



TORBAY

Hi-TECH CLUSTER

Solving the world's most complex problems

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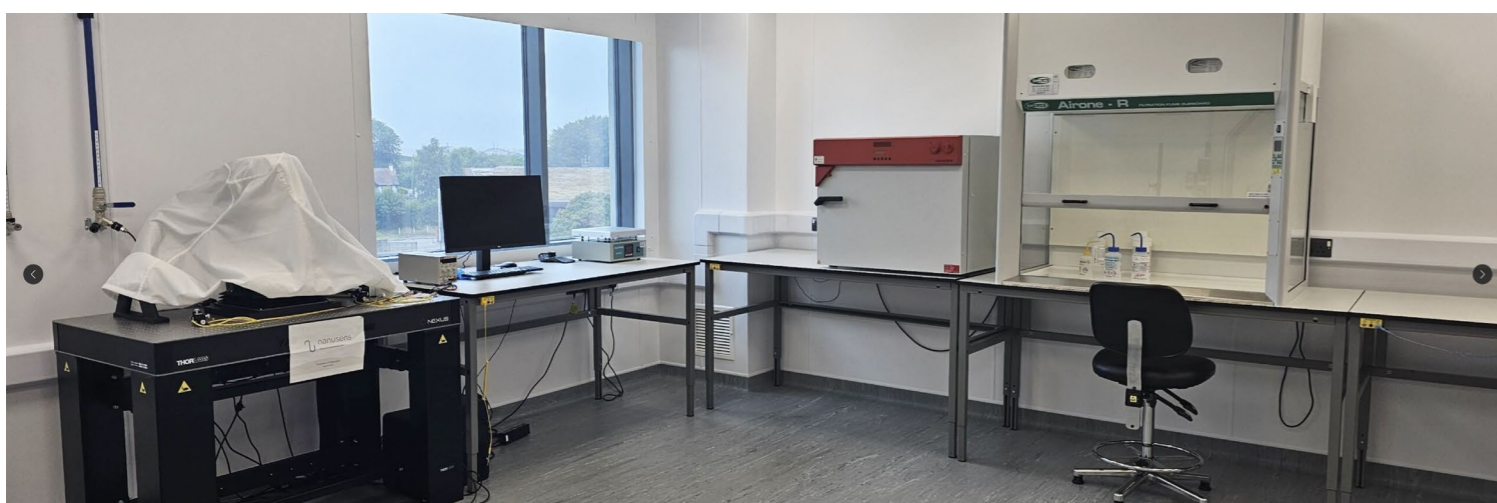
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FOREWORD



A message from our Chair

As we are now moving well away from the pandemic, it's time to reflect on what's been, but more importantly to look forward to all the fantastic opportunities that are happening in the Bay.

The tech sectors have grown on the back of a prospering tech economy and the EPIC Centre has now reached full occupancy with new companies and more investment coming into the area. This has been achieved on the back of previous successes with the work the Torbay Hi-Tech Cluster has done with government, education and business to help deliver the EPIC Centre, educational modules with South Devon College and equipment

“ Torbay has a fantastic opportunity to grow ‘Tech in the Bay’ and develop our wide range of technical capabilities across many sectors. We need to build a future for technology within Torbay through engagement and development of partnerships with government, education and industry to provide a growing sector for generations to come.

to help the college develop technical capability and thus add to the rich history and skill set we already have in Torbay.

The landscape is now changing, and we must look to the future and realise what seems like a fantastic circumstance of events. We have a once in a generation opportunity to grow this capability within “Our Torbay Story” and further develop and grow our “Tech by the Bay”. It is fantastic news that our Levelling up Fund has been approved for the “Fish and Chips” application which means further investment for the fishing industry in Brixham and the Tech Sector in Torbay with the building of Torbay

Technology Park. Couple this with the Levelling up Partnerships, the town centre redevelopments and the wider devolution discussion, it feels like things are really changing in the Bay.

The Technology Park will enable growth within the Bay which began with the EPIC centre. The success of EPIC has been instrumental in achieving Levelling Up Fund Round 3 for Torbay Technology Park and will allow businesses to expand in the Bay and not have to move elsewhere – thus providing further incubation space for incoming companies.

All of this should bring further incoming investment opportunities for Torbay and the Torbay Hi-Tech Cluster want to use this as a springboard to enable growth and work with business, government and education to provide a roadmap for innovation across various tech sectors that provides well paid jobs in world class facilities for the next generation.

Our technical capabilities in the Bay cross many sectors and we want to recognise the diversities we have to provide a wider platform for future jobs across the tech space. We have a thriving photonics and electronics capability but are also growing other key sectors like creative tech, marine tech, med tech and engineering. As we pull this together, we will all have a wider voice across the region and aim to encourage talent to grow in the area and provide jobs for people in the Bay.

The companies we currently have are leading the world in major ways - impacting climate change, developing internet capability and bandwidth, creating world leading media content, developing technologies that drive everyday activities through deployments in space, impacting global social media trends, developing next generation medical improvements and technologies that will help save life and conserve our oceans (to name but a few).

It is the role of the Cluster to promote and grow the sectors and provide the roadmap for future success by both raising the profile of the Hi-Tech Cluster as a group of companies, and being ‘stronger together’ as a group of companies across Devon and the South West.

