CONNECT

PEERING INTO THE DEEP THROUGH THE LENS OF PARTNERSHIP

ALSO IN THIS ISSUE

40 YEARS OF THE CHARLES SEALE-HAYNE LIBRARY
PIONEERING PATIENT ENGAGEMENT IN NURSING AND MIDWIFERY
FILMING SHARK DOCUMENTARIES FOR ITV
A message from our Vice-Chancellor

One of the important characteristics that underpin the work of universities is the way in which they apply their expertise to strengthen knowledge and the economy. Universities generate greater insight, new technologies, innovation and the people who can drive forward economic and cultural prosperity.

This edition’s lead story, which details how one of our marine scientists has worked with one of our alumni from photography to develop a new underwater camera system, is a powerful example of this: two experts in their field, collaborating across disciplinary boundaries to create affordable technology that will assist with mapping unexplored environments.

Universities are also engines for social change, and there are some powerful examples in this issue that demonstrate this. From creating a culture of patient engagement in GP surgeries, to providing educational and social opportunities for deprived children in South Africa; from championing sustainability within mining in Hong Kong, to leading internationally renowned research on technology-enhanced learning, we can take pride in the positive impact of our academic endeavour.

I hope you enjoy this edition and have a good summer.

Judith

Professor Judith Petts CBE
Vice-Chancellor
Fish hide among delicate corals and sponges down in the deep of the north-east Atlantic Ocean. Look close, and you can see urchins, anemones, and myriads of other creatures living among them.

That these pictures are among the first to be taken of the life colonising the seamounts in the Marine Protected Areas, some 300km or so west of Scotland, frames their scientific significance. But what makes this even more remarkable is the story behind the camera – how a Plymouth University photography graduate, working with a renowned marine biologist, designed and built a new system that could revolutionise working in the deep sea forever.

When Marcus Shirley graduated from his photography degree at Plymouth in 2009, he knew exactly what he was going to do next. Having originally rejected the chance to study engineering at Warwick, Marcus was keen to revisit his love of electronics and combine it with the photography skills he’d learned on his course.

“My brother taught me to solder at the age of nine, and by 14 I was flying gliders,” he says. “It seems natural in hindsight that I’d become interested in aerial photography, and while I was studying for my degree, I built a kite camera and was designing radio control systems.

“My brother taught me to solder at the age of nine, and by 14 I was flying gliders,” he says. “It seems natural in hindsight that I’d become interested in aerial photography, and while I was studying for my degree, I built a kite camera and was designing radio control systems.

“So when we were encouraged to look for work experience, I contacted a local aerial photography and filming company, Hovercam. I went for an interview and took along my kite-camera rig. They said ‘Forget about the work experience, what are you doing when you graduate?’ The answer was, of course, working full time for them.”
In an age before drones, Marcus worked with gas turbine-powered, radio-controlled mini helicopters, and spent much of his time in the company’s workshop. He was also asked to help out at a sister company that built electronic control systems for yacht manufacturers, and it was during this time that the idea of working in the marine sector began to take root.

“It’s always good to look at things from a different angle, and that is what aerial photography does,” Marcus says. “Underwater photography operates on similar principles – it’s a camera, a protective housing, and a joystick – just a different set of environmental challenges.”

In 2010, Marcus saw an advert for a taller day on remotely operated vehicles (ROVs) to be held at the Underwater Centre in Fort William, Scotland. He jumped on his motorbike, rode for an entire day, and took the course. When he returned to Plymouth, he searched the internet for local ROV companies, and found one, Hydrobotix, just 300 yards away from his house. He contacted the owner, and three weeks later he was working in the Caspian Sea.

“It was an incredible baptism – I was on my own and very much in at the deep end,” he says. “But over time, I became experienced in operating underwater vehicles, and have had the chance to work around the world, including on the Costa Concordia salvage operation.”

Dr Kerry Howell, Associate Professor in Marine Ecology, in the Faculty of Science and Engineering, has been investigating deep-sea environments in British territorial waters for more than 15 years. Her expertise in mapping and surveying, and finding hitherto undiscovered expanses of cold water coral, has played a crucial role in providing evidence to government bodies such as the Joint Nature Conservation Committee (JNCC).

“For a long time I have been interested in getting better quality pictures in my work,” Kerry says. “I have been using underwater cameras since 2005, but they were often atrocious. The issue is that if you want to identify animals, you need high definition video, but the cameras that produce that level of quality, cost £10,000 to £20,000 each and we didn’t have that kind of budget.”

