

HIGH TECH NEWS

A Dismal summer?

Banksy's Dismaland exhibition drew global attention to the SouthWest and the tech cluster here, and local tech CEO Rupert Baines draws some key lessons from the event of the summer on page 14.

This comes as Bristol and Bath continues to cement its position as a leading tech cluster in Europe, from the new Cray supercomputer research lab (p2) to recent smart city project wins and a significant bid in the pipeline (p2). The region has a real opportunity to develop the next generation of hardware and software technology for smart living (page 3) both in Europe and around the world. This is boosted by the latest smart home research centre at the Bristol Robotics Lab (page 9) using networking technology from local startup ContinuumBridge. Blu Wireless Technology is also seeing its technology being adopted in multiple projects across Europe (p6).

Quantum technologies continue to be a strong force in the region, with a new deal with Oxford Instruments, another local company, and researchers heading over to see the latest quantum computing technology from D-Wave in the US.

We welcome back the TEDx Bristol conference next month, and are delighted to see the BrisTech developers conference added to the array of technical conferences in the region such as Intelligent Test (page 13). There is also increasing interest in various coding schemes around the city and a need for mentors and volunteers, from Digimakers <local> and Code Clubs (page 12), and GeekGirls are looking at how all this fits together (page 14)

You can have a say in how high tech companies can be supported in the region, and any other issues facing the industry - from finance to innovation and skills - by joining the High Tech Sector group. The board meets every two months. If you are interested please contact Nick nick@flaherty.co.uk or Mike mike@testandverification.com for more information.

In this issue October 2015

Anite	p6
ARPAL	p9
Bristol is Open	p2
BRL	p9
Blu Wireless Technology	p2,6,7
Boxarr	p8
Bristech	p13
Bristol Robotics Lab	p9
Centre for Quantum Photonics	p10
Code Club	p12
Cray	p2
Digimakers <local>	p12
D-Wave	p10
Events	p13
Fhoss	p7
GeekGirls	p15
HBB	p12
Imagination Technologies	p11
Oxford Instruments	p10
Pitch@Palace	p9
Technation	p4
Toshiba	p3
UltraSOC	p14
University of Bath	p4,5
University of Bristol	p2,6,15
Ultrahaptics	p13
UWE	p4
Wittenstein HIS	p4
YellowDog	p8
Zeeta Networks	p3

The High Tech News banner highlights the expertise in the region, from the robotics capabilities of XMOS, Infineon and the Bristol Robotics Lab, the chip design heritage of the Inmos transputer and live Android image processing code shipping in products today

Cray sets up first European research lab in Bristol

Supercomputer designer Cray is setting up a research lab in Bristol to act as the focal point for its technical engagements with European High Performance Computing (HPC) companies.

The lab was announced at the 2015 International High Performance Computing User Forum and will work with new and existing customers on various technical collaborations such as special research and development initiatives, the co-design of customer-specific technology solutions, and collaborative joint research projects with a wide array of organizations. The research lab will also be Cray's main interface to European development programs, such as Horizon 2020 and the FET Flagship Initiatives.



"Establishing a dedicated research lab in the region allows us to further engage with our customers in co-designing solutions for their current and future supercomputing requirements," said Steve Scott, senior vice president and chief technical officer at Cray.

"The European market is vitally important to Cray. With the recent opening of our regional headquarters in Bristol, a new Cray EMEA Research Lab, and a growing customer base in the region, our commitment to

the European HPC community is stronger than ever."

The lab is currently working with the Jülich Supercomputing Center in Germany to deliver a pilot supercomputing system for the Human Brain Project, as well as the Edinburgh Parallel Computing Centre (EPCC) at the University of Edinburgh in the United Kingdom, the Alan Turing Institute in London, and the Swiss National Supercomputing Centre in Lugano, Switzerland.

"EPCC is very pleased to see Cray establishing this dedicated research lab," said Prof. Mark Parsons, Executive Director at the EPCC in Edinburgh. "We have engaged in a number of research collaborations with Cray over the past decade including the highly successful CRESTA Exascale software project."

www.cray.com

Bristol bids to be top European smart city...

Bristol is bidding to become the UK's first smart city demonstrator, alongside a European project in collaboration with two other key cities. Winning the £10m UK bid, which will be decided in November, would make Bristol a key global smart city demonstrator.

The purpose of the demonstrator city is to show how the Internet of Things (IoT) can be implemented on a large scale by using everyday objects that are connected to a network. One of the key aims of the Bristol project is to show how the data this captures can benefit the people in the city by helping to improve the environment as well as services such as transport and healthcare.

Bristol is Open (BIO) is at the heart of the bid, working with global partners such as NEC, General Electric, Ernst & Young and Atkins Global, as well as smaller companies Imtech UK, Esoterix Systems, data aggregation company Zipabout.

The bid comes as Bristol starts to roll out a €25 million Horizon 2020 European project create integrated smart city solutions to tackle traffic congestion, poor air quality and unsustainable energy use. Working with San Sebastián and Florence, the project will primarily focus on East Bristol.

The REPLICATE (REnaissance of PLaces with Innovative Citizenship And TEchnologies) consortium saw the highest score of all the entries for its innovative proposal to integrate energy,

transport and ICT at scale in the City and will include academics from both the University of Bristol (UoB) and the University of the West of England (UWE) will be involved in the project research and evaluation work. Dr Mike Yearworth in the Faculty of Engineering is leading the University of Bristol's collaboration and the strategic planning and business modelling work for the overall project, while Professor Dimitra Simeonidou, Head of the [High Performance Networks](#) (HPN) Group in the University of Bristol's Faculty of Engineering and Bristol Is Open's Chief Technology Officer is developing the Smart City Platform concept.