This all provides a fantastic opportunity to provide the balance we have with the collaborative lifestyle we enjoy in the bay – the balance of hi-tech and well paid jobs coupled with our outdoor spaces, beaches and countryside. Exciting times indeed and a lot to look forward to for “Tech by the Bay”.

Chris Wardle, QLM
Chair of Torbay
Hi-Tech Cluster

BACKGROUND

Torbay and South Devon has a rich heritage in the microelectronics sector. The region has seen continued growth and development which makes it a lucrative hub for technology businesses.

Standard Telephones & Cables (STC) moved into the Long Road, Paignton site in the mid-1950s. Always at the leading-edge of communications technology, the company, by 1999 in its Nortel form, employed over 5,000 people. The company was a key global hub during the dot.com revolution brought about by a critical advance in photonics, namely, the change from using copper cables for communication to optical fibre technology. Today, this technology forms the backbone of the information superhighway that drives the internet, enables fast video streaming and makes sure all our smart device apps work 24/7.

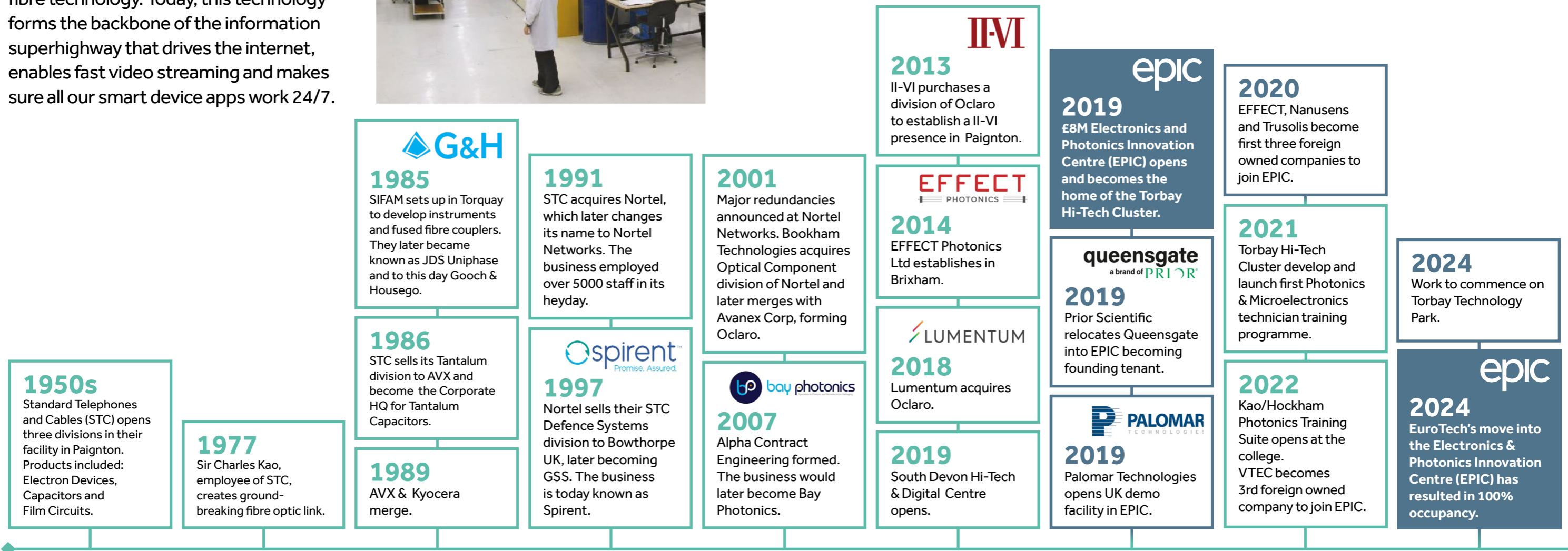


The future requirements for cloud-based computing, the Internet of Things, and autonomous vehicles means that telecommunications will continue to grow. The amount of data required to ensure safe, error-free navigation to allow use of autonomous vehicles on our highways will require constant advances in technology.

The old STC Long Road site is now the location of South Devon College, where today's breed of innovators are being trained in fantastic new facilities

such as the newly opened Hi-Tech and Digital Centre. The College works with local hi-tech companies and introduces apprenticeship schemes tailored to the sector. This collaboration has been key in retaining exceptional young talent in the area.

On an adjacent site, the Electronics & Photonics Innovation Centre (EPIC) was opened in 2019. This facility offers businesses access to a classified cleanroom and state-of-the-art prototyping capability.



VALUE OF PHOTONICS & MICROELECTRONICS SECTOR UNITED KINGDOM



£15.2bn
industry value to the
UK economy

THE SOUTH WEST

The Photonics and Microelectronics cluster in the South West continues to grow quickly with investment in jobs, new product development, premises and facilities.

