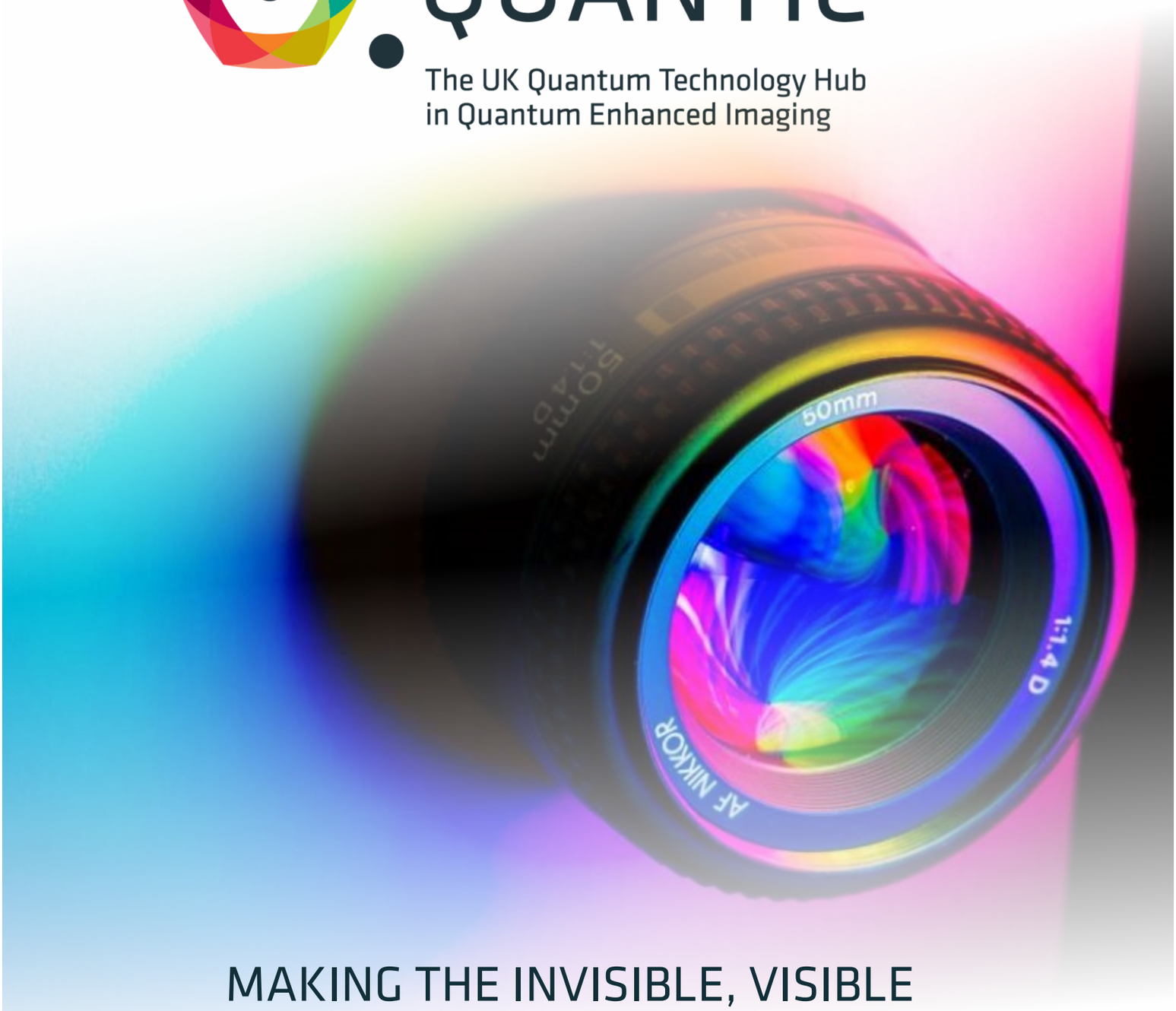
QUANTIC

The UK Quantum Technology Hub
in Quantum Enhanced Imaging



MAKING THE INVISIBLE, VISIBLE

Our mission is to connect world-leading scientists across UK universities with pioneering industry leaders to accelerate quantum innovation in imaging.