The details of the REPLICATE bid will be confirmed in the coming months with the outcome of the IoT bid by the end of November 2015.

... as Bristol is Open goes global...

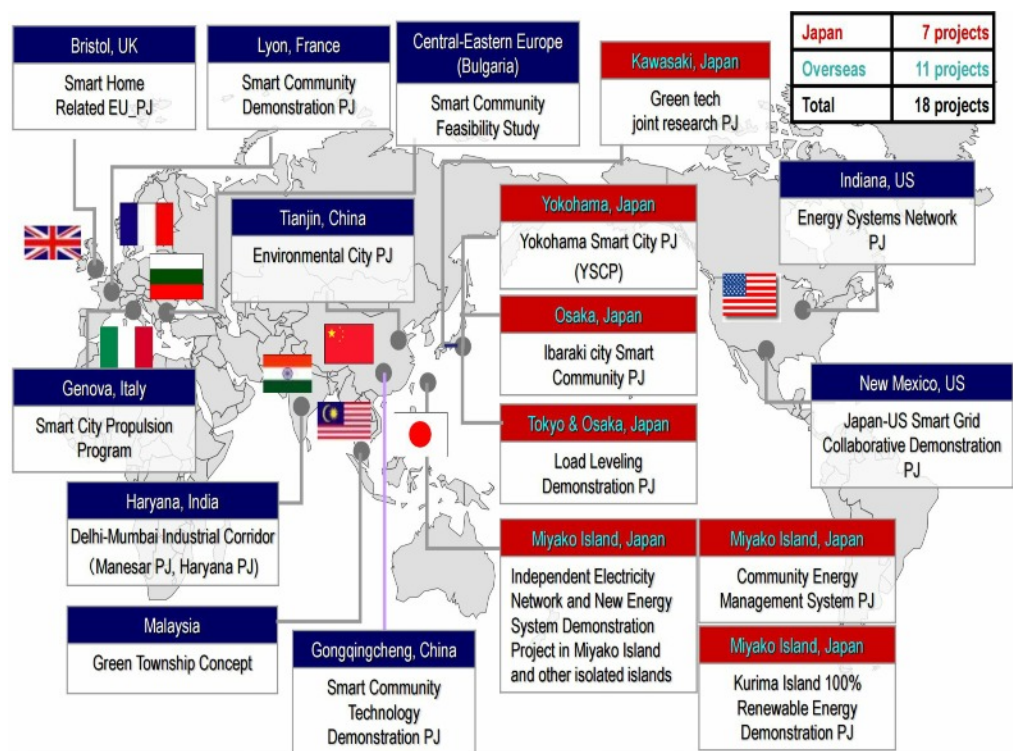
Bristol is Open has been presenting at events in China, South America and India to share ideas around what future cities may look like. All three countries have a high proportion of inhabitants in cities and urban areas and Bristol Is Open sees opportunities in all three regions for using technology to make cities more efficient and responsive to people's needs.

"It was the perfect time for Bristol to visit India to present our experience of developing a smart and sustainable city," said Stephen Hilton, Director of the Futures Group at Bristol City Council. "The Indian Government has issued a [£5bn] City Challenge that will result in 100 Indian Smart Cities being created – the first 20 being identified before the end of this year. A number of businesses have been in touch who are keen to explore how Bristol can enter into future collaboration on the India smart cities programme. There is huge potential for Bristol Is Open and for Bristol's businesses."

The HPN group at the University of Bristol has also spun out the core operating system, NetOS, into a separate company, Zeeta Networks. This is now looking at the commercial opportunities for the technology around the world.

.... and Tokyo rolls out IoT with Bristol tech

The wireless technology behind the roll out of the Internet of Things (IoT) in Japan was developed at the Toshiba Telecommunications Research Lab in Bristol.



The wireless links for 27m smart meters rolled out across Tokyo by Toshiba subsidiary Landis+Gyr. This was also part of the development of the Wi-SUN Alliance, a set of IPv6-based technologies that bridge many interoperability gaps that exist today between wireless mesh, powerline carrier (PLC) and home area network (HAN) technologies. The Wi-Sun specification is also used by Silver Springs for its data network across Bristol's lampposts that is part of Bristol is Open.

Bristol operating system heads into the data centre

With all the major apps such as Facebook, Twitter and Snapchat hosted in the cloud, the infrastructure of the data centre is a key growth area.

Bristol-based software developer WITTENSTEIN high integrity systems (WHIS) has launched a new operating system that allows system builders to develop new functions quickly and efficiently on the Intel servers that dominate the data centre market.

OpenRTOS IE is a powerful, small footprint real time operating system (RTOS) and driver solution for the Intel Innovation Engine (IE), which Intel announced earlier this year. IE is a small Intel architecture processor and I/O sub-system embedded into Intel's next generations of servers. This can be used for server, storage and networking applications such as a lightweight BMC for basic manageability and so reduce overall system cost, or to improve server performance by offloading subroutines to the IE.

OpenRTOS is the smallest RTOS option enabled for the Intel IE, with the RTOS requiring less than 10Kbytes and the entire RTOS and IE driver solution less than 100Kbytes, maximizing the amount of memory available for the system builder's application code. Building on the OpenRTOS, the world's most popular RTOS, OpenRTOS IE offers a trusted foundation for system builders to quickly and efficiently build their applications on. There is an easy to use API, comprehensive documentation, and a working 'out of the box' demonstration application, all designed to help development engineers gain a better understanding of Intel IE. This allows creation of effective, robust designs in a short time period with minimum IE memory usage.