250
companies

79,100
people employed in the
UK across the sector



7,050
people employed
in the South West*

£5.3bn
Total Gross Value Added (GVA)

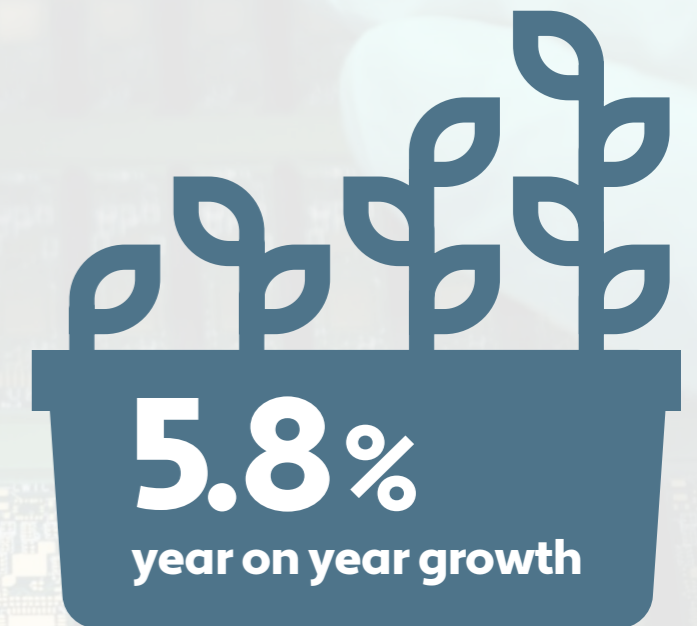


£89,400
GVA per employee**
(vs UK manufacturing average of £67,000)

£725m
total turnover



5.8%
year on year growth



10
Photonics &
Microelectronics
training programme



* Source: UK Photonics 2023:
The Hidden Economic Engine

** Source UK Photonics Leadership
Group UK Photonics 2023

CAPABILITIES

Advanced photonic materials technologies including Indium Phosphide (InP), Gallium Arsenide (GaAs) and Complementary metal-oxide-semiconductor (CMOS), for Photonic Integrated Circuit (PIC) and Micro Electro-Mechanical Systems (MEMS) realisation.

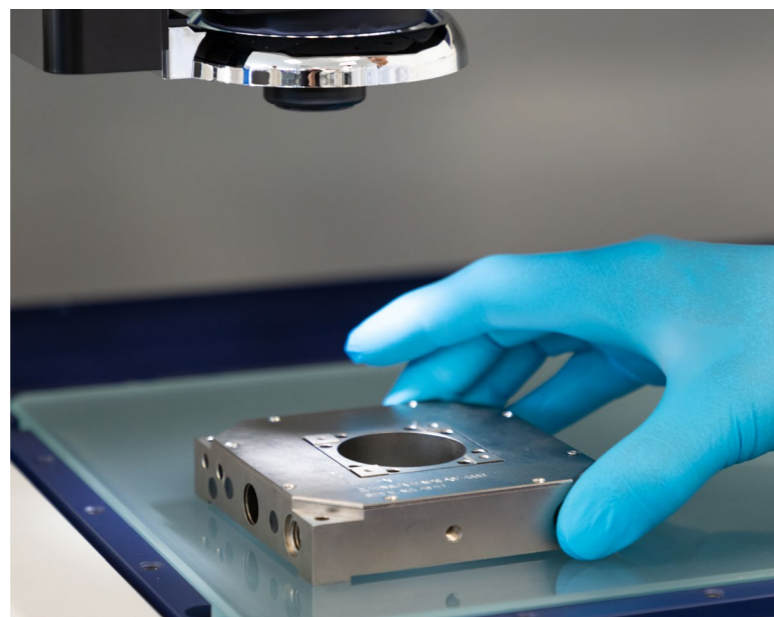
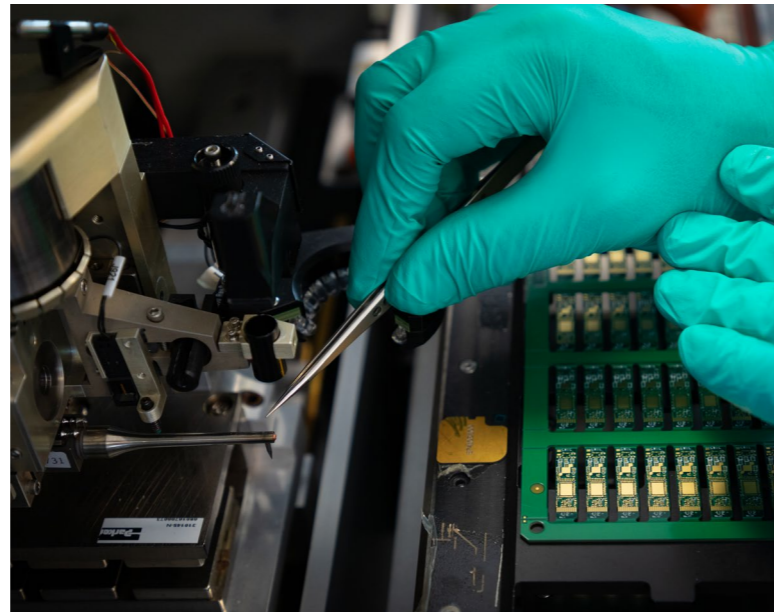
Advanced Complementary Metal-Oxide-Semiconductor (CMOS) materials technologies for micro-electronic Integrated Circuit (IC) and Micro Electro-Mechanical Systems (MEMS) realisation. Nano-positioning technologies with nano-meter resolutions and accuracies, including piezoelectric actuators for nano-positioning sensing and actuation.

Quantum Technologies, including Assembly and Packaging for secure communications, computational and positioning solutions, and LIDAR solutions for GHG emission monitoring and climate impact.

Die Attach Technologies, including electronic integrated circuits and MEMS integrated circuit die attach, die bonders, thermo-sonic gold wire, epoxy and soft solder bonding processes.