Kerry met Marcus in 2011 through the Marine Institute after he did some filming on shipwrecks, using the University’s ROV, for a programme on Channel 5. By now, he had set up his own company, Mr ROV. With some funding provided by the institute, she asked if he might be able to build her an underwater camera that could assist her in her research. This he did, using a GoPro camera, a second-hand titanium housing, some control electronics, and an extra-large battery.

“We tested it on a cruise off Scotland using Marine Scotland’s vessel Scotia,” Kerry says. “We bolted it to a camera frame and put it into the water. The only issue was that part of the frame was in shot, so the light from the camera reflected off it, which caused motion blur. But we learned a great deal from that test.”

A better low-light sensor immediately improved the design, but then Kerry set Marcus a new challenge: could he build a system that would enable a scientist to view the pictures in real time at the surface? Oh, and do it on a budget of just £8,000?

His solution was ingenious.

“I designed the frame and sourced second-hand lights,” Marcus said. “But the question of how to relay pictures from the camera to the surface required a different philosophy. It required cabling.”

“Every research ship has a CTD (conductivity, temperature, depth) cable,” adds Kerry. “Our vision was to plug into that cable using a set of boxes procured from a specialist company. It was a low-cost but hugely innovative solution.”

The duo took the equipment to Belgium and hooked it up to a 2,000m cable on dry land, and it worked. Within four months – now, mid 2014 – Marcus had created a prototype of Deep Search 1, which he and Kerry took out on the Belgica research vessel to the Southwest Canyons, a Marine Protected Area off the UK. Again, it worked, and the DS1 secured some good imagery from depths of up to 800m.

“It was enough for Kerry to write a Grant Capital Equipment bid to the Natural Environment Research Council (NERC), which was duly granted. With funding of nearly £80,000 from NERC, Marcus replaced the camera in the DS1 with an HD CCTV camera with controllable shutter speed, Ethernet capabilities, a solid state sensor, and provided that platform to work with others. Very few universities have anything like this, and we’re already receiving enquiries.”

Marcus recently provided a guest lecture to current Plymouth photography students, trying to sum up the remarkable twists and turns of his career to-date: one that has taken him around the world and back, to altitude and the depths of the ocean, and through a number of high-profile institutions such as Sea Life, San Diego State University and the National Marine Aquarium.

“It was certainly interesting to sum up all I’ve done in 30 minutes,” he reflects. “What I tried to explain is that they need not solely think about careers in photography. Some of the jobs they will go on to do haven’t even been invented yet.”

How does the DS2 work?

Unlike more expensive autonomous and manually operated robots, or those cameras that rely on fragile fibre-optic cables, the DS2 plugs into a research vessel’s copper CTD cable and can then be lowered to depths of up to 5000m. It has various sensors on board, including a CTD and altimeter. The vehicle is ‘flown’ by an operator at the surface controlling the cable winch so that it doesn’t strike the seafloor. The camera records high-definition video, which is saved onto its solid state hard drive. It also feeds a standard-definition video signal back up the cable that can be viewed in real time, and once it breaks the surface, it can wirelessly send the HD video footage and sensor data to the operator.

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“It was certainly interesting to sum up all I’ve done in 30 minutes,” he reflects. “What I tried to explain is that they need not solely think about careers in photography. Some of the jobs they will go on to do haven’t even been invented yet.”
The institution’s original library was located inside the Link Building, but with the establishment of Plymouth Polytechnic in 1970, the need for a dedicated building became steadily more urgent. And in 1976, at a cost of £830,000, the first major campus capital development of the LRC and Students’ Union was completed, and opened by the Duke of Edinburgh. At that stage, the library housed 70,000 books, but as the polytechnic expanded to incorporate three other sites (Rolle, Seale-Hayne and Exeter), so that figure rose to 500,000.

For a much wider range of services such as large-format printing and print finishing services, the SUM-UP mathematics drop-in centre, and the open-access computing area.

“It seems funny to think that when we first mooted a 24/7 computer facility that would be unsupervised overnight, there were concerns that either the machines would be damaged, or someone would drive up with a lorry and take the lot,” says Kate. “But that has been the way of many of the changes we’ve made, and they’ve all worked!”

Those changes have often revolved around the ethos of ‘self-service’ – such as when, after much debate, the decision was taken in the mid-1980s to take the computer reference system used by staff and ‘turn it around’ to face the students so they could see for themselves whether the book they wanted was available or on loan. And then there was the scrapping of fines in 2013 (for all but a few exceptional instances), a change in approach that has subsequently been adopted by a number of other institutions.