"Supporting Intel with their latest technology in the server sector is a new and exciting market for us. Previously we have seen great success in the embedded systems RTOS market, where we have a leading role and a specialization in supplying safety pre-certified RTOS's for use in mission critical Medical and Industrial products," said Andrew Longhurst, Business Development Manager for WHIS. "Bringing our years of commercial embedded systems RTOS experience of lean, responsive and minimum resource usage to Intel's Server IE platforms, supported by a straight forward approach to licensing and pricing has been a major objective for us."

www.highintegritysystems.co.uk

Ultrahaptics signs Jaguar Land Rover deal

Bristol startup Ultrahaptics has signed a research deal with car maker Jaguar Land Rover for its ultrasonic sensing technology. Jaguar will use Ultrahaptics' technology as part of its investigation into a mid-air touch system for its Predictive Infotainment Screen.

The technology can track the driver's hand and allow them to control, and get feedback from, virtual buttons and switches in mid air. Using the Ultrahaptics solution, the driver's hand can be located and tracked as it moves across the interactive field; the system locks on and creates a physical sensation to indicate connection. The user can feel virtual objects and control switches and buttons, giving the ability to control them in mid-air and receive feedback to confirm their action has been successfully completed.

"We are enormously proud to have been chosen to support this safety critical technology program. Our innovation will be truly disruptive to the way we interface with the technology within our vehicles," said Steve Cliffe, CEO of Ultrahaptics.

www.ultrahaptics.com

Technation 2016 survey seeks contributions

London-based Technation is running a survey to determine the state of the tech industry in the UK, with a rather limited focus on developers and cloud computing, but its still an important source of information for policy makers and needs input from the wider tech community.

The survey is at bit.ly/1isocZO

Bath opens advanced emissions testing lab

With exquisite timing, the University of Bath has opened its state-of-the-art centre for emissions testing of vehicles.

With Volkswagen struggling with the after effects of the 'cheat software' used to modify tests, the £2.4m Centre for Low Emission Vehicle Research (CLEVeR) features a state of the art Chassis Dynamometer. Commonly known as a rolling road, the dynamometer bridges the gap between the lab and the real world by allowing vehicles to be analysed in a series of real-world driving conditions, but within a precisely controlled laboratory environment, and will be at the centre of a UK centre of excellence in low carbon vehicle research.

In addition to the four wheel drive dynamometer, the facility is able to analyse vehicle performance at a range of temperatures (from -10°C through to +50°C), vary the humidity of the driving conditions, and carry out state-of-the-art emission measurements, ensuring that the emissions from cars out on the open road are not different to those established by traditional laboratory analysis.

The facility will also conduct analysis using a robotic driver which can be programmed to perform a range of driving styles to reflect everyday varying driver behaviour which can significantly affect the fuel efficiency and emissions of vehicles. Hybrid vehicles can also be examined using the dynamometer, with two power supply racks for battery emulation, giving faster analysis with highly repeatable results in a safe environment.

CLEVeR is the flagship facility within the University's Powertrain & Vehicle Research Centre (PVRC), one of the leading UK university groups in this field, with collaborations that include Jaguar Land Rover, Ford, AshWoods and Lotus.

The facility includes a robot driver that can simulate different driver behaviours. "This unique new facility will open avenues of automotive research that were not previously possible," said Professor Gary Hawley, lead investigator for CLEVeR and Dean of the University of Bath's Faculty of Engineering & Design. "We have established a platform where fundamental academic research can be undertaken alongside applied industry investigations in a world-class environment. CLEVeR will address many of the future research challenges associated with current and future low and ultra-low carbon vehicles under real world driving conditions."

Magnetised gold can boost electronics

A team of researchers including physicists at the University of Bath have magnetised gold in a process that could lead to a new generation of electronics and make computers faster, smaller and more powerful.



Under certain conditions a layer of gold can become magnetic from charge carriers flowing out of a superconductor into the metal, and the ability to generate and to manipulate magnetic currents in this way has the potential for applications in new types of electronic devices in future.

Researchers in Professor Simon Bending's group in the Department of Physics have been using a unique low temperature scanning probe microscope to systematically study magnetisation reversal in these superconducting spin-valve samples. "This is a really ground-breaking piece of research whose long-term goal is to marry the fields of spintronics and superconductivity," said

Professor Bending, Head of the Department of Physics at the University of Bath.

"We believe that for the first time we have observed spin accumulation arising from a current of spin-carrying pairs of superconducting electrons that can be controlled by manipulating the

magnetisation direction in a ferromagnetic control electrode. This is the first step to realising superconducting spintronic devices that operate without generating heat and could be the basis for entirely new types of computers that are faster, smaller and more powerful than before."

The experiments involved a large team of collaborators led by Professor Steve Lee of the University of St Andrews, including the University of Bath, the University of Leeds, Royal Holloway and Bedford College (University of London), the ISIS Facility and the Paul Scherrer Institute in Switzerland.

Published in [Nature Physics](#)

Bristol looks at the future of wireless with 5G-XHaul European wireless project...

Bristol researchers are at the heart of an ambitious pan-European project to evaluate the infrastructure for the next generation of communications networks and services. The X-Haul project includes Blu Wireless Technology, Bristol is Open and the University of Bristol alongside companies, research institutes and universities from four European countries.

One key focus of the £5m Horizon2020-funded project will be on establishing dynamically adaptive communication for transport hubs including railway stations and airports and at major events.