Advanced Security Technologies, including hardware authentication, use behaviour analytics, data loss prevention, deep learning and cloud-based storage.

Space Communications Technologies, including free space photonic inter-satellite communications and sensing.



TECHNOLOGIES

Photonic Integrated Circuit (PIC) design, including high-speed tunable lasers, optical modulators, hi-sensitivity optical receivers, optical routing multiplexers, waveguides and add-drop filters, enabling the design and manufacture of highly integrated, high reliability Pluggable Photonic Transceivers for emerging and next-generation optical networks. Utilising lean hi-productivity photonic manufacturing capabilities for mass manufacture and global supply.

Micro Electro-Mechanical Systems (MEMS) technologies realising the amalgamation of microscopic mechanical devices with moving parts and micro-electronic circuits. MEMS design combined with MEMS engineering and manufacturing expertise realise micro-scaled systems which are now standard features in modern consumer mobile devices. MEMS accelerometers and gyros are combined with absolute positioning technologies, such as GNSS for user localisation and positioning, face recognition, and communications.

Manufacturers of precision nano-scale motion, automation, and optical measurement systems, sub-systems, and components, including microscope automation equipment with high precision motorized microscope stages. Piezo nano-positioning systems, motorised filter wheels, high-speed shutters, laser autofocus systems, custom and OEM electromechanical and optical systems, for nano-metric micro-chip inspection and surface analysis.

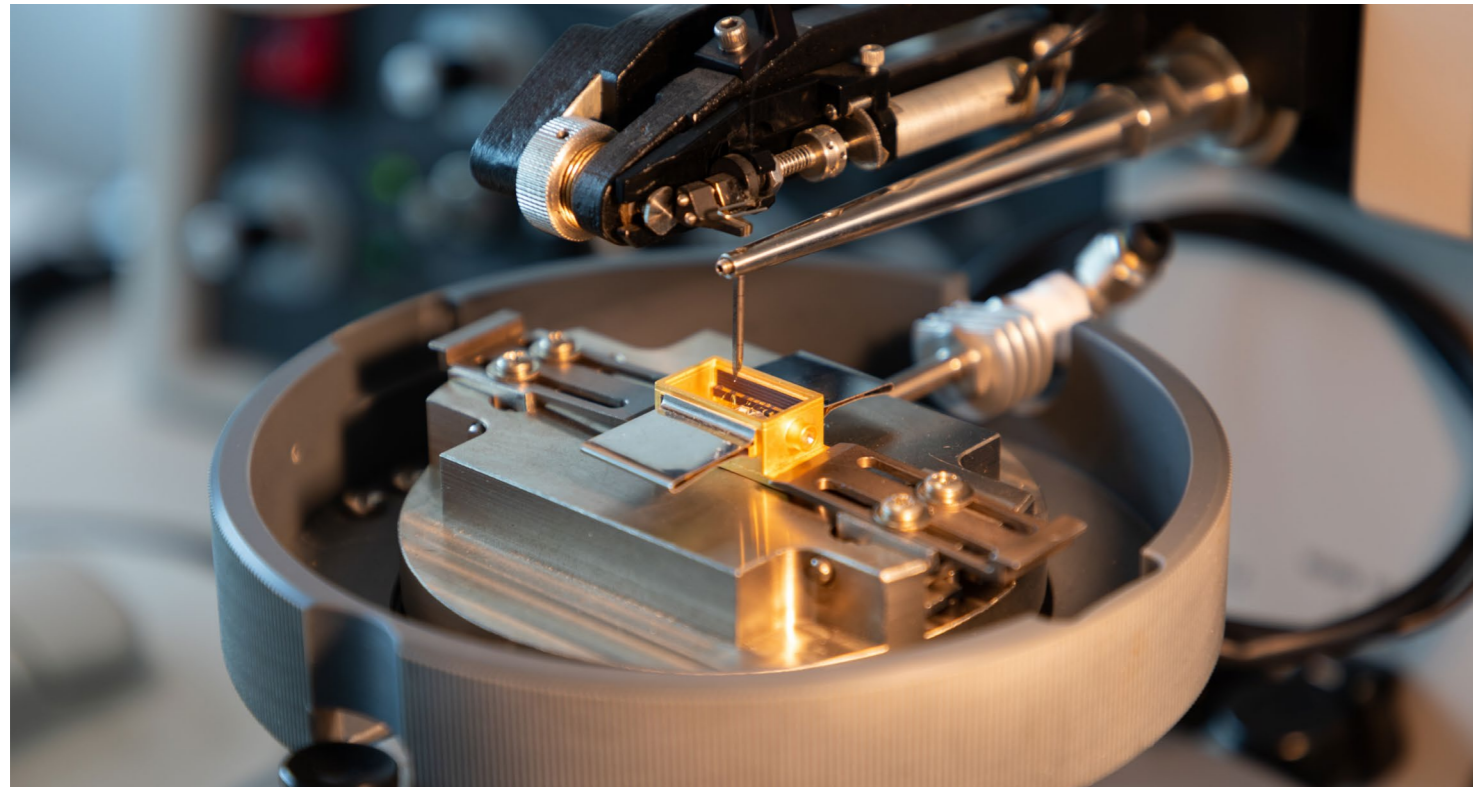
Quantum technology and packaging expertise is finding applications in secure communications, high sensitivity measurement methods including LIDAR (Light Detection and Ranging). As well as enabling enhanced computing power in navigation and timing systems, and healthcare imaging.