Jane says: “Changes might not always be straightforward to implement, but having taken the chance, they’ve all worked. Call it a ‘what if’ or ‘can do’ approach, it’s been a consistent theme across the 40 years. The service has been innovative from the word ‘go.’”

Further evidence of that forward thinking, and the positioning of the library as a learning resource centre, came in 2011–12 when the team began to provide a staffed service 24 hours a day, 365 days a year – even Christmas Day – a change that is still one of the most positively commented upon aspects of university life in student surveys. And then there are the technological advancements that the library has accommodated, such as the innovative e-Textbooks project, or the integration of the library’s Primo catalogue into the Digital Learning Environment, enabling students to search for books, journals and electronic resources on the move.

Kate added: “It is ironic that, at a time when we’re celebrating 40 years of the building, one of the things we do is use our technology so that people do not have to step foot inside the library if they don’t want to. All of our books can be requested online, and where that book or journal or report is electronic, we can even deliver it to your tablet or phone, wherever you are.”

Plenty of people did step foot in the library, however, on 6 June for the 40th birthday celebrations. There were tours running all day, with some show-and-tell sessions including an introduction to the Special Collections, recent advancements such as e-textbooks, and the way the library supports research in the institution. And it wouldn’t have been a birthday without some cake.

Professor Pauline Kneale, Pro Vice-Chancellor for Teaching and Learning, paid tribute to the staff – and to Jane, who retires later this year – for their work. She said: “The library is an innovative learning space that has served the University very well over the years and has moved with – indeed ahead of – the times. And its popularity with students is testament to the way the staff support them: even through the night on Christmas Day they are here, which is remarkable.”

“Not so much a library... more a way of learning” proclaims the 1977-vintage pamphlet on the then newly opened Learning Resource Centre (LRC). Forty years on, it’s a marketing soundbite that has remained truer to the ethos of the facility than perhaps its author could ever have envisaged.

“It’s always absolutely packed,” says Jane Gosling, Head of Library and Digital Support, who’s been part of the fabric for 36 of those 40 years. “Even though students have their own laptops, you still find them using the computers here, and that is because this is ‘their office’. They might live 200 yards away in the Mary Newman Building, but this is where they like to work.”

“And it’s a social learning space – they can bring drinks and cold food, use their phones;” adds Kate Esmer, Information Services Coordinator. “That might seem a far cry from the rules of a traditional library, but we’ve made these changes because that is what students are telling us they want, not because it makes it any easier for us!”

“We ran the other libraries with the same ethos, and implemented the same technology – it was a huge operation,” says Jane. “We had a shuttle service to transfer books between the sites. When the campuses closed, we brought everything to Plymouth, building the extension while at the same time maintaining the service for students.”

That £7 million extension – formally opened in January 2005 – increased the library’s footprint by 60% and enabled it to make fundamental changes to the learning environment. There are now 350,000 books and an average daily footfall of 5,000 people (one million per year), who come to search for books, journals and electronic resources on the move.

A year in statistics

- 1,036,000 users
- 305,000 items borrowed
- 9,864 new books
- 6,005 inter-library loans
- 5,300 trolleys of books re-shelved

The average daily footfall of 5,000 people is remarkable.”
Since 1996, hundreds of graduates have embarked upon careers in nursing thanks to the degree courses at Plymouth University: uniforms pressed, ready to utilise newly learned skills for the good of their patients.

But in 2015, to reflect a change of emphasis across national health, the School of Nursing and Midwifery asked itself, and its students, the question, ‘How can we work with patients to help them get the most out of their care?’

The answers that they’ve come up with have been in tune with the national heartbeat – so much so that earlier this year, Health Education England Senior Policy Nurse, Ruth Auton, came to see for herself the work being done. So what’s different about this education strategy, and how did it come about?

“We’re pioneering an ethos of ‘patients as partners,’” says Kim Young, Adult Nursing Field Lead and Nurse Lecturer, who has the responsibility for developing and implementing wider patient engagement initiatives. “That means providing nurses with the people skills that will serve them in good stead when they start their career in a clinical care setting. It supplements the existing activities that student nurses currently engage in during their clinical placement periods, and has the potential to make an important contribution to our local communities.”