The findings of the project will be used to determine new technology and services across Europe, and it is being co-ordinated by [Innovations for High Performance Microelectronics](#) (IHP) in Frankfurt, Germany. The project is using a combination of optical and wireless technologies to support small wireless cells that can deliver high speed broadband connections to 5G mobile phones. It allows the dynamic allocation of network resources to predicted and actual hotspots to ensure everyone gets a high speed link.

Field trials are already underway with [Bristol is Open](#) and Blue Wireless Technology. "5G-XHaul is an exciting collaboration set up to establish the ways that networks of the future will operate. For Bristol is Open, Blu Wireless is deploying its mm wave technology to extend the fibre network.

Millimetre wave wireless technology will form a key aspect of 5G and we are very pleased to be involved with this important project," said Mark Barrett, CMO of Blu Wireless Technology.

Other partners in the project include Huawei, Telefonica I+D, i2CAT, ADVA Optical Networking, COSMOTE, Airrays, TES Electronic Solutions, TU Dresden and the University of Thessalias.

... with £500,000 Anite wireless tester deal...

The University of Bristol's 5G research has been given a boost with a £540,000 grant to upgrade its wireless channel emulation facility.

The [Communication Systems and Networks](#) (CSN) Group now has a pair of [channel emulators](#) from Anite and duplexing filters to enhance its test and measurement equipment in the laboratory. This new hardware can be rapidly configured to support up to 16 independent streams with a bandwidth of 160MHz for testing the latest WiFi and long-term evolution (LTE) 4G technologies. This can also be used for testing and optimising antenna array and beamforming techniques for millimetre wave wireless access technologies.

"Anite's Prosim F8 channel emulators with enhanced bandwidth capability will open a new avenue in our 5G research projects, such as mmMAGIC and 5G-XHaul, part of the Horizon 2020 programme, as well as collaborative projects with industry," said [Professor Andrew Nix](#), Dean of the [Faculty of Engineering](#) and who leads the CSN Group at Bristol.

Researchers from the universities of [Southampton](#), [Sheffield](#) and [Heriot Watt](#), industrial collaborators including engineers from [BluWireless](#), [Jaguar LandRover](#) and [Toshiba](#) have also been involved in training on the new equipment at the University.

... as Blu Wireless joins 5G research lab....

Bristol has continued to build on its expertise in wireless technology through the University and Blue Wireless Technology (BWT).

BWT has joined the 5G centre of excellence at Surrey University that opened last month to integrate its 'Lightning' millimetre wave gigabit modems within the 5G mobile testbed.

The 5G Innovation Centre (5GIC) is the UK's only research centre dedicated to the next generation of mobile communications and provides businesses and researchers with a fully-functioning advanced 4G network in Guildford which, over time, will be upgraded to a fully-fledged 5G system. This will boost the development and testing of 5G prototype technologies in a real world situation, and Blu Wireless will also assist with general technical collaboration on requirements and technology for advanced baseband modems for the 5G millimeter-wave modem.

"The 5GIC is a global centre of research into next generation wireless networks and we are delighted to be a part of it. Our technology will enable 5G infrastructure and access applications such as radio transport over Back Haul and Front Haul networks and will help to drive the research that will underpin the 5G standards of the future," said Mark Barrett, chief marketing officer at Blu Wireless.

... and moves into new headquarters

Blu Wireless has outgrown its base for the last four years at the EngineShed and moved into new headquarters at Temple Way.

The Evening Post building was the home of the eponymous local Bristol paper. The building won praise when it opened in 1974 for its solid elegance. "The move was necessary in order to find additional space to house our expanding team and is another step forward in our company growth," said Blu Wireless CMO Mark Barrett. "As Blu Wireless works to develop the wireless networks of the future and develop the standards of 5G we hope this building will continue to generate news."

www.bluwirelesstechnology.com

Fhoss takes wearable lighting into analytics

Standard fluorescent jackets have become compulsory workwear for millions of people around the world, but the traditional designs haven't improved since the 1960s. Fhoss in Weston-super-Mare has updated the market with patented, battery powered, self-reflective technology that has recently been adopted by National Rail, Balfour Beatty, Transport for London and Gatwick Airport.

Conventional hi-vis clothing suffers reduced visibility in wet conditions and is completely ineffective in the dark, when no external light can be reflected. By embedding battery-backed LED strips into the clothing, staff can be significantly more visible. But having a battery available opens up the opportunity for sensor analytics and geolocation.

The North Somerset business recently earned Frost & Sullivan's 2015 New Product Innovation Award. The judging panel commented: "With such an innovative design ensuring superior performance under varied conditions, Fhoss Technology simply outperforms its peers in the market." The research also found staff using Fhoss products felt much safer, remaining visible for over 1.5 miles, whilst vehicles approaching worksites were said to slow down much sooner.

This caught the eye of Towergate Insurance, who now offer customers lower premiums if equipping their workforce with the Fhoss technology.

Fhoss now plan to use additional emerging technologies to become a major force in the world of wearable tech with the integration of analytical data capture, for health and visual monitoring, plus geo-location tracking which will allow for real-time reporting and statistical evaluation.

www.fhoss.com

Boxarr tackles technology supply chain risks

Bristol-based Plexus Planning has relaunched as BOXARR, providing a software tool to efficiently solve the challenges of Interdependent Systems Management (ISM).

The latest version of Boxarr can handle over 1m separate factors with simple-to-construct BOXes and ARRows networks, allowing the construction and analysis of these boxes and arrows networks at truly massive scale and with powerful analytical tools and providing valuable insights into the most complex of business and engineering challenges. This is used to model and analyse the most complex networks of interdependency that are common in systems engineering, supply-chains and process & project schedules, particularly in aerospace and defence developments.