The advanced implementation of **micro-electronic integrated circuit die bonding** and assembly processes realises highly integrated multi-chip multi-functional systems with reduced physical size. These advanced processes are enablers in the realisation of high reliability, physically robust next-generation of portable communications devices including smart phones and GPS locations and positioning systems for terrestrial and space applications.

As society moves towards **data sharing** and cloud storage, the requirements for advanced security applications including hardware authentication, data loss prevention, user behaviour analytics becomes necessary to protect personal and corporate information.

Space and satellite instrumentation design and manufacture requires the realisation of hi-reliability, robust components and systems for Earth environment observation, astronomical exploration and inter-satellite communications in extreme operational environments.

RESEARCH & DEVELOPMENT



Research and Development (R&D) includes activities that companies undertake to innovate and introduce new products and services. It is often the first stage in the development process. R&D is therefore pertinent to businesses in microelectronics and photonics. The Torbay and the South West region is rife with technical capabilities, expertise and a vibrant supply chain to support R&D.

The Cluster is involved with projects and collaboration with academia and national research centres from up and down the country. In fact, many of the region's businesses benefit from the breadth of talent that comes from two excellent universities in Exeter and Plymouth.

UNIVERSITY OF EXETER

University of Exeter offers a number of relevant photonics graduate courses as well as PhD courses through the internationally renowned Centre for Doctoral Training (CDT) in metamaterials.



University of Exeter



UNIVERSITY OF PLYMOUTH

Enterprise Solutions is the gateway service for external organisations to access the University of Plymouth's internationally renowned research expertise and state-of-the-art facilities including immersive visualization suites, electron microscopes, clean labs, sub-sonic wind tunnel, cyber-SHIP lab and geotechnics laboratories.

We can help you tap into our services, inject new thinking, and support and drive innovation in:

- Advanced Engineering & Manufacturing
- AI, Machine Learning and Robotics
- Creative Tech
- Cyber Security
- Marine Tech
- Med Tech

The newly refurbished Babbage Building houses specialist equipment and laboratories that bring engineering, science, and the arts together, enabling holistic and creative approaches to problem-solving to address some of the world's biggest issues and business's R&D needs.

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UNIVERSITY OF PLYMOUTH
Research and Innovation



EPIC

Electronics & Photonics Innovation Centre

ABOUT EPIC

EPIC is the technology hub of the South West. The centre offers modern facilities to businesses in the tech sector. With 25,000 sq. ft. of lettable space, EPIC provides an array of flexible space to both small and growth businesses. It is therefore the ideal location to locate or relocate a technology business.



WHAT'S ON OFFER

The centre has modern offices and laboratories to let. The flexibility of EPIC enables businesses to start small and then grow into larger or multiple units.

EPIC offers tenants access to a fully classified Cleanroom and a wide variety of shared spaces including boardrooms and other conference facilities. The concept of EPIC is therefore for businesses to let the space they need and to fully utilise the services of the wider centre to improve the offer to their staff and customers.

TECHNICAL CAPABILITY

EPIC tenants have access to >£3.5M worth of prototyping equipment to increase their technical capability. This provides access to technology that smaller businesses wouldn't ordinarily be able to purchase (or justify) in their own right.

Current capabilities include:

- Die, Wire, Ball Bonding
- Bond Testing
- Automated Visual Measuring (VMS)
- Scanning Electron Microscopy (SEM)
- Plasma Cleaning
- Environmental Simulation
- Product Storage
- Photonics Packaging
- Alignment
- Design Software
- LIDAR solutions for GHG emission monitoring and climate impact
- X-Ray and CT Scanning

THE HI TECH & DIGITAL CENTRE

 South Devon College



A FACILITY FOR THE FUTURE

For our business and professional partners, we offer a range of options for reskilling and upskilling your existing workforce, including bespoke remote courses within the Management and Leadership Excellence Programme, as well as AAT accounting, Chartered Management Institute (CMI) courses, CIPD and HR qualifications.

Alongside specific training courses for businesses, qualifications available cover a range of levels from entry up to degree-level study.

We offer a wide range of apprenticeships, ranging from a Level 3 to Level 6 degrees, including Machining Technician, Product Design and Development and Multi-Channel Marketer.

For 16-18 further education, there are opportunities to study subjects spanning the engineering, technology and digital sectors, including Design and Development for Engineering and Manufacturing in Electrical and Electronic Engineering, Digital Media, and Esports.

We design curriculum and develop resources based around employer needs, equipping future generations with the skills and experience to drive the technology and engineering industries forward. If you would like us to provide bespoke training to meet your requirements, please get in touch to discuss opportunities at employers@southdevon.ac.uk

OTHER FACILITIES

PARC

Located in North Devon for nearly 20 years, PARC Ltd has provided a range of environmental testing services to assess a product's reliability, and to ensure that the product survives in its working environment.



EXETER SCIENCE PARK

Exeter Science Park is the result of a vision to develop a science park in the South West of the UK to stimulate a knowledge-based economy delivering better jobs, higher productivity and economic growth.



