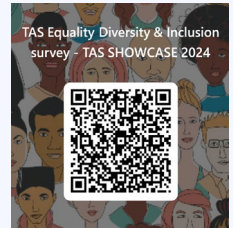


Equality, Diversity and Inclusion

TAS is committed to embedding Equality, Diversity and Inclusion (EDI) in all our activities. To assist us to identify any EDI gaps to strengthen our future EDI plans and the impact of our research activities, we ask that you take a few minutes to complete our EDI survey.

All questions are voluntary. Your responses will be anonymous. Data will be kept securely and accessed only by designated TAS Hub staff.

Please come to Booth 23 in the Haslett room to learn more.



Code of Conduct

Policy Against Harassment at UKRI Trustworthy Autonomous Systems Hub Activities

The open exchange of ideas is central to the 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.

The full code of conduct can be found: <https://tas.ac.uk/wp-content/uploads/2022/11/Code-of-Conduct-Web-version.pdf>

Equality, Diversity and Inclusion Allies

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

Programme

Day One – Tuesday 5 March 2024

09:00 - 09:30	Registration	Flowers + Haslett Rooms
09:30 – 11:00	Plenary 1: TAS - Programme, highlights and impacts	Kelvin Lecture Theatre
<p>Welcome</p> <ul style="list-style-type: none">• Professor Michael Boniface, Impact Director, TAS Hub, University of Southampton <p>TAS Programme Overview, Highlights and Achievements</p> <ul style="list-style-type: none">• Professor Gopal Ramchurn, Director, TAS Hub, University of Southampton <p>A TAS Story Highlight: Jess+ The musical robot breaking down barriers for people with disabilities</p> <ul style="list-style-type: none">• Professor Craig Vear, University of Nottingham <p>Opportunities and challenges presented by trustworthy autonomous systems</p> <ul style="list-style-type: none">• Chair, Defence and Security : Professor Andy Wright, Chair of the TAS Hub board and Professorial Fellow, University of Southampton• Culture and Creative sector: Dr Rhianne Jones, BBC R&D• Energy and environment: Dr Robert Skilton, UK Atomic Energy Authority• Health and Wellbeing: Professor Prokar Dasgupta, Kings College London• Transport: Professor Jack Stilgoe, University College London• Governance and Regulation: Professor Sana Khareghani, Kings College London <p>Closing remarks</p> <ul style="list-style-type: none">• Professor Michael Boniface, Impact Director, TAS Hub, University of Southampton		
11:00 – 11:15	Break	Flowers + Haslett Rooms