BOXARR uniquely enables the easy identification of critical dependencies and interactions to mitigate risks, optimize resources and evaluate alternative sources. This helps to avoid the enormous cost and timescale overruns typical of large, complex projects by achieving the optimum trade-off between requirements, cost, timescale and risk.

“Our new name gives a clear indication of the nature of our solutions, which will improve our market differentiation as we expand both geographically, and functionally, into related sectors of the aerospace and defence markets,” said Alasdair Pettigrew, Chief Executive.

Release 5.3 includes more ways to analyse the complexities of ISM by connecting data generated by its automated scheduling functions (fields like start dates, end dates, total costs, slack values) to be processed with user-customizable functions. This makes it easy to apply BOXARR in areas like earned value management (EVM), flow time analysis, critical chain analysis, as well as linking types of analyses in ways that aren't possible in any other tool, as well as providing improvements in the performance of the browser-based viewer (now known as BOXARR Insight).

“BOXARR continues to grow rapidly in capability, as we introduce new features to address the needs of our clients who wish to solve a wider range of ISM requirements. As a result, BOXARR has become the only solution that really works for vastly complex aerospace and defence projects,” said Pettigrew.

www.boxarr.com

Startup crowdsources ‘world’s fastest computer’

YellowDog, which crowd sources processing cycles for animators from across the Internet, has started its beta programme after raising over £200,000 from crowd funding site Seedrs.

The startup, based at the EngineShed, allows animators to use the processors of PCs and laptops attached to the Internet to render complex graphics. It charges by the second (at £1 per hour) for the equivalent processing power of two servers, and users can increase or decrease the cost depending on the urgency of the rendering.

“We believe this has the potential to create the world’s fastest super-computer,” said co-founder and CEO Gareth Williams “There are 8.8 million people in the UK between the ages 24 and 35; there are 2.3 million students in higher education, 89% have laptops. If we joined together all these laptops we would create the fastest supercomputer the world has ever seen, over four times the current fastest. That’s enough processing power to render a film like Toy Story in 1 minute 12 seconds.”

The owners of the machines are paid for the time their CPUs are used. “A computer that is less than two years old and is used eight hours a day would earn £5 a week,” he said.

YellowDog’s other co-founder, Simon Ponsford, started Bath-based Cranberry Computers which developed the world’s lowest power PC. The company is one of the finalists in the Pitch@Palace competition (page 9)

www.yellowdog.co

Bristol start-ups win chance to take technology to St James's Palace

Three innovative tech start-ups from the West will be showcasing their businesses at St James's Palace in London as part of Pitch@Palace.

Wriggle, YellowDog and Altitude Technology have won the opportunity to attend the Pitch@Palace Bootcamp in London this week, presenting to a panel of judges. The judges will then select the companies who present at Pitch@Palace 4.0 at St James's Palace in November.

This year's event is focusing on the Internet of Things and Smart Cities areas of technology. Potential outcomes from attending Pitch@Palace 4.0 in London include investment offers, promotion opportunities and new customers or partners.

"Bristol and the South West is a very innovative region," said the Duke of York. "Through our relationship with SETsquared, which has been developed over a number of years, we have been able to work with some truly cutting edge internet-of-things and smart cities companies at the South West Pitch on Tour event. That's what the Pitch@Palace initiative is all about, bridging the chasm between start-up ventures and decision makers to help them move forward."

The programme visited the region on tour in September. "Pitch@Palace On Tour is a fantastic opportunity for entrepreneurs developing products and services for the Internet of Things and Smart Cities fields and it was wonderful to see so many SETsquared member companies take part in the Roadshow event," said Simon Bond, innovation director for SETsquared. "Holding the selection event in the region meant we had an excellent chance of showing off developments from Southern England in front of the 'A' list of investors, movers and shakers. We're very proud of Wriggle, YellowDog – both from Bristol & Bath SETsquared Centres - and Altitude Tech – from the Bristol Robotics Laboratory at the University of the West of England - for getting through to Bootcamp and wish them every success at this next stage."

As well as the chance to attend Bootcamp and the final event at St James's Palace there were other prizes up for grabs for entrepreneurs at the event, including free legal advice for start-ups offered by Bond Dickinson and free marketing and PR consultancy offered by Publitek.

The Roadshow event in Bristol was one of three regional rounds held across the UK. The city was chosen as a destination due to its status as the country's only fast-growing, globally significant tech cluster.

The Bootcamp stage of Pitch@Palace will take place in London on 14 October. Each participant will attend Pitch@Palace 4.0 at St James's Palace on 2 November, with selected entrepreneurs given the chance to pitch to an audience of around 300 CEOs, angels, mentors and key business partners.

www.pitchatpalace.com

BRL opens robotic assisted living centre

Bristol Robotics Laboratory (BRL) has launched the Anchor Robotics Personalised Assisted Living (ARPAL) facility to enable robotics researchers, elderly people with assistive needs and those supporting them to work together to devise and test new robotic technologies in the home.

ARPAL is sponsored by The Anchor Society, a charity that supports the elderly, frail and isolated in Bristol and the neighbouring regions and provides a 'Living Lab' that resembles a typical single level home comprising an open-plan living, dining and kitchen area and a bathroom and bedroom with a network of wireless sensors linked to a Smart Home Controller Hub, Wi-Fi cameras and an ADSL connection using technology from Bristol startup ContinuumBridge. The BRL researchers are using the data generated from the sensors to detect patterns of activity in the house to build adaptable algorithms. The algorithms will be used to record individual habits to devise personalised robotic systems especially adapted to each person's lifestyle to support independent living.

www.brl.ac.uk

Quantum Centre students visit D-Wave...