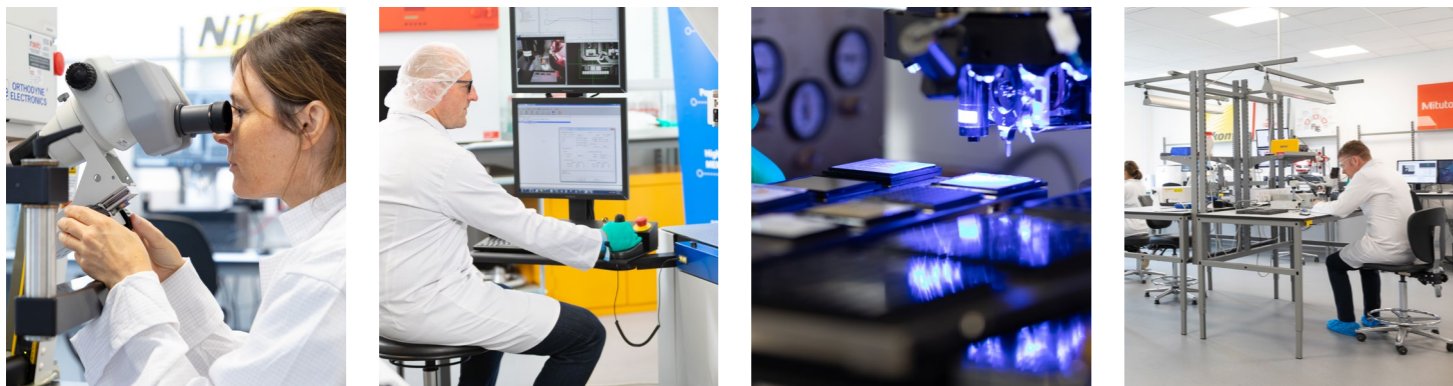
PLYMOUTH ELECTRON MICROSCOPY CENTRE

This facility offers a comprehensive range of light microscopes, electron microscopes, imaging processing and analysis software, providing support to a range of disciplines within Plymouth University, external research organisations and industry clients.

This equipment is integrated with sophisticated software for image analysis, image processing and x-ray characterisation of materials, with facilities for rapid report generation.



Torbay is an internationally recognised region for R&D, product design and manufacturing in hi-tech photonics & micro-electronics as well as creative tech, med tech and marine tech. It has world-leading companies, highly motivated and experienced employees and excellent access to markets.



PUTTING TORBAY ON THE MAP

Global leaders in technology like QLM, Oriole, Lumentum, Nanusens, Bay Photonics, Gooch & Housego, Superb, Coherent, Prior Queensgate, Sage Tech Medical, Spirent, Photonics Express, White Rock and TWM Technology are all located in Torbay.

These companies are committed to major ongoing investment in the region. Alongside these are other specialised companies in photonics integrated circuits (PIC) packaging such as Bay Photonics, as well as providers of software and firmware. This has cemented our reputation as one of the UK's most vibrant microelectronics and photonics clusters.

“There are multiple world leading microelectronics and photonics organisations operating within our vibrant Cluster.

Chris Wardle

(QLM) Chair, Torbay Hi Tech Cluster



The South West, particularly Torbay, has for decades been a location of expertise in the development of robust and resilient components for telecommunications and consumer electronics. Driven by the internet of things and our demand for high speed connectivity, the global demand is huge. The future growth prospects of the South West photonics and microelectronics industry are immense and vital for growing the UK communications supply chain.

Dr John Lincoln CEO, UK PLG



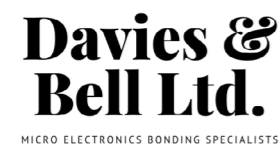
CLUSTER OBJECTIVES:

With headquarters at EPIC, the Torbay Hi-Tech Cluster is very active as an organisation promoting and advocating Torbay companies and regional expertise. It is leading in pursuing opportunities for collaboration, innovation and investment. The Cluster is also a proud member of the European Photonics Industry Consortium, the industry association promoting the sustainable development of organisations working in the field of photonics across Europe.

The group has clear objectives that are regularly reviewed. These include:

- Continue to promote the Torbay Hi-Tech Cluster
- Grow a pipeline of businesses waiting to come into EPIC
- Develop Torbay Technology Park for growth and promote further investment
- Support smooth transition out of EPIC into other sites around Torbay
- Grow Torbay's technical capability
- Encourage next generation of engineers and fill the skills gap
- Grow collaborations

CLUSTER MEMBERS



CASE STUDIES



G&H Torquay has a successful track record of regularly introducing new products and recently won the Queen's award for Enterprise in Innovation for their flagship FibreQ product. This technology is used in advanced laser systems for metrology and material processing applications and sold all over the world. The company has been developing and manufacturing hi-tech photonic components in Torquay for over 30 years and is part of the larger Gooch & Housego plc group.



The manufacture of virgin anaesthetic agents and their release as greenhouse gases is highly damaging to the environment and contributes significantly to the carbon footprint of healthcare. SageTech Medical have developed a safe, sustainable and easy to use solution for the capture and recycling of these waste volatile agents, providing hospitals and clinics with a straightforward solution to make a real difference to our planet.

The circular economy solution safely captures waste volatile anaesthetic agents onto two reusable capture canisters ('SID-Cans') which are housed inside a capture machine ('SID-Dock') that integrates simply, seamlessly and universally into existing anaesthetic equipment. The captured agents are then recovered and recycled in Devon, ready for future reuse.



Lumentum is an advanced technology company which delivers innovative photonic technology based products to accelerate the speed and scale of next generation optical telecommunications. Lumentum also focuses on and new evolving advanced technology global market opportunities, including; cloud networking and storage, advanced material manufacturing, 3D sensing, clean renewable energy generation, autonomous automotive vehicle applications, 5G wireless evolution, and Internet of Things (IoT).