The key development has been to link nursing students to patient participation groups (PPGs) based in GP practices. In collaboration with the Development Director at the Patients Association, Heather Eardley, the University launched a pilot project in the spring of 2015 involving 23 PPGs across the South West. Over a three-month period, nursing students attended meetings within their community to identify issues and suggest and create solutions, such as social and printed media campaigns, and communication sessions to raise awareness on key issues.

The project has not only benefited the community, through improving access to health services and better representation of hard-to-reach groups, but the wider patient engagement opportunities have also helped to enhance the students’ clinical placements. Student nurses now receive written feedback from patients, carers and service users on the care they provide on placements, helping them to fine-tune and perfect their practice.

Student nurse Megan Betts was partnered with a GP surgery in Falmouth, and during that time she created new resources such as a patient questionnaire. She said: “I was able to go into the GP surgery and brainstorm with the patient participation group. It was a totally new approach, both for them and for us as nursing students. In the case of this GP surgery, they really struggle to get young mums in to see them, so I helped to improve some of the baby vaccination information, such as leaflets with details on meningitis B. In the longer term, there are other issues the course could help with, such as working with young adults on sexual health and sun protection in the summer.”

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Zoe Young became a student representative in not one but two PPGs, one of which was her own GP surgery, and she’s keen to see the partnership continue post-graduation. She said: “Having seen the difference it can make, I’m going to continue to work with the PPGs after I qualify as a nurse this year.”

To support the students’ ‘out in the field’, a specialist tag on Twitter @ FUNCTION (Plymouth University Nursing Cohort 2014) was set up by Ray Jones, Professor of Health Informatics, enabling them to exchange ideas and best practice. Ray has since published a paper on the effectiveness of Twitter as an assessed module for first-year student nurses, and has been interviewed about his positive findings by national publications including Nursing Standard.

This wider patient engagement programme was deemed to have made such a difference that it was extended to the 2015–16 intake of students, and with the Nursing and Midwifery Council revising its nursing education standards next year, it could be replicated in higher education institutions across the country. Plymouth nursing students now undertake specific educational activities with a national patient representation group to learn how concerns and feedback are responded to by healthcare organisations.

James Munro, Chief Executive of Patient Opinion, said: “Over the past 10 years, patient experience has come to be seen as one of the three quality pillars of modern healthcare, alongside safety and effectiveness. And so, increasingly, the education and training of healthcare professionals is emphasising not only anatomy and physiology, but also experience, communication and culture. Plymouth University has introduced Patient Opinion into the undergraduate nursing curriculum, and students are encouraged to engage strongly with social media and be actively involved with patient participation initiatives across the South West.”

Staff and students from Plymouth University will be working alongside Patient Opinion to present their engagement work at the Royal College of Nursing Centenary Conference in November, where they hope to inspire more national health providers.

“This project demonstrates how we’re taking on board government directives and ensuring that nurses are equipped to carry out their clinical role,” adds Kim. “But it is also about ensuring that they are able to communicate with patients, advocate for and support them, and make important decisions on their behalf.”
ON BOARD WITH ITV AND BRITAIN'S SHARKS

Where are the sharks?

That was the question repeatedly going through the mind of Dr Nick Higgs as he sat on board the vessel at the centre of one of the most innovative British marine research projects in recent memory.

With a nine-metre whale carcass in tow, and a television crew with two celebrity presenters on board, the only thing missing from ITV’s new documentary, Britain’s Sharks, was the guests of honour.

“It was a nervous time,” says Nick, a post-doctoral research fellow and Deputy Director of the Marine Institute, reflecting on the first two days of the shoot. “The whole time we were sitting there, the directors were saying, ‘Don’t worry, we’ll make something of this regardless.’ And that’s part of the attraction of science – you can’t guarantee results – but it’s not necessarily good for television.”

As anyone who watched the final documentary over the Easter holiday, Britain’s Sharks was ultimately a resounding success in capturing on film for the very first time how Britain’s Sharks: Easter Holiday, where the guests of honour.

Nick joined the University in January 2013, not long after completing a PhD at the University of Leeds and the Natural History Museum, and the opportunity to be part of the documentary came his way via his former supervisor in London.

“These types of programmes have been done in Japan, the US and Sweden, but not in British waters,” Nick says. “We’d spoken to several producers in the past who were interested in doing something similar, and so it was in 2014 that I received a call from Big Wave TV.”