The ten post-graduate students in the Centre for Doctoral Training (CDT) in Quantum Technology are to visit D-Wave in the US at the end of this month. The company, a partner in the Centre, recently shipped its latest quantum computer with 1000 qubits to NASA's Ames laboratory, and maintains that it can scale its technology to larger numbers of qubits with the same cooling technology that brings the temperature down close to absolute zero.

The photonic quantum technology being developed at Bristol's Centre for Quantum Photonics (see below) only requires the sensors to be cooled, providing a different tradeoff in power consumption.

"Quantum computers based on photonics have much less of a requirement for cooling since the photonic circuits operate at room temperature - currently only the detectors need to be cooled," said the Centre. "Having one part of the system cooled and one part at room temperature present its own unique challenges, but this is one of the things we're working to address here at CQP."

... as programmable photonics chip boosts quantum experiments ...

Researchers at Bristol's CQP have developed a programmable photonics chip that represents a step change for experiments with photons, and what the future looks like for quantum technologies.

A major barrier in testing new theories for quantum science and quantum computing is the time and resources needed to build new experiments, which are typically extremely demanding due to the notoriously fragile nature of quantum systems.

"A whole field of research has essentially been put onto a single optical chip that is easily controlled," said Dr Anthony Laing, who led the project. "The implications of the work go beyond the huge resource savings. Now anybody can run their own experiments with photons, much like they operate any other piece of software on a computer. They no longer need to convince a physicist to devote many months of their life to painstakingly build and conduct a new experiment."

Working with researchers from [Nippon Telegraph and Telephone \(NTT\)](#) in Japan, the team demonstrated the chip's unique capabilities by re-programming it to rapidly perform a number of different experiments, each of which would previously have taken many months to build.

Bristol PhD student Jacques Carolan, one of the researchers, added: "Once we wrote the code for each circuit, it took seconds to re-programme the chip, and milliseconds for the chip to switch to the new experiment. We carried out a year's worth of experiments in a matter of hours. What we're really excited about is using these chips to discover new science that we haven't even thought of yet."

As highlighted in the last Sector newsletter, this is "Over the last decade, we have established an ecosystem for photonic quantum technologies, allowing the best minds in quantum information science to hook up with established research and engineering expertise in the telecommunications industry. It's a model that we need to encourage if we are to realise our vision for a quantum computer," said Professor Jeremy O'Brien, Director of the [CQP](#).

['Universal Linear Optics'](#) by J Carolan et al in *Science*

... and Quantum Engineering Centre teams with Oxford Instruments

Equipment maker Oxford Instruments, which has a major Plasma Technology site at Yatton in Bristol, is to supply three doctoral training centres at the University, including the Centre for Doctoral Training in Quantum Engineering.

The strategic relationship with the School of Physics at the University of Bristol makes Oxford Instruments a training partner and collaborator for the Bristol Centre for Functional Nanomaterials, the Centre for Doctoral Training in Condensed Matter Physics and the Centre for Quantum Engineering.

Oxford Instruments has identified these areas as being essential in the development of new cutting edge commercial technology. A unique part of the agreement allows all three CDTs to engage with Oxford Instruments in idea generating workshops for the co-development of integrated research programmes.

“Providing tools for exploration and exploitation of Quantum Science and functional nanomaterials is a key element of the forward looking technology strategy for Oxford Instruments,” said Dr Michael Cuthbert, Managing Director at Oxford Instruments NanoScience. “Establishing partnerships with experts in the field and supporting the talent pipeline of future research and technology leaders, both as future customer and future employees, is an important underpinning activity for us as a nanotechnology business.”

www.oxfordinstruments.co.uk

Imagination rolls out complete Enigma connectivity IP from baseband to RF

Imagination Technologies has rolled out a complete set of connectivity designs from its Enigma development group in Chepstow. This includes Wi-Fi/Bluetooth software, media access control (MAC) layer, baseband, analogue front end (AFE) and RF with a range of flexible licensing and support models.

The Enigma radio communications processors (RPU) are supplied as complete communications solutions including certifications. In addition to licensing baseband IP, Imagination provides RF IP for customers who need it. Imagination already works with partner RF providers and customers' own in-house RF to provide a range of RF choices that work with Enigma basebands. Customers who don't already have RF capability can license Enigma RF as hard IP blocks for SoC integration or standalone use. If needed, customers can also take advantage of Imagination's back-end productization, pre-certification, characterization, and test capabilities.

“Connectivity is increasingly moving on-chip – not only the baseband, but also in many cases the RF functionality,” said Chakra Parvathaneni, vice president of Enigma business operations at Imagination. “With Enigma, Imagination provides the world's most complete end-to-end connectivity IP solutions from RF to baseband, enabling customers to easily integrate a broad spectrum of communications capabilities into their SoC designs. Our Enigma RPU – including the high-performance Explorer family and low-power Whisper family – are already shipping in millions of units.”

“We used multiple Imagination IP cores in our highly integrated IoT processors. This includes the Enigma Explorer RPU that provides the high-speed Wi-Fi which is a hallmark of these processors. The fact that Imagination also offers RF made it easy for us to take these processors into production,” said Toshiya Matsui, general manager at Toshiba.

Imagination is also working with Synopsys so that its DesignWare Bluetooth Smart IP supports the latest Bluetooth low energy standard and operates down to one volt supply, and on the Analogue Front-End IP to enable wireless device connectivity with low-power consumption.