Nanusens is the only company to have perfected the building of sensors within chips. The sensors, called MEMS or Micro Electro Mechanical Systems, are built using the standard chip manufacturing techniques, called CMOS, that are used to build the electronic circuits on chips and at the same time as the rest of the chip circuitry. This means that chips with Nanusens embedded sensors can be made in any of the many CMOS fab in virtually unlimited numbers and with the high yields that are normal in such fabs with all the benefits of low unit costs that fab production provides.

The latest innovation from the company is a novel solution for the RF front end of the next generation of mobile phones called 6G. It uses the same breakthrough technology of building nanoscale structures within CMOS layers to the numerous RF Digitally Tunable Capacitors required all in a single chip.



For over 35 years, Spirent has serviced the needs of GNSS developers and users in a wide range of industries and application areas. From the robustness requirements of defense to the precision demands of civil applications, Spirent solutions deliver flexibility and assured performance needed to advance test programs.



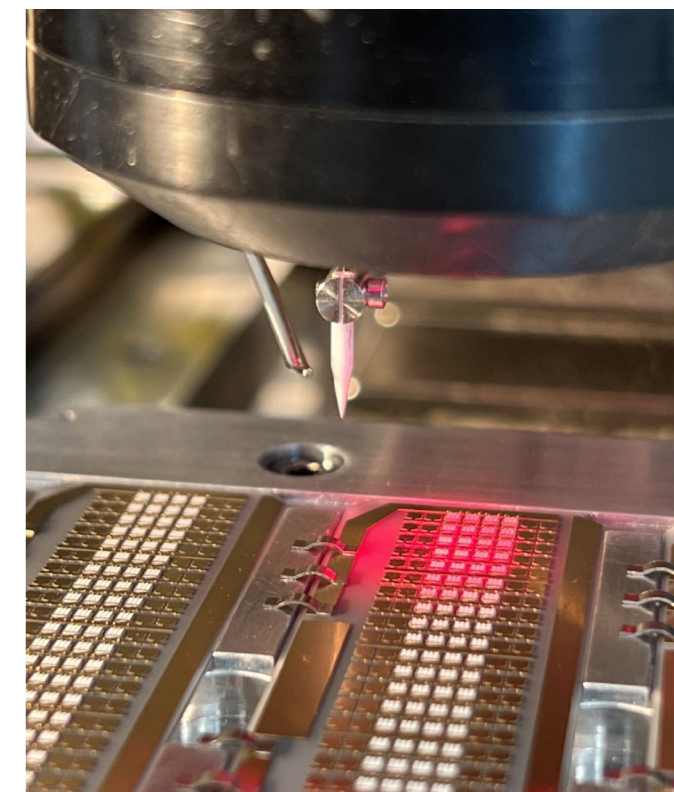
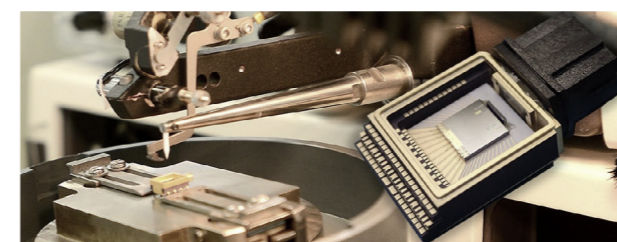


queensgate
a brand of **PRIOR**



Queensgate has over 45 years' experience designing and manufacturing high-performance piezo nanopositioning systems. These systems provide an enabling technology for radical innovations in various fields such as mobile communications and personalised therapeutics. As part of Prior Scientific we supply complete opto-mechanical systems for research users and OEM scientific instrument manufacturers.

QLM is revolutionising gas sensing in the oil & gas industry by developing compact, high-sensitivity, low-power Tuneable Diode Lidar (TDLidar) gas detection and imaging systems based on infrared single-photon detection. Using technology based on research developed at the University of Bristol, QLM meets the needs of natural gas producers, distributors and service providers with fast, accurate and low-cost gas leak identification and monitoring for; oil and gas, industrial, biogas and agricultural applications.



Bay Photonics specializes in providing advanced packaging solutions for semiconductor-based photonic devices (e.g. Silicon Photonics, Photonic Integrated Circuits).

Founded in 2007 by Larry Clarke and Glenn George, two UK acknowledged pioneers of photonic integration, Bay Photonics focuses on providing solutions for advanced telecommunications, quantum technologies, sensing and biomedical imaging.

Bay Photonics partners with clients enabling reduced costs by offering expertise in packaging design, assembly and test, required for the multiple stages of innovative technologically advanced semiconductor product development. From proof of concept to volume manufacturing.

The company is based in the Electronics & Photonics Innovation Centre (EPIC) in Paignton, Devon, UK, which is a recognised hub for hi-tech research and innovation.

Bay Photonics also provides expertise in collaborative projects and partnerships, contributing to advancements in semiconductor technology packaging. Working closely with pioneering organisations involved in environmental sensing, light detection and ranging, secure telecommunications, and other leading-edge technology projects.

The Bay Photonics team consists of experienced engineers who work closely with clients to ensure efficient, cost-effective and highly successful technical solutions.

WHY RELOCATE?