Big Wave TV, which has a track record of filming nature documentaries, was offering to take care of all of the logistics, including the freezing of the animal, and had already developed links with whale stranding groups. They had also obtained agreement-in-principle from the ‘Receiver of Wrecks’ at the Natural History Museum, an historic position with authority vested in it to oversee the Crown’s interest in certain maritime affairs.

“Whales are classed as ‘Fishes Royal’, like sturgeon,” Nick says, “so technically they are owned by HM The Queen!”

With a filming window of summer 2014 identified to meet the schedules of Ben Fogle and Ellie Harrison, the wait began for a whale to wash up that was suitable for the experiment – neither too large nor too small, and sufficiently intact. But despite an average of seven whales being washed up every year, the rest of the year would yield nothing. It was not until July 2015, when a nine-metre humpback whale died after becoming entangled in fishing gear in Scottish waters, that the programme-makers were able to give the green light.

At the end of August, Nick boarded the research vessel at Yelland Quay, near Bideford, and the crew set off, towing the whale behind them. They got to Lundy the next day and were forced to stay there due to the bad weather. And it was at this moment that a very different story hit the media.

Nick recalls: “The newspapers started to report that we were baiting for great white sharks, and there were discussions around whether that was irresponsible. So Ben Fogle had to do satellite interviews with ITV breakfast shows, which in a way worked to our advantage because we were able to convey the message that this was a scientific study. And the reality at that time was that we were still in inshore waters and we were not seeing any scavengers at all.”

The following day, the team reached the Celtic Deep, 35 miles off the coast of Cornwall, and that was when the blue sharks began to show up. In total, the team estimate that over the course of the next four days, 200 sharks consumed 15% of the whale, ingesting some two million calories.

“An external company paid for it, undertook all of the logistical work, documented it, provided facilities, and were quite happy for us to do scientific testing as well.”

With a storm fast approaching, the crew had to sink the whale into the deeps, and it came to rest 86m down, with a camera for company. When Nick revisited the site six months later, he was amazed by what he found.

“The whale had been completely skeletonised,” he says. “After one month there was essentially a large hole in the side of the carcass, but five months later it was just bones – six tonnes of whale eaten.”

Nick is now studying the footage taken from the cameras, both of the sharks at the surface and the crabs that picked at the corpse below. An academic paper, written with fellow consultant on the documentary, Richard Pierce, of the Shark Trust, will follow.

“Well, it deserves to be recorded that we were able to secure funding for a scientific project through television,” Nick adds. “An external company paid for it, undertook all of the logistical work, documented it, provided facilities, and were quite happy for us to do scientific testing as well.”
KATIE BRADLEY: a sporting and fighting scholar

So says British student taekwondo champion Katie Bradley, who, at five foot one and only 49kg in weight, has clearly followed her own mantra.

Coming to the end of a successful first year as a mechanical engineering student and Sporting Scholar at the University, Katie has balanced her studies with competing at the highest level in her discipline. And with the 2020 Olympics firmly in her sights, the busy schedule doesn’t look like stopping anytime soon.

“I’ve got a number of ranking events taking place over the summer,” she says. “And I’ve managed to qualify for the European University Games in Croatia in July, so I can’t wait to represent Plymouth there. It’s been a very busy year, my first as a senior, but I love the challenge and I’m really grateful to the University for supporting me along the way.”

Having attended her first taekwondo class at the age of six, Katie could have had little idea of how far she would progress. Joining on her dad’s advice to help boost her confidence and to overcome bullying, she quickly fell in love with the sport and, after years of hard practice and ascension through the junior ranks, she is now representing Great Britain’s under-21s.

“It was very lucky to have the support of my dad, and taekwondo has pretty much become my life!” she says.

But, despite becoming British National Champion, a World Championship bronze medallist and Commonwealth Champion as a junior, Katie says it was always important to her to have a backup plan. Born in Crawley before moving with her family to Plymouth, Katie knew that she wanted to maintain excellence in academia, and the support offered through the University’s sporting scholarship programme was one of the key factors that influenced Katie to stay in the city.

She reflects: “The financial support has helped me to enter more ranking competitions around Europe and the world, and the sport therapy helps me to improve and keep in good condition. Also the fact that the scholarship team helps me work with my course tutors to try and balance everything where necessary is brilliant.”

Katie has to do plenty of balancing herself, and it hasn’t been without its challenges. In the run-up to the British Student Taekwondo Championships, she carried a minor foot injury, and was unable to make her normal fight weight of <49kg. As a result, she had to move up a weight class to the <53kg division, increasing the challenge, and making her eventual win seem all the more unlikely. Not only that, but she had an assignment deadline looming on the Monday morning, and utilised the four-hour gap between quarter- and semi-finals to work on her group project.