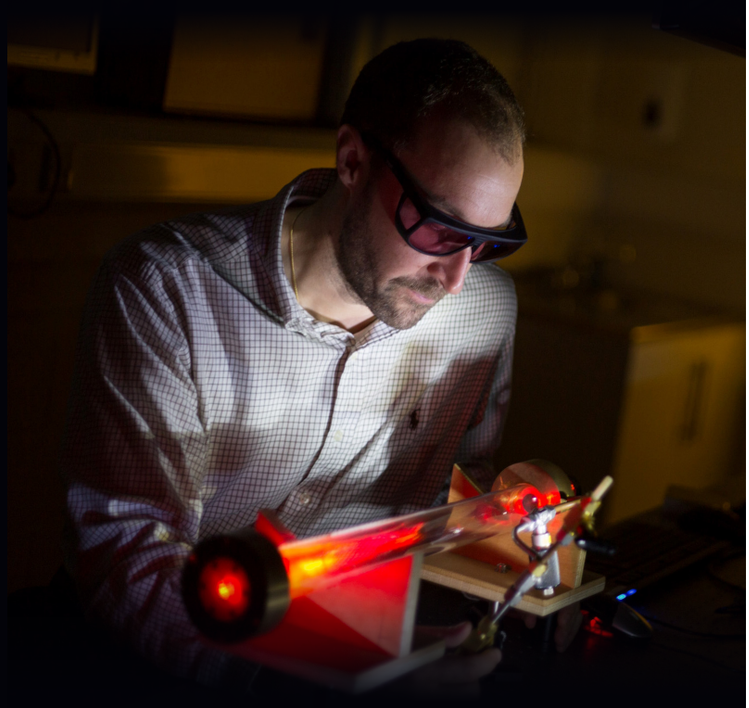
www.quantic.ac.uk

OUR MISSION

QuantIC aims to commercialise world-leading imaging research to pioneer a family of cameras operating across a range of wavelengths, timescales and length-scales, creating a new industrial landscape for imaging systems and their applications.

We combine single photon sensing with nonlinear optics, computational methods, and a range of specialised detectors to advance imaging technology.

Established in 2014, QuantIC is part of the £1b UK National Quantum Technologies Programme. A dynamic collaboration between industry, academic and government designed to create a global centre of excellence for quantum science and innovation.



WORK WITH US

QuantIC's research programme is accessible to industry and new academic research groups through a £4M Partnership Resource Fund.

This collaborative fund offers an easy access, low-risk, mechanism for QuantIC to integrate with industrial products and processes, form new quantum technology based ventures, and address large-scale industrial challenges through novel quantum approaches.

QuantIC also offers a fully funded Industrial Studentship Programme which is designed to develop both academic and technical excellence in the next generation of quantum engineers.

To discuss how QuantIC research in imaging can have an impact on your company contact info@quantic.ac.uk.

OUR SUCCESS

QuantIC has contributed to the development of several technologies that have been successfully commercialised with industry partners.

Methane Gas Sensing

QLM Technology is a start-up company, founded by QuantIC researchers at the University of Bristol, who aim to mitigate greenhouse gas emissions through LiDAR technology.

QLM has developed drone mounted, quantum sensing technology capable of remotely detecting and quantifying minute methane leaks. This work was supported by QuantIC, through an EPSRC Impact Acceleration award, and the Quantum Technology Centre (QTEC) at the University of Bristol.

In Nov 2021, QLM carried out the first successful trial of the quantum gas camera at a real-world site, hosted by SPLICE project industrial partners National Grid Gas. www.qlmtec.com

Wide field fluorescence imaging (FLIM) camera for biological microscopy

Horiba Scientific collaborated with QuantIC to incorporate the QuantiCAM Single Photon Avalanche Diode (SPAD) sensor into their existing fluorescence imaging system. The collaboration resulted in the development and launch of FLIMera, a new wide-field fluorescence lifetime imaging camera which is exceptionally faster than conventional scanning microscopes and enables the study of mobile samples, such as live cells and fluid biopsy for cancer screening.