11:15 – 12:45	Parallel sector session 1	Kelvin Lecture Theatre + Watson-Watt Room
<p>Health and Wellbeing</p> <ul style="list-style-type: none"> • Professor Prokar Dasgupta, King's College London <p>DAISY Diagnostic AI System for Robot-Assisted A&E Triage</p> <ul style="list-style-type: none"> • Dr Ol'Tunde Ashaolu, York and Scarborough Teaching Hospitals NHS Foundation Trust • Professor Radu Calinescu, University of York • Dr Ioannis Stefanakos, University of York <p>Ensuring accountable people have to knowledge and skills to manage AI fragility and safety</p> <ul style="list-style-type: none"> • Chair: Professor Stuart Anderson, University of Edinburgh • Dr Ganesh Vigneswaran, University Hospital Southampton Foundation Trust • Dr Chris Duckworth, University of Southampton • Dr Jamie Chow, Blackford Analysis • Dr Marta Romeo, Heriot-Watt University • Professor Rema Padman, Carnegie Mellon University <p>Responsibility attribution in AI healthcare systems</p> <ul style="list-style-type: none"> • Dr Zoe Porter, University of York • Professor Stuart Anderson, University of Edinburgh • Dr Chris Duckworth, University of Southampton 		<p>Transport</p> <ul style="list-style-type: none"> • Professor Jack Stilgoe, University College London <p>TAS and the Transport Industry</p> <ul style="list-style-type: none"> • Dr Sarah Gates, Director, Public Policy, Wayve <p>Transport Panel</p> <ul style="list-style-type: none"> • Chair: Professor Jack Stilgoe, University College London • Dr Carolyn Ten Holter, University of Oxford • Dr Luke Moffat, University of Lancaster • Professor Ibrahim Habli, University of York • Dr Connor Champ, Law Commission of England and Wales • Professor Kerstin Eder, University of Bristol
12:45 – 14:15	Lunch + Exhibition	All Exhibition Spaces
14:15 – 15:45	Parallel sector session 2	Kelvin Lecture Theatre + Watson-Watt Room
<p>Culture and Creative Industries</p> <ul style="list-style-type: none"> • Professor Joel Fischer, University of Nottingham • Dr Alan Chamberlain, University of Nottingham <p>TAS Hub's Creative Programme, showcasing unusual and provocative deployments of robots</p> <ul style="list-style-type: none"> • Matt Adams, Blast Theory • Professor Sarah Whatley, University of Coventry • Dr Kate Devlin, King's College London • Professor Steve Benford, University of Nottingham 		<p>Energy and Environment</p> <ul style="list-style-type: none"> • Professor Enrico Gerding , University of Southampton • Professor Sebastian Stein, University of Southampton <p>Evtonomy: A Smart EV routing app</p> <ul style="list-style-type: none"> • Dr Elnaz Shafipour, University of Southampton <p>InterNET ZERO: Towards Resource Responsible Trustworthy Autonomous Systems</p> <ul style="list-style-type: none"> • Dr Michael Stead, Lancaster University <p>The Citizen Carbon Budget</p> <ul style="list-style-type: none"> • Dr Gisela Reyes-Cruz , University of Nottingham <p>Autonomous Systems for Forest ProtEctioN (ASPEN)</p> <ul style="list-style-type: none"> • Dr Calum Imrie, University of York <p>Energy and Environment Panel</p> <ul style="list-style-type: none"> • Chairs: Professors Enrico Gerding & Sebastian Stein • Dr Elnaz Shafipour, University of Southampton • Dr Michael Stead, Lancaster University • Dr Gisela Reyes-Cruz, University of Nottingham • Dr Calum Imrie, University of York

15:45 – 16:00	Break	Haslett and Flowers Room
16:00 – 17:00	Plenary 2: TAS Impact Stories	Kelvin Lecture Theatre
<p>Chair: Professor Carmine Venture, TAS Hub Deputy Director, King's College London</p> <p>Trustworthy Swarms</p> <ul style="list-style-type: none"> • Professor Sabine Hauert, University of Bristol <p>Kaspar the educational robot: helping children with autism understand the world through causal explanations</p> <ul style="list-style-type: none"> • Professor Farshid Amirabdollahian, University of Hertfordshire 		
17:00 – 19:00	Drinks Reception, Networking + Exhibition	All Exhibition Spaces
<p>Music 17:30 – 18:30</p> <p>AI Jazz Music (Haslett Room) Professor Craig Vear, University of Nottingham</p> <p>AI Folk Music (Flowers Room) Professor Steve Benford, University of Nottingham</p>		
19:00	Close	