“I revised in the car, in the hotel, and during the competition to ensure I got everything done,” she says.

And if that wasn’t enough, she didn’t just win the competition – as the saying goes, she walked it. Each match was stopped after Katie had opened up a 12-point gap, scoring numerous head and body shots to her respective opponents from Brunel University, UCL and Goldsmiths.

She says: “I was so happy to have won the title for myself and as a representative of Plymouth University. As taekwondo isn’t currently part of British Universities and Colleges Sport (BUCS), I don’t have many opportunities to compete for the University, so it was a real privilege.”

In the meantime, she also found that her dedicated studying earned her three firsts and a 2:1 in her first four modules. With exams to revise for and the European University Games to compete in, Katie has her work cut out for the coming months. Then ultimately, it’s onwards and upwards to Tokyo 2020.

“I may have missed a few internationals and qualifying events, but I’m still determined to compete for Great Britain at every opportunity,” she says. “Nothing is going to stop me striving for my dream.”

Judging by her achievements so far, not to mention the size of that fight within the girl, who’d bet against her?!
FROM LITTLE ACORNS TO ZX SPECTRUMS: archiving our computer past

It’s safe to say that 50 years has been a long time in the world of computing. Gone are the monolithic structures and valve-filled towers that filled entire rooms, replaced by devices with vastly greater capabilities that can fit in the user’s pocket. But there’s an enduring appeal to these formerly cutting-edge ‘antiquities’ – a shared nostalgia evidenced by the crowds who are drawn to exhibitions of retro technology.

And here on the Plymouth campus, in the Portland Square Building, there is just such an exhibition.

Housed in glass cabinets within the School of Computing, Electronics and Mathematics is the South West Retro Computing Archive, a collection of dozens of items that chart the development of personal computing and gaming technology since the early 1970s.

“It started many years ago when we wanted to do something to give our area within Portland Square more of an identity,” says Head of School, Professor Steve Furnell, who has loaned many of the items from his own extensive collection.

“We started with a few pieces of old technology, and it became apparent that people were stopping, looking and reminiscing about what we had on show. So we began to look at ways to expand, and now we have reached the stage where every available space on our part of the floor is full.”

The archive – curated in conjunction with the South West Branch of BCS – The Chartered Institute for IT, and also available to view online at www.retro-computing.org – represents a technological journey through time, starting with a now somewhat dated Ladybird tome from 1971 titled How It Works: The Computer. It then charts the meteoric rise in popularity of computers over the next four decades, representing innovations created by manufacturers from Amstrad to Apple, Commodore to Dell, Hitachi to IBM, Microsoft to Nintendo, Sega to Sinclair, and more.

There are popular systems from the 1970s and ’80s, such as the Acorn Electron, Sinclair ZX Spectrum, BBC Master and Commodore 64, and iconic consoles from the ’90s including the Nintendo Game Boy, Sega Game Gear and Atari Lynx, as well as more recent additions such as the Apple Mac and Nintendo DS Lite. And there are games which have enthralled millions across the world, including Battleship, Donkey Kong, PacMan and Simon.

Steve says: “I grew up with the Sinclair Spectrum and then moved on to computers from Amstrad and Commodore, so for me there is a connection to so many of these items. And over the years, I have managed to acquire hundreds of pieces of equipment and software, not just for that personal tie but because it is always a great reminder to see how far computing has come during my lifetime and how quickly things can change. Within the archive, there are many devices that changed their time and became international icons, while there are also lesser known items that have influenced the innovators of today such as the Apple Newton which, in essence, was the pre-cursor to the iPhone.”

As well as being on permanent display in Portland Square, the archive has formed part of the undergraduate programme, with students using the old systems as a means to understand the evolutions of technology over recent decades. It has also been used extensively at public events, with computers and consoles on display at the University’s annual Science and Technology Showcase, the recent celebration of the library’s 40th birthday, and BCS’ own retro gaming and computing events held in Plymouth.

Steve, who is Chairman of the BCS’ South West branch, adds: “The archive may have started out as something to enhance the school’s identity, but it has grown to become something else, even if there is now only a small portion of it on show at any one time. We now regularly receive donations from the public and thanks to the efforts of those within the school – including Paul Dowland, Bogdan Ghita, Ismini Vasileiou and John Welsh – most of those systems are catalogued and, in many cases, restored to working order. It is something that will grow, and we will continue to look for ways to reach an even wider audience.”
It might just be the “quirkiest” building in the University’s increasingly diverse estates portfolio: a 35m², wood-built facility, with not a right angle in sight, and situated next door to a pen of Iberian wolves.