Having a base in Torbay enables you to access exceptional hi-tech equipment, clean lab spaces and strong working relationships between Hi-Tech Cluster members in the EPIC building as well as local research and design (R & D) and education partners. This includes the University of Plymouth, University of Exeter, and South Devon College who are all providers of skills training programmes and research excellence.

The Hi-Tech Sector in Torbay and the South West is known for its capabilities in R & D, design and new product development. Torbay and the EPIC Centre offers the ideal location for companies developing new technology.

FAST GROWING INTERNATIONAL CLUSTER

We have seen multi-million pound investment across our Cluster including companies such as QLM, Oriole, Lumentum, Nanusens, Bay Photonics, Gooch & Housego, Superb, Coherent, Prior Queensgate, Sage MedTech, Spirent, Photonics Express, White Rock and EuroTech.

All of these investments support a high proportion of R & D, new product design and manufacturing. We have ambitious plans to grow our Cluster, why not come and join us?



QUALITY OF LIFE

Torbay is a glorious part of Devon and England, encompassing the towns of Torquay, Brixham and Paignton. It sits on the beautiful Tor Bay and next to the stunning landscape of Dartmoor National Park.

Whilst we are a magnet for visitors, known as the English Riviera, we also host globally significant technology businesses. We can balance out that work life with our stunning green

countryside and access to our blue sea, where you can find 20 beaches along 22 miles of coastline.

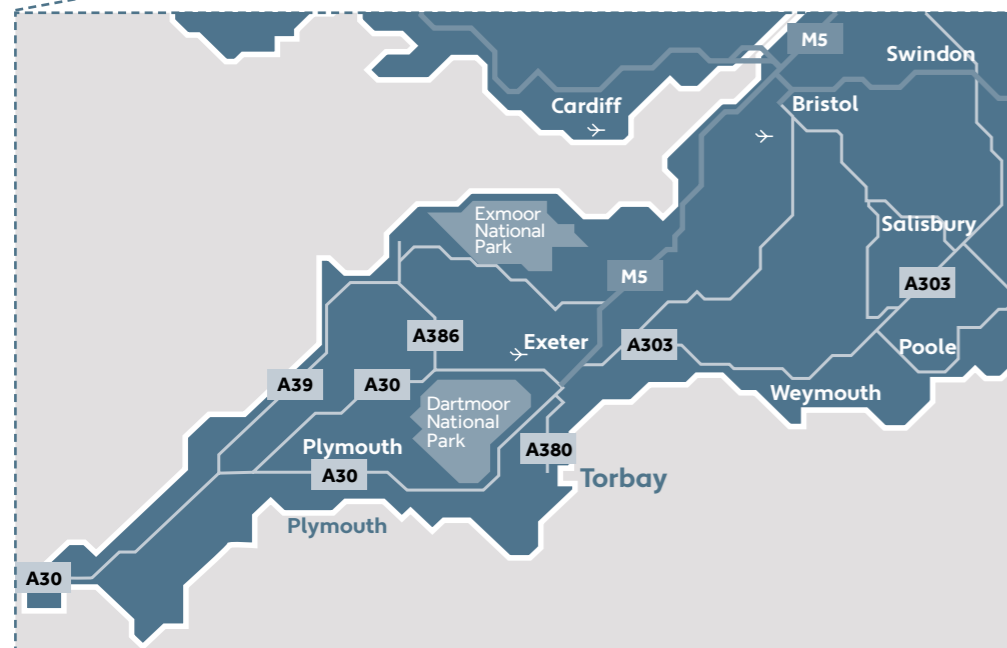
The wonderfully mild climate which, coupled with the compelling natural environment, makes Torbay a hugely attractive place to live and work.

Remote working opportunities mean that you can also still easily connect and work with customers in cities in the UK, locally, regionally, nationally and internationally.

The English Riviera UNESCO Global Geopark is one of eight in the United Kingdom. The Geopark celebrates, conserves, enhances, and protects the unique and diverse culture, heritage, and environment of this naturally inspiring area.

CONNECTIVITY

AN EASY ROUTE INTO THE SOUTH WEST



DIRECT ACCESS TO LOCATIONS WORLDWIDE

Fly to major cities within the UK and Europe via Exeter and Bristol airports.

CONNECTING YOU TO CUSTOMERS AND SUPPLIERS BY ROAD...

Connecting you to the Midlands in 2.5 hours and London in 3.5 hours, via the M5.

GLOBAL SUPPLY CHAIN AND DEPLOYMENT SUPPORT

Accessible through six strategically located ports in the South West region.

... AND RAIL

Travel to London, the Midlands and beyond via fast and frequent rail links.

CONTACTS



CHRIS WARDLE

TORBAY HI-TECH CLUSTER CHAIR

Chris will be able to provide further information about the cluster group and its objectives.

chris.wardle@qlmtec.com



DR. ANDREW ROBERTSON

TORBAY HI-TECH CLUSTER VICE CHAIR

Andrew is a local ambassador for the Torbay Hi Tech Cluster and is able to provide technical insights around the local supply chain

andrew.robertson@bayphotonics.com



RICHARD SCUTT

EPIC CENTRE DIRECTOR

Richard can facilitate the move of technology businesses into the EPIC Centre and support them with their growth.

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JOJO RAMSDEN

SENIOR ECONOMIC DEVELOPMENT OFFICER

JoJo assists hi-tech companies to identify expansion, relocation, and grant funding opportunities.

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