Programme

Day Two – Wednesday 6 March 2024

09:00 – 09:30	Registration	Flowers + Haslett Rooms
09:30 – 11:15	Plenary 3: TAS Hub – A national platform supporting inclusive and responsible research and skills	Kelvin Lecture Theatre
<p>The TAS Hub Overview</p> <ul style="list-style-type: none">• Professor Elvira Perez Vallejos, University of Nottingham <p>Responsible Research and Innovation/Equality, Diversity and Inclusion</p> <ul style="list-style-type: none">• Co-chairs: Dr Virginia Portillo, University of Nottingham and Dr Helena Webb, University of Nottingham <p>Contributors:</p> <ul style="list-style-type: none">• Professor Chris Greenhalgh, University of Nottingham• Professor Elvira Perez Vallejos, University of Nottingham• Dr Alan Chamberlain, University of Nottingham• Dr Peter Craigon, University of Nottingham <p>Panel:</p> <ul style="list-style-type: none">• Dr Gisela Reyes-Cruz, University of Nottingham• Dr Mohammad Naiseh, Bournemouth University• Dr Sachini Weerawardhana, King’s College University <p>Supporting skills and careers within a rapidly changing AI landscape</p> <ul style="list-style-type: none">• Chair: Professor Gopal Ramchurn, Director, TAS Hub, University of Southampton <p>Panel:</p> <ul style="list-style-type: none">• Dr Angie Ma, Faculty AI• Dr Maya Indira Ganesh, Institute of Continuing Education• Eryn Rigley, University of Southampton		
11:15 – 11:30	Break	Flowers + Haslett Rooms

11:30 – 13:00	Parallel sector session 3	Kelvin Lecture Theatre + Watson-Watt
<p>Governance and Regulation</p> <ul style="list-style-type: none"> • Dr Jennifer Williams, University of Southampton • Nuala Polo, Department of Science, Innovation and Technology • Cdr. Richard Sturman, Military Aviation Authority <p>AI Regulation Panel Discussion</p> <ul style="list-style-type: none"> • Chair: Professor Stuart Anderson, University of Edinburgh • Nuala Polo, Department of Science, Innovation and Technology • Cdr. Richard Sturman, Military Aviation Authority • Professor Sana Khareghani, King's College London • Dr Justyna Lisinska, King's College London • Professor Submaranian (Ram) Ramamoorthy, University of Edinburgh <p>Regulating Social Robots</p> <ul style="list-style-type: none"> • Miranda Addey University of Bristol • Dr Marta Romeo, Heriot-Watt University <p>AI Regulation Engagement Opportunities</p> <ul style="list-style-type: none"> • Dr Jennifer Williams, University of Southampton 		<p>Defence and Security</p> <p>Welcome & Overview of TAS Projects</p> <ul style="list-style-type: none"> • Dr Mohammad Soorati, University of Southampton <p>AI Governance and the Importance of Transparency</p> <ul style="list-style-type: none"> • Professor Ramayya Krishnan, AI Advisor to the President of the United States and Professor at Carnegie Mellon University <p>AI and Autonomy: Using drones to trailblaze the future of warfare</p> <ul style="list-style-type: none"> • Annalisa Russell-Smith, Flyby Technology <p>Panel Discussion</p> <ul style="list-style-type: none"> • Chair: Dr Alec Banks, DSTL UK • Steve Lynch, DSTL UK • Ben Pritchard, Thales UK • Professor Weisi Guo, University of Cranfield • Professor Nick Colosimo, BAE Systems
13:00 – 14:15	Lunch + Exhibition	All Exhibition Spaces
14:15 – 15:15	Plenary 4: Future Horizons	Kelvin Lecture Theatre
<p>Explainability as the foundation of trust for self-driving vehicles</p> <ul style="list-style-type: none"> • Bryn Balcombe, Oxa 		
15:15 – 15:30	Break	Haslett + Flowers Room
15:30 – 16:30	Plenary 4: Future Horizons (cont.)	Kelvin Lecture Theatre
<p>Future Challenges for Trustworthy Autonomous Systems</p> <ul style="list-style-type: none"> • Chair: Professor Joel Fischer, Research Director, TAS Hub, University of Nottingham <p>Panel:</p> <ul style="list-style-type: none"> • Andrew Strait, Ada Lovelace Institute • Dr Abigail Gilbert, Institute for the Future of Work • Professor Henry Tse, BAE Systems • Bryn Balcombe, Oxa • Professor Sabine Hauert, University of Bristol • Professor Gopal Ramchurn, Director, TAS Hub, University of Southampton 		
16:30	Close	

Keynote Speakers



Professor Craig Vear

Craig Vear is Professor of Music and Computer Science at the University of Nottingham split between music and the mixed reality lab. His research is naturally hybrid as he draws together the fields of music, digital performance, creative technologies, Artificial Intelligence, creativity, gaming, mixed reality and robotics. He has been engaged in practice-based research with emerging technologies for nearly three

decades, and was editor for The Routledge International Handbook of Practice-Based Research, published in 2022. His recent monograph The Digital Score: creativity, musicianship and innovation, was published by Routledge in 2019, and he is Series Editor of Springer's Cultural Computing Series. In 2021 he was awarded a €2Million ERC Consolidator Grant to continue to develop his Digital Score research.