What the Dartmoor Institute of Animal Science (DIAS) Pod lacks in scale, however, it more than makes up for in location and potential. For it is in the heart of Dartmoor Zoo, in the company of wolves, that Plymouth students can now base themselves for their studies and research.

“Dartmoor Zoo is a living laboratory for the University and really helps to connect our students to the reality of working with and studying animals,” says Professor Kevin Jones, Dean of the Faculty of Science and Engineering. “We’ve built up a very close partnership with Dartmoor Zoo, and this new facility really is symbolic of that relationship.”

Students from across the academic spectrum come to the zoo on placement and for academic research and dissertations. From Health, there are psychology students looking at both animal and human wellbeing; in Arts, there are students using the zoo for life drawing; and of course, across Science, there are students on a range of degrees, including those specialising in animal behaviour and welfare, biological sciences and conservation biology, and postgraduates studying zoo conservation.

Until recently, those students had to decamp to the restaurant if they wanted to work under cover, but the DIAS Pod provides them with a permanent base complete with desk space, Wi-Fi and warmth in the winter. And the location brings added responsibility: having to interact with the public.

“They are human exhibits!” says Dartmoor Zoo CEO, Benjamin Mee, with a beaming smile. “We want visitors to the zoo to come in and see what they’re doing and to talk to them about their work. It’s part of the deal.”

"They are human exhibits! We want visitors to the zoo to come in and see what they’re doing and to talk to them about their work. It’s part of the deal."}

The DIAS pod certainly facilitates the research agenda that Benjamin has been so keen to support since he took over the zoo. And the responsibility of coordinating that work falls to University graduate Adam Cook, who heads the Dartmoor Institute of Animal Science, and is also an Associate Lecturer at Plymouth.

“The most attractive thing for students is our open door policy,” Adam says. “I have a list of research projects that they can pick up and do, or they can come up with their own ideas. Those projects will involve every type of animal in the zoo, and might range from studying genetic material to looking at moral and ethical issues. And hopefully the interdisciplinary mix of students using the pod will lead to new projects and collaborations.”

There will be 27 students based in Dartmoor Zoo next year, and one of the topics of interest will be the impact the pod has upon the wellbeing of the users themselves.

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Dr Craig Donaldson joined Plymouth University in February 2013 from the University of the West of England (UWE), as Deputy Head of School. Promoted to Head in January of this year, he now oversees a vibrant multidisciplinary community that covers subject areas including biomedicine, human bioscience, clinical physiology, cardiology, and nutrition and fitness. In this interview, he provides an insight into his journey to higher education and how a road traffic accident as a teenager set him on the path to biomedical science.

Looking back, while there have been many highlights in my university career, I think that time establishing the Cord Blood Bank ranks as the top.

**DR CRAIG DONALDSON:**
**HEAD OF SCHOOL FOR BIOMEDICAL AND HEALTHCARE SCIENCES**

**What is the attraction of biomedical degrees?**
With biomedical sciences, it’s a great way to keep your career options open. You are looking at the science behind the disease and the treatment and diagnosis, so careers in this field are going to be with companies that are developing research, or new treatments and diagnostics, or equipment for the NHS. If students are thinking of becoming a biomedical scientist in the NHS, then the healthcare science is the course we advise them to take because that is the one that has NHS placements.

**What are you most proud of in your career?**
You could say I have had three separate careers over the years. I was a biomedical scientist in the NHS for 16 years, first in the National Blood Transfusion Service and then as Head of the Department of Haematology at Southmead Hospital, Bristol. I then moved into research and development, joining the University of Bristol Department of Transplantation Sciences, where I set up and developed the Bristol Cord Blood Bank, a three-year initiative jointly funded by the Leukaemia Research Fund and the National Blood Service, to determine the feasibility of setting up a cord blood bank within the NHS. Subsequently I undertook research into expansion of haematopoietic stem cells to increase the transplanted cell dose while also undertaking a part-time PhD investigating immune-reconstitution post stem cell transplants. When the grant funding came to an end with one year of my PhD to go, I was fortunate enough to gain a post as a Lecturer in Biomedical Science (Haematology & Immunology) at UWE Bristol. So my first year lecturing was spent juggling final year PhD commitments and a young family – which was interesting, and one of my proudest achievements.

**How has the move to the Plymouth University Peninsula Schools of Medicine and Dentistry changed your school?**
I’d say it was a very good synergy for both our research and teaching. We are the science behind the medicine; biomedical science underpins the understanding of diagnoses and treatments, and provides a very good link to that translation from the bench to the bedside in developing new methodologies and techniques. Being aligned to a medical school has also helped with our recruitment of students, because not only do our students benefit from being part of that interdisciplinary community, but from a recruitment perspective we can offer several incentives that reduce the risk of losing people through adjustment. For example, we now have five places reserved each year where high-performing biomed students can apply to enter either medicine or dentistry at the end of their first year. And our graduates are eligible to apply for entry to the programmes in medicine and dentistry here without doing the UK GAMSAT tests for at least two years post-graduation. This year we had nine students enrol on medicine who had either moved across or had re-applied post-graduation.

**How do you assess the research standing of the school?**
Being part of the medical school, and having those close ties with Derriford and the other hospitals, gives us a much stronger research link. And we have some very exciting projects under way. Dr Michael Jarvis’ work with ebolavirus is an area of strong interest; and in infection and immunity, with Professor Simon Jackson and Dr Mat Upton are doing some fantastic work on antibiotic resistances and new methodologies. We are very keen on supporting the translation of research into real impact in our hospitals and surgeries, and Professor Neil Avent’s work on non-invasive diagnostics is a great example of that.

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**Was there a particular reason that you became interested in biomedical science?**
I was interested in science at school, taking biology, chemistry and physics A levels. In the Lower 6th, I was thinking of applying for a biochemistry degree, but without any great thought about where that would lead career-wise. I was then in a road traffic accident, where I was knocked down by a bus, and I was in hospital with collapsed lungs for several weeks. While I was there, I had a couple of blood transfusions and had numerous blood samples taken, and I was intrigued as to what tests were done on them. It was through this experience that I became aware of the role of biomedical scientists in the NHS and decided that was what I wanted to do as a career.

**What is the attraction of the biomedical degrees?**
With biomedical sciences, it’s a great way to keep your career options open. You are looking at the science behind the disease and the treatment and diagnosis, so careers in this field are going to be with companies that are developing research, or new treatments and diagnostics, or equipment for the NHS. If students are thinking of becoming a biomedical scientist in the NHS, then the healthcare science is the course we advise them to take because that is the one that has NHS placements. Healthcare science is still a new term and there are some problems nationally recruiting to these courses because people associate it more with nursing rather than with biomedicine or clinical physiology. So we work hard to make that distinction clear at our open and applicant days; and again when our students start their course.

**What are you most proud of in your career?**
You could say I have had three separate careers over the years. I was a biomedical scientist in the NHS for 16 years, first in the National Blood Transfusion Service and then as Head of the Immunology Section within the Department of Haematology at Southmead Hospital, Bristol. I then moved into research and development, joining the University of Bristol Department of Transplantation Sciences, where I set up and developed the Bristol Cord Blood Bank, a three-year initiative jointly funded by the Leukaemia Research Fund and the National Blood Service, to determine the feasibility of setting up a cord blood bank within the NHS. Subsequently I undertook research into expansion of haematopoietic stem cells to increase the transplanted cell dose while also undertaking a part-time PhD investigating immune-reconstitution post stem cell transplants. When the grant funding came to an end with one year of my PhD to go, I was fortunate enough to gain a post as a Lecturer in Biomedical Science (Haematology & Immunology) at UWE Bristol. So my first year lecturing was spent juggling final year PhD commitments and a young family – which was interesting, and one of my proudest achievements.

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**Is there anything on the horizon that the school needs to be prepared for?**
We have a large number of accrediting bodies in our field, such as the Health and Care Professions Council and the Institute of Biomedical Science, so we need to be constantly in touch with them and our placement providers to ensure that our courses are producing the research-informed graduates that they need. We have an employer liaison group that meets twice per year so that we can gain that insight into those workforce requirements.

We are also developing a masters degree in cardiac physiology and looking at CPD opportunities as there is a training shortfall in the NHS at the moment. I believe we can play an important role in improving that situation in the region.
Steve, Associate Professor within the Plymouth Institute of Education, says, “I thought, ‘This is the future’, Star Trek had just come out, and it featured video communication and futuristic technologies that you could see would one day become a fixture in people