Enigma connectivity IP is available for license as complete IP subsystems incorporating RF/AFE/baseband in different technology nodes. The first subsystems include the Enigma Whisper low-power Wi-Fi 802.11n 1×1 subsystem for applications such as wearable computing, health care, home control; the Enigma Whisper ultra-low power Bluetooth Smart and 802.15.4 subsystem for extremely low-power applications such as wearables and IoT sensors; and the Enigma Explorer high-performance Wi-Fi 802.11ac 2×2 MIMO subsystem for applications such as video streaming, Wi-Fi cameras and access points.

www.imgtec.com

Local coding with Digimakers and Bristol & Bath SIGs...



Digimaker <local> has been running over the summer at the Barton Hill community centre, and is now rolling out in Southmead. HBB runs coding workshops across Bristol using Raspberry Pi boards donated by RS Components. This is a version of the Digimaker scheme that runs four times a year at @Bristol that is backed by the University of Bristol and the British Computer Society. Digimaker <local> will support the workshops at sites across the two cities, and is always looking for mentors who can help out. CodeCblubs (below) will run alongside the Digimaker <local> scheme.

For info and to sign up, contact: Dr John Bradford, john@hbb.org.uk or Nick Flaherty at nick@swinnovation.co.uk

www.hbb.org.uk

.. and a local push for Code Clubs

Bristol's Code club is looking for volunteers to help with coding in schools.

Code Clubs are funded volunteer-led after school clubs to get children aged 9 - 11 excited about digital making and are free to host venues and children. The children learn to make animations, build websites and create computer games using Scratch, HTML/CSS and Python. By the time these children leave primary school they can express themselves by creating within the digital environment.

Code Club has been running for 3 years across the UK and there are 3,055 clubs running in primary schools and other public buildings such as libraries and community centres. Everything needed to run a Code Club is provided including learning materials, certificates and more. Across the South West there are currently around 300 clubs, and this is influencing the way coding is taught in schools in Bristol within the new primary curriculum:

At West Town Lane Primary School in Bristol, after running Code Club for a year, the management team decided to introduce the Code Club Scratch projects for all year 3 - 6 children. Since September the after-school Code Clubs were straight into HTML/CSS and Python projects. On the back of this success, the school has now also introduced Scratch Jr for children in years 1 and 2 using iPads, and bought a heap of technology including Lego WeDo and My Romo. We have a strong and growing community of volunteers, including supported volunteering from organisations such as Met Office in Exeter, JP Morgan in Bournemouth, Lloyds Banking Group in Bristol, GCHQ Cheltenham, DVLA in Swansea and many SME and micro-businesses within the technology sector. The commitment is normally one hour per week during school hours and you can buddy-up with another volunteer so, if work commitments get in the way, there is always someone to help out. In a school environment there will always be a teacher in the room as well. If you already have a connection with a primary school, such as being a school governor or a parent, we can help you register them as a Code Club host and link you to that venue, or maybe you would like to help run a Code Club or Digimakers <local> in your local library, community centre or church hall? This can also be done through the HBB skills SIG (above) with John Bradford.

Registering as a volunteer is a simple process through the Code Club website or contact Seemah at southwest@codeclub.org.uk or john@hbb.org.uk for more information.

EVENTS

First Bristech conference takes off...

The first Bristech developer conference takes place with week, with all sessions sold out and an array of speakers from around the region. The conference at @Bristol on the 15th October is unashamedly centred around developers and technology, with speakers from Softwire, Scott Logic, ClusterHQ and Chipless, with three separate strands on development techniques, Web/mobile development and languages and architectures. It comes as a result of the success of the popular developer meet up sessions in the region.

2015.bristech.ch

... as TEDxBristol returns

The Bristol version of the popular TED conference has returned this year, taking place on 11th November at the Colston Hall. Topics include innovation, digital media and robotics.

www.tedxbristol.com

Functional Safety in Hardware Verification

TVS in Bristol is working with Cadence Design Systems, Synopsys, NXP and Mentor Graphics to bring the DVClub Europe Conference to Bristol on 20th October 2015. The conference will focus on “Functional Safety in Hardware Verification”. You can attend physically (at UWE in Bristol, Cambridge, Grenoble and Sophia) or remotely.

The event includes papers on “Making your ISO 26262 Flow Flawless: Establishing Confidence in Verification Tools” from Nigel Elliot of Mentor Graphics, “Unified Safety and Functional Verification” from Adam Sherer of Cadence, “Safety, Requirements Engineering and Proof of Implementation” from Serrie-Justine Chapman of TVS and “Realizing Road Vehicle SoC Solutions Based on ISO26262” from Haridas Vilakathara of NXP Semiconductors.

[Registration](#)

Intelligent Testing Conference

The Autumn Intelligent Testing Conference returns in November, focusing on the tools, techniques, methods and ideas for improving software testing, whether improving test effectiveness or the efficiency of test processes. It also provides a forum for sharing testing challenges being faced by organisations as well as sharing testing improvements. They embrace software testing in its widest sense covering all forms of software verification, not just dynamic testing.

When: Thursday 19 November, 2015

Time: 12:00 – 17:00

Venue: UWE Conference Centre (University of the West of England), Frenchay, Bristol

[Registration](#)

Dismaland boost to the region's tech cluster

Over the summer, Weston-super-mare, and the South West became the focus of global attention. Rupert Baines draws some key lessons from the summer



The Dismaland exhibition by street artist Banksy captured the imagination of people around the world with 150,000 visitors.

Living in Bath, we *ummed* and *ahhed* about getting tickets, and eventually bought some on Ebay for more than the face value. And it was rubbish. No, actually – it was great, but I ought to keep with the ethos of the concept.