Horiba Scientific were awarded the Institute of Physics Business Innovation Award in 2019 for the collaborative work with QuantIC in developing the novel FLIMera technology.

"Partnering with QuantIC has made it so much easier for HORIBA to collaborate in diverse projects with leading research groups. Our FLIMera camera heralds new era in accessible, robust, fluorescence lifetime imaging based on the gold standard of single-photon counting."
David McLoskey, Managing Director, HORIBA Jobin Yvon IBH Ltd.

IMAGING THE FUTURE

Working with industry partners QuantIC has developed a range of active demonstrators that exhibit these next generation technologies. We are partnered with industry, and government bodies across the following sectors:

Healthcare and life science

QuantIC seeks to expand its contributions in biomedical imaging.

We are developing new optical cameras that could replace modern-day MRI and endoscopy equipment, and detect subtle differences in biological materials advancing tumor detection. More speculative work is combining single photon detection with machine learning to image through the body.

Climate change

To tackle Climate Change, it is necessary for both industry and government organisations to have accurate, widespread access to monitoring solutions that can show the emissions, condition, and sustainability of our society.

QuantIC researchers have developed a range of quantum solutions that address major areas of climate impact. These include seeing gas emissions such as methane and hydrogen, structural health monitoring within challenging environments, and enabling improved product longevity and recycling capabilities through new spectral imaging for material sorting and quality control.

Transport

Quantum imaging offers intelligent, and dynamic approaches for improving the safety, efficiency, and security of our transport networks, whilst reducing its impact on the environment, and budgets.

QuantIC cameras can track objects around corners or through hard-to-see heavy rain, snow and fog. This imaging technology will provide cities with improved traffic management, safer roads, more reliable public services, and usher a new era of autonomous vehicles. Quantum imaging research has simultaneously improved our capacity to manage the urban environment through crowd monitoring, remote scanning and emission level monitoring.

Defence and security

QuantIC are developing a range of cameras and sensors that will advance surveillance, navigation, and threat detection across defence and security settings. Quantum effects allow us to surpass conventional limits to reduce image noise or enhance image resolution - enabling covert surveillance from greater distances keeping us ahead of threats.

Quantum imaging can also provide an alternative approach to navigation informing location without reference to satellites. This allows organisations using quantum technology systems to remain effective under restrictive environments, improving covert activities, data-security, and resilience to electronic and cyber-warfare attacks.

Space communications

Satellites and low orbit technology are vital for a wide range of terrestrial applications, from communications and weather system tracking to navigation and earth observation.

QuantIC's researchers produce high value components in small packages, enabling quantum solutions to be deployed in nanosatellites. These technologies take advantage of next-generation low power consumption, minimal background interference, and high sensitivity.

OUR TECHNOLOGY & SERVICES

QuantIC provides a range of technologies and services to deliver quantum imaging solutions.

Quantum detectors

The design, fabrication, and testing of quantum detectors offers unparalleled capabilities. Devices such as Single Photon Avalanche Diodes (SPADs) provide incredible light sensitivity and high precision timing, used in technologies such as LiDAR and next generation cameras.

Novel optics

Utilising quantum mechanics and our broad understanding of light, QuantIC provides optics that allow us to image places and wavelengths never seen before. These include non-linear waveguides and fibre-optic technologies that enable new applications and enhance existing systems.

Structured & computational imaging

Machine learning and internet-of-things solutions for quantum cameras allows our technologies to intelligently use their hardware and data. This ensures ultra-low size, weight, and power devices at scalable costs.

CONTACT US

QuantIC
Advanced Research Centre
University of Glasgow
Glasgow, G12 8QQ

Email: info@quantic.ac.uk
Tel: 0141 330 2338
Follow us: Twitter @QuantIC_QTHub

Images by Kevin Mitchell