The UKRI Trustworthy Autonomous Systems Hub

CONTRIBUTION TO HEALTH AND WELLBEING

Prokar Dasgupta OBE
Professor of Surgery, Chair in Robotic Surgery and Urological Innovation,
King's College London
www.tas.ac.uk

UKRI TAS Hub
UK Research and Innovation
University of Southampton
University of Nottingham UK | CHINA | MALAYSIA
King's College London

Key Message

Working towards correct attribution to responsibility in complex and dynamic autonomous health and wellbeing systems

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Health and Social Care Research Projects

UKRI Trustworthy Autonomous Systems Hub

DAISY

Diagnostic **AI Sy**stem for Robot-Assisted A&E Triage This project aims to prototype a robot-assisted **A&E triage solution for reducing patient waiting time and doctor workload.**

LEAD CONTACT:
Radu Calinescu,
Professor of Computer Science, TAS Resilience Node PI,
University of York

Empowering Future Care Workforces

Scoping Capabilities to Leverage Assistive Robotics through Co-Design This project aims to understand how health and social care professionals can benefit from using assistive robotics on their own terms. And in ways that are safe, trustworthy, and meet the legal and ethical standards of their professions

LEAD CONTACT:
Dr Cian O'Donovan,
Senior Research Fellow,
University College London

Reimagining TAS with Disabled Young People

This project brings together **Disabled Young People (DYP), social and computer science researchers and school and industry partners**. We centralise the expertise and aspirations of DYP around questions of trust, resilience and capacity in relation to autonomous systems; thus embedding inclusion, equity, responsible research and innovation in studies of TAS.

LEAD CONTACTS:
Dan Goodley
Professor iHuman, University of Sheffield

Lauren White
Research Associate iHuman/Education, University of Sheffield

Health and Social Care Research Projects

Trustworthy Autonomous Recommender Systems on Music Streaming Platforms

Even if Recommender Systems (RS) are intended to be consumer-centric, they tend to exhibit inherent biases in the recommendations made. This project will look at how these biases in the RS impact market competition between suppliers of products on the RS platform.

LEAD CONTACTS:

Peter Ormosi,
Professor of Competition Economics,
University of East Anglia

Rahul Savani
Professor of Computer Science,
University of Liverpool

Intersectional Approaches to Design and Deployment of Trustworthy Autonomous Systems

Exploring how intersectional approaches can inform the design and deployment of TAS toward the creation of an inclusive, fair and just world. We focus on the health and maritime sectors to address a range of individual, technical, systemic, place-based, professional, cultural and institutional issues from an intersectional perspective.

LEAD CONTACT:

Caitlin Bentley,
Lecturer in AI-enabled Information Systems,
University of Sheffield

Virtually There

Exploring Presence, **Ethics** and Aesthetics in Immersive Semi-Autonomous Teleoperation for Hazardous Environments.

LEAD CONTACT:

Verity McIntosh
Senior Lecturer,
University of West England

Health and Social Care Research Projects

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Trustworthy Autonomous Systems to Support Value-based Healthcare Experiences

Exploring how **trustworthy autonomous systems embedded in devices in the home** can support decision-making about health and wellbeing.

LEAD CONTACT:
Liz Dowthwaite
Research Fellow,
University of Nottingham

Trustworthy Human-robot Teams

Exploring different aspects related to trust within and towards human-robot teams in two essential tasks: **surgery and cleaning**.

LEAD CONTACT:
Nicholas Watson
Associate Professor,
University of Nottingham

SafeSpaces NLP

Behaviour classification NLP in a socio-technical AI setting for **online harmful behaviours for children and young people**

LEAD CONTACT:
Stuart Middleton
Lecturer in Computer Science,
University of Southampton

Codesigning Trustworthy Autonomous Diabetes Systems (Cotads)

Designing algorithms for diabetes management during life transitions using co-design, provenance and explainable AI. This project aims to Increase trust and understanding by **bringing together clinicians, data scientists, and people with type-1 diabetes.**

LEAD CONTACT:
Michael Boniface
Professorial Fellow of Information Systems,
Director of the IT Innovation Centre,
University of Southampton

A Participatory Approach To The Ethical Assurance Of Digital Mental Healthcare

Developing a novel approach to assurance through participatory methodology, to underwrite the responsible design, development, and deployment of autonomous and **intelligent systems in digital mental healthcare.**

LEAD CONTACT:
Christopher Burr
Ethics Fellow, Alan Turing Institute

Trustworthy Light-based Robotic Devices For Autonomous Wound Healing

Demonstrating **wound healing** in the laboratory and defining an envelope of operation that balances risks and benefits of machine learning and **autonomous control**.

LEAD CONTACT:
Sabine Hauert
Associate Professor of Swarm Engineering Bristol Robotics Laboratory,
University of Bristol

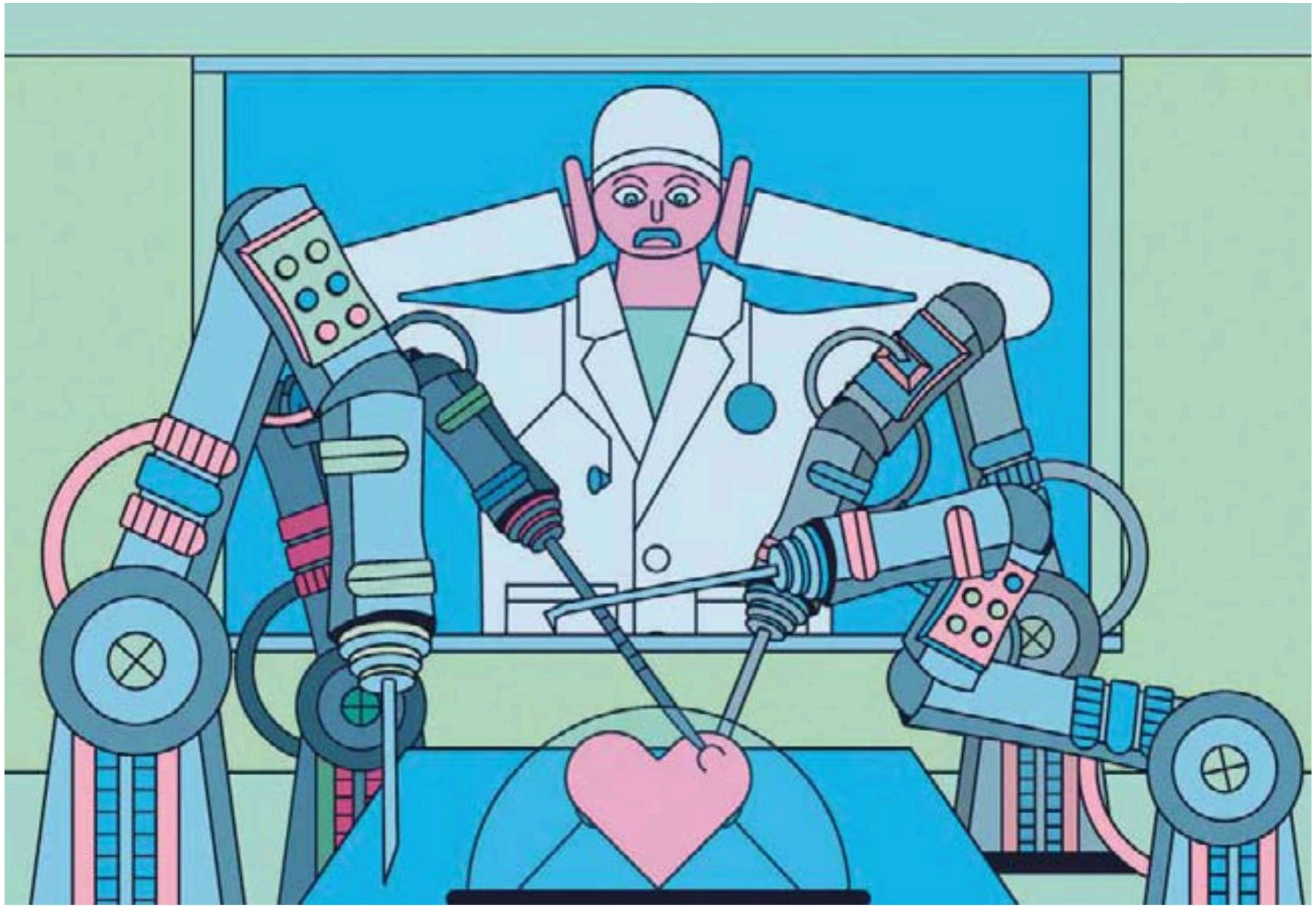
Welcome to the cutting-edge world of AI-led robot surgeons

Trustworthy Autonomous Systems, EPSRC UKRI
Conor et al, Nature Reviews 2020

28.4m

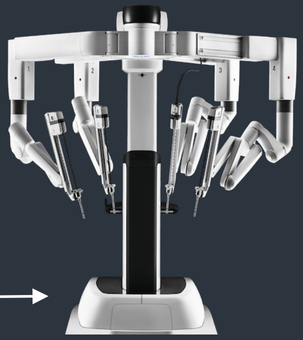
Surgeries that could be cancelled this year globally as a result of Covid-19. Robot surgeons would help to address this

'To tell a patient that I will press a button and everything will be done by a robot, while I have coffee, may not be acceptable to many'



Levels of Autonomy

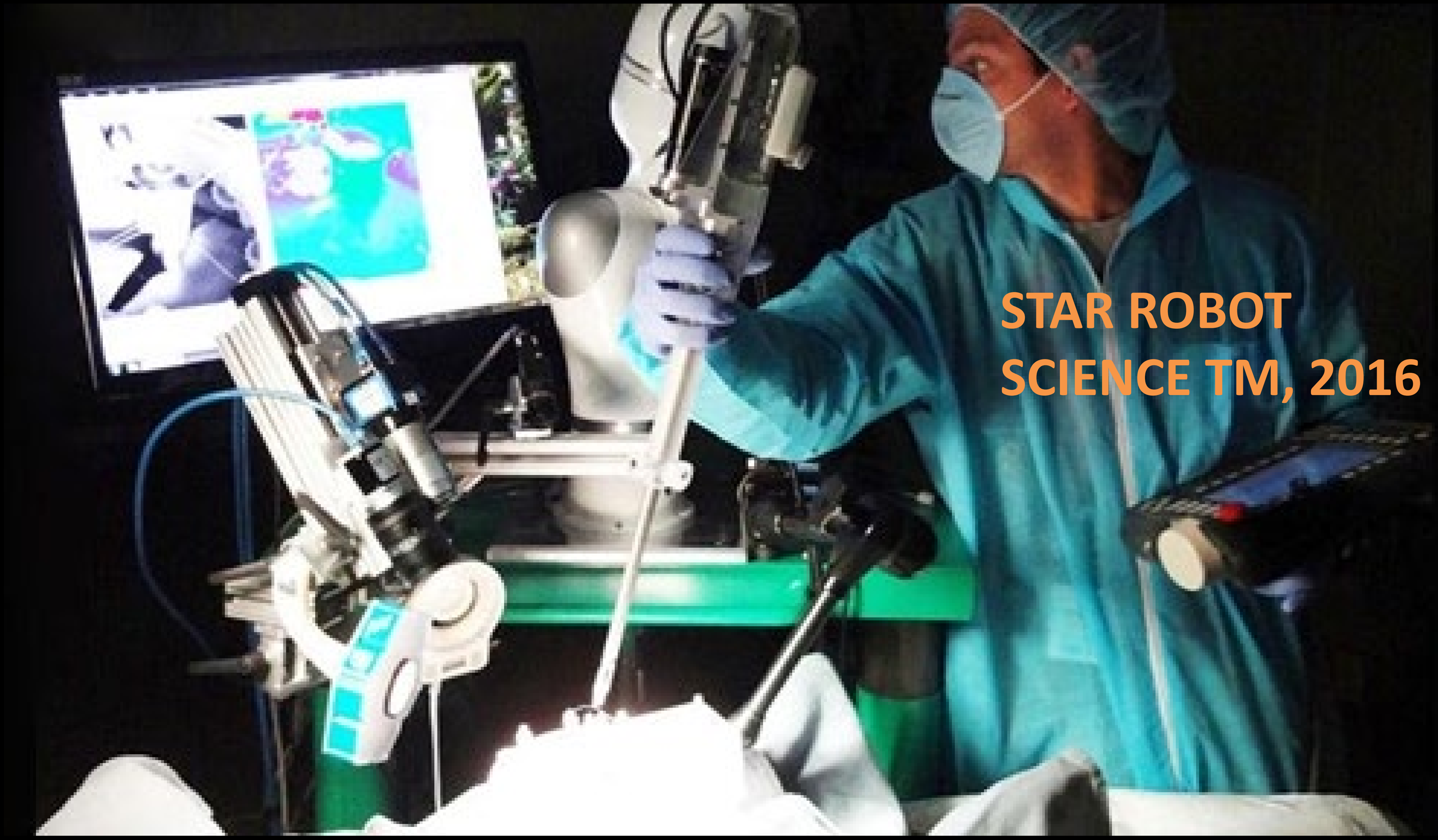
Level	Autonomy	Description	Examples
0	No Autonomy	No autonomy	AESOP (1994)
1	Robot Assistance	Robot = guidance/assistance during task Human = continuous control	da Vinci Systems (2000)
2	Task Autonomy	Robot = task-specific as directed Human = discrete (not continuous control)	PROBOT (1997)
3	Conditional Autonomy	Robot = generates task-strategies, can perform task without close oversight Human = selects strategies and/or approves autonomously selected strategy.	AquaBeam (2019)
4	High Autonomy	Robot = can make medical decisions Human = direct supervision	
5	Full Autonomy	Robot = robot surgeon that can perform an entire operation independently	



Da Vinci Xi (Intuitive Surgical)

AquaBeam (PROCEPT BioRobotics)

Table 1 A Table Summarising an Automation Classification used in Surgical Robotics, including Definitions and Example Systems.
Adapted from Connor et al. (2020), Lane (2018) and Zaman et al. (2021)


STAR ROBOT
SCIENCE TM, 2016

nature medicine

Consensus Statement

https://doi.org/10.1038/s41591-023-02732-7

The IDEAL framework for surgical robotics: development, comparative evaluation and long-term monitoring

Marcus H et al. Nature Med 2024