As someone who lives in the South West, works in Cambridge and commutes to the Bay Area, I get plenty of time to ponder the regional differences

and Dismaland did make me think about lessons for the tech sector.

One of these is about the sense of place. It took something like Dismaland to really put the town on the map, and highlights the importance of a ‘thing’ to visit. But I think you can talk about “place” more generally: you don’t need a single physical location, but you need a concept that there is something there. We talk about Silicon Valley as though it is a specific place but it’s a 40 mile stretch of motorway with half a dozen cities. It’s the same in Cambridge – things spun out of the Science Park, or ARM’s original barn, but people will see the Cambridge startup scene as though there were one building.

In contrast, the South West doesn’t quite have that “place”. I love David Meyer Robert’s aphorism that Bath is San Francisco to Bristol’s San Jose, because it tries to bring them together in a context rather than just two independent things.

The success of Dismaland also demonstrates the power of creativity to overcome negatives, making full use of Weston’s past to enhance its future. It’s about being visionary and not being afraid to try things.

There was no one individual in San Jose council that decided to make Silicon Valley a success, no one in Cambridge council that made Cambridge phenomenon a success, there was no one in the Weston council making the decision or making the plans – I heard there were only two people who knew and others were told it was for a Hollywood horror film with big stars so it had to be a secret.

The lesson is having a vision, commitment to it and being prepared to experiment.

But will the tech sector, and the South West’s tech cluster, look like Dismaland once the current tech bubble bursts? Ouch... (Oh, and there *is* a bubble)

I think this time, compared to the tech bubble in 2000, business is a lot less exposed. The bubble then was across the whole of the tech sector – it was Cisco and Nortel just as much as it was pets.com or boo.com. This time it’s largely the sharing, .com economy with late stage private companies. If someone like Dropbox goes POP, that doesn’t really matter to everyone else – it’s not going to bring the NASDAQ down and we haven’t got this huge buildout of infrastructure that happened last time. There’s more diversification and a lot less risk, which is a good thing.

In the spirit of Banksy’s wit and sarcasm I should say Dismaland was awful (it wasn’t).

But there are lessons. It shows the power of vision, creativity and commitment, and all of that applies just as much to the tech cluster we have here as well.

Rupert Baines is CEO of UltraSOC in Cambridge, having worked at Mindspeed and picoChip in Bath, as well as with companies on both coasts of the US. He is also a mentor at the Bath Innovation Centre.

University of Bristol breaks new ground with innovation degree courses

The strength of innovation and technology in the region has allowed the University of Bristol to launch a new kind of degree programme that merges traditional subjects with the opportunity to become an entrepreneur.

The [Bristol Innovation Programmes](#) have been designed after 30 per cent of its students said they planned to become entrepreneurs after leaving university. It is unique because it allows undergraduates to choose a core academic subject to study from eleven disciplines that range from anthropology and history to computer science, electronics and physics, while learning about how to innovate, develop and plan their own business venture from day one. This came from the experience of undergraduates from many subjects wanting computer science skills as part of their plans, says Prof David May at the Computer Science department.

As part of the programme students can create their own enterprise in the final year after immersive training in design, innovation and entrepreneurship.

This needed a new teaching and business hub to encourage students with different specialisms to work in trans-disciplinary teams alongside industry partners and builds on the existing links with industry through the [SETsquared](#) business incubation centre at the [Engine Shed](#), and the [Pervasive Media Studio](#) at Watershed. The new innovation courses also build on Bristol's reputation as a creative city with a fast growing number of technology start-ups.

"Building on the UK's immense strengths in design and innovation, we want to educate the generation who will create technology to enrich our lives in the future," said Dr Kirsten Cater, a Senior Lecturer in Computer Science at the University and one of the Programme's academic leaders. "We've created an environment where students from different backgrounds, with different expertise, can work in teams and across disciplines to create new ventures together. Much like Apple, the innovators of the 21st century will bring together art, design, science, engineering and enterprise to deliver new products, services and ways of working and living."

Applications for 2016/17 [Bristol Innovation Programmes](#) are now open for Anthropology, Computer Science, Electrical and Electronic Engineering, Film and Television, Geography, History, Management, Music, Physics, Psychology, and Theatre.

Geek Girls EGM seeks way forward

Geek Girls in Bristol is holding a ExtraOrdinary General meeting (EGM) at the EngineShed at Temple Meads at 7pm on Wed 15th October.

The group has been running since 2010 and is one of the most active GGD's in the south west, and is looking to build on the success so far. By building a bigger central support committee all with less responsibilities they aim to better serve the group as a whole. The group has highlighted other groups in Bristol such as Urbanistas, Women who code, Women in engineering, Women in technology, Women in Biz, Women outside the box, ladies that ux and grrrlgames, and wants to co-exist with these, possibly with a central 'Bristol Women in Tech Hub' to share info and initiatives across the groups. Codeclub for example (above) wants to get more women involved

[Meet up](#)

About the West of England Local Economic Partnership

The West of England Local Enterprise Partnership supports business growth and is working to attract new jobs to Bristol, Bath and Weston-super-Mare. The structure supports the LEP Board in making it happen, backed by multiple Sector Groups including the High Tech Sector which meets once a month. More information on the vertical and cross cutting sector groups is [here](#). For more information or to get involved join [the LinkedIn group](#) and sign up for the [High Tech Sector Newsletter at SW Innovation News](#) for news of events and Special Interest Groups

High Tech News is published by SW Innovation News (www.swinnovation.co.uk) for the High Tech Sector group of the West of England Local Economic Partnership. For custom newsletters for your company or events, please contact Nick Flaherty nick@swinnovation.co.uk