Professor Sabine Hauert

Sabine Hauert is Professor of Swarm Engineering at University of Bristol. She leads a team of 20 researchers working on making swarms for people, and across scales, from nanorobots for cancer treatment, to larger robots for environmental monitoring, or logistics (<https://hauertlab.com/>).



Before joining the University of Bristol, Sabine engineered swarms of nanoparticles for cancer treatment at MIT, and deployed swarms of flying robots at EPFL. She's PI or Co-I on more than 30M GBP in grant funding and has served on national and international committees, including the UK Robotics Growth Partnership, the Royal Society Working Group on Machine Learning, and several IEEE boards. She is on the board of directors of the Open Source Robotics Foundation and is Executive Trustee of non-profits robohub.org and aihub.org, which connect the robotics and AI communities to the public.



Professor Farshid Amirabollahian

Farshid Amirabdollahian is a professor of human-robot Interaction at the University of Hertfordshire. He leads the Robotics research group. He is also director of the University of Hertfordshire Robot House, an EPSRC funded national infrastructure, and Kaspar projects

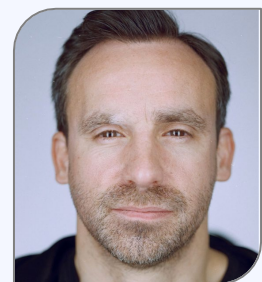
both of which are focused on assistive and rehabilitation robotics, both receiving high impact mark at the latest research excellence framework (REF2021) indicating research impact at national and international levels.

He has been involved in a number of European and National funded projects, namely GENTLE/S, i-match, LIREC, RoboSkin and CORBYS. As coordinator, he has successfully secured, managed and completed Accompany (FP7 STREP: €4.8m) and SCRIPT (FP7 STREP: €4.6m) projects working on companion robotic technology for home use. He was a Co-I in the Trustworthy Robotic Assistants project funded by the UK EPSRC ([EP/K006509/1](#)) and is currently a Co-I in EPSRC funded Network+, EMERGENCE ([EP/W000741/1](#)), which looks at Facilitating the Emergence of Healthcare Robots from Labs into Service. Farshid joined the TAS Hub via the pump-priming project, Kaspar Explains that investigated using causal explanations during child-robot interaction in the context of autism education.

Farshid was a member of ISO TC299 involved in standardisation activities targeting robot and robotic devices and has been involved in the work leading to ISO13482 that relates to safety requirements for companion technology.

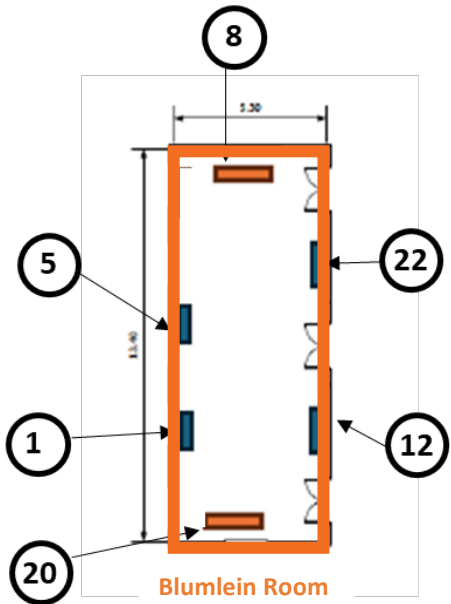
Bryn Balcombe

Bryn Balcombe is a Technical Advisor in the CTO Office at Oxa, specialising in autonomy systems, safety and regulation. He previously served as Chief Technology Officer for Roborace the world's first autonomous motorsport championship and from 2018-2022 he chaired the ITU-T Focus Group on AI for Autonomous and Assisted Driving (FG-AI4AD) with over 350 global participants.



His previous experience comes from Formula One where he architected and patented vehicle to infrastructure communication systems and developed the F1 Group's global media network. He holds a BEng in Mechanical Engineering & Vehicle Design from the University of Hertfordshire.

Exhibition



Exhibition opening times:

Day One: 12:45 – 14:15 + 17:00 – 19:00

Day Two: 13:00 – 14:15

Exhibition spaces:

Marconi + Haslett Rooms:

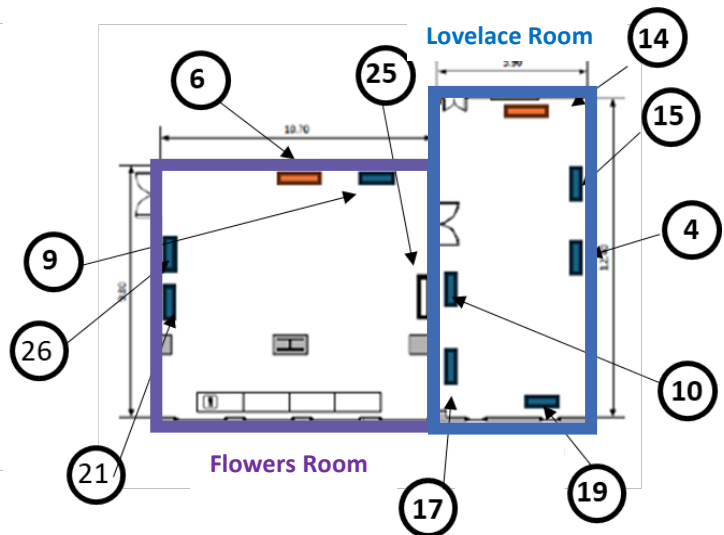
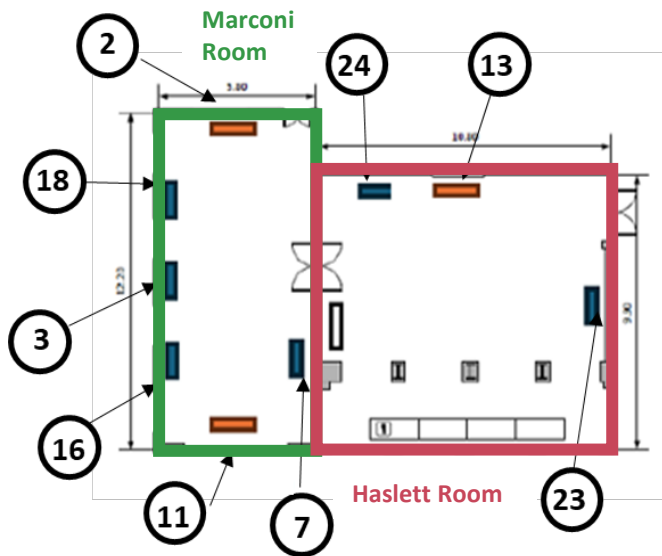
Health and Wellbeing + RRI/EDI

Flowers + Lovelace Rooms:

Transport, Responsibility, Defence and Security

Blumlein Room:

Culture and Creative + Energy and Environment





Booth 1 (Blumlein Room)

Would you trust a robot to care for you?

Using creativity for public engagement with trust and autonomy

Booth 2 (Marconi Room)

Telepresence Robot Playground

Exploring the adoption of telepresence in the cultural sector through continuous public engagement



Booth 3 (Marconi Room)

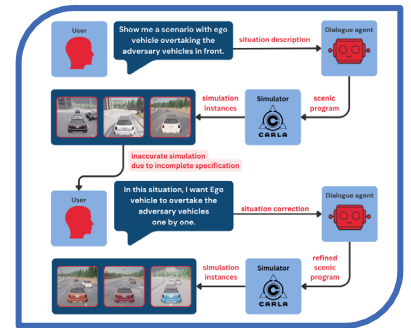
Trustworthy Human-AI supporting Oesophageal Cancer Care

Providing a data driven, fair and equitable AI decision support tool for oesophageal cancer patients

Booth 4 (Lovelace Room)

A Dialogue Interface for creating Driving Scenarios

Enabling interactive testing of driving policies for autonomous vehicles in simulation



Booth 5 (Blumlein Room)

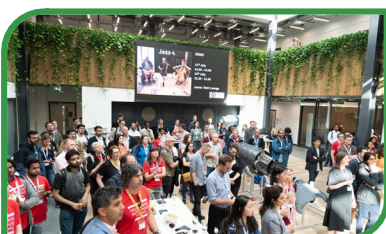
Empowering Smart Farming: Enhancing Trust In Agritech

Revolutionising agriculture with trusted, data-driven environmental and soil monitoring solutions

Booth 6 (Flowers Room)

Co-design of Context-aware Trustworthy Audio Capture

Understanding cross sector regulation and rights management for autonomous audio systems



Booth 7 (Marconi Room)

TAS Skills Programme

Developing the next generation of highly skilled TAS researchers, engineers, and designers



Booth 8 (Blumlein Room)

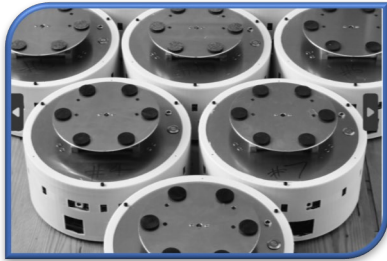
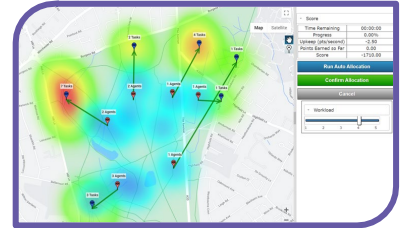
Autonomous Systems Protecting our Forests

Improving early detection of forest pests and diseases

Booth 9 (Flowers Room)

Dynamically Adaptive Human Swarm Interaction

Reducing swarm operator's workload while increasing human-swarm team performance



Booth 10 (Lovelace Room)

Trustworthy Swarms for Everyday Applications

Techniques to deploy and scale swarm applications requiring many types of robots (logistics, environmental monitoring, construction)

Booth 11 (Marconi Room)

Can Robots pick up Paper Cranes?

Developing robotic grippers that can adapt to different objects in a trustworthy way



Booth 12 (Blumein Room)

Furhat the Translator

Bringing people together through robot language translators and mediators

Al Moubayed, Samer, et al. "Furhat: a back-projected human-like robot head for multiparty human-machine interaction." Cognitive Behavioural Systems: COST 2102 International Training School, Dresden, Germany, February 21-26, 2011, Revised Selected Papers. Springer Berlin Heidelberg, 2012

Booth 13 (Haslett Room)

Trustworthy Assistive Robotics: Empowering Users in Activities of Daily Living (ADL)

Empowering users with disabilities through smart robotic wheelchairs



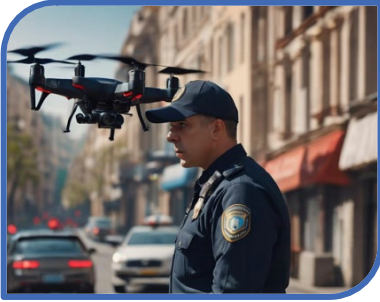
Personal Robotics Laboratory, Department of EEE, Imperial College London



Booth 14 (Lovelace Room)

COLLABORATIVE TRUSTWORTHY AND SECURE AUTONOMY

Helping stakeholders collaborate in assessing social and ethical impact of autonomous systems (AS) security



Booth 15 (Lovelace Room)

Ensuring the Security of Future Transport Systems

Advances from technical research of the TAS Security node

Booth 16 (Marconi Room)

Diagnostic AI System for Robot-assisted A&E Triage

DAISY aims to reduce patient overcrowding and medical practitioner overload in NHS Emergency Departments



Booth 17 (Lovelace Room)

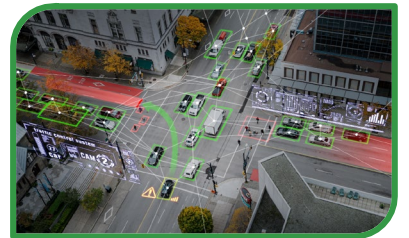
Mind the Gap: Accountable Autonomous Systems in Healthcare

Ensuring people with accountability have sufficient knowledge and control over autonomous systems

Booth 18 (Marconi Room)

Mind the Gap: Accountable Autonomous Systems in Transport

Ensuring people with accountability have sufficient knowledge and control over autonomous systems



Booth 19 (Lovelace Room)

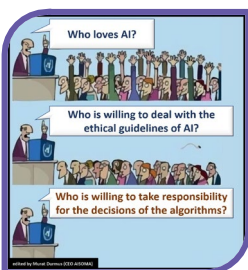
Verified Autonomy

A unifying framework to quickly and easily verify complex autonomous systems

Booth 20 (Lovelace Room)

Kaspar the Educational Robot

Helping children with autism understand the world through causal explanations



Booth 21 (Flowers Room)

Responsibility for Autonomous Systems

Helping organisations to understand their responsibilities for autonomous systems



Images by Richard Ramchurn

Booth 22 (Blumlein Room)

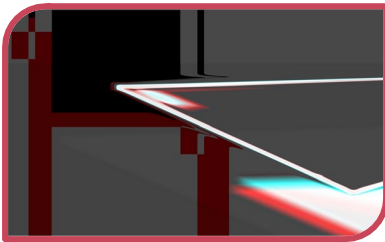
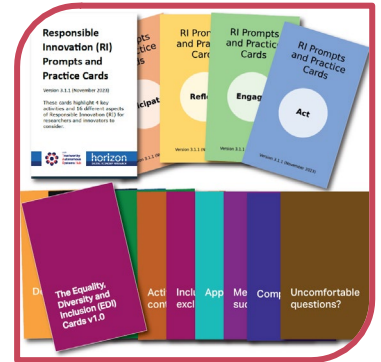
The TAS Artists in Residence & Beyond!

Bringing the Arts, Humanities and Technology Together to Understand, Develop and Shape Innovation

Booth 23 (Haslett Room)

Responsible Research and Innovation (RRI) and Equality, Diversity and Inclusion (EDI) in TAS

Tools and processes to put RRI and EDI into practice



Booth 24 (Haslett Room)

Solaris Jazz-AI Quartet

Performed by Craig Vear and Solaris AI
Solaris is a jazz quartet made from 3 AI performers (piano, bass & drum machine), playing a range of jazz standards in very different ways. The AI and the human co-create in real-time generating sensations of freedom, togetherness, trust and emergence.

Booth 25 (Flowers Room)

AI Folk Music

Performed by LOERIC, Carolan and Steve
LOERIC is an AI that can compose and perform traditional folk tunes in response to a human's playing.



Scharfsinn / Alamy Stock Photo

Booth 26 (Flowers Room)

Responsibility for Autonomous Systems

Helping stakeholders understand the complexities of holding people responsible when things go wrong



UK Research
and Innovation



UKRI
**Trustworthy
Autonomous
Systems Hub**

Find out more at
www.tas.ac.uk



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University of
Southampton



University of
Nottingham
UK | CHINA | MALAYSIA



Enabling the development of socially beneficial autonomous systems
that are both trustworthy in principle and trusted in practice
by the public, government, and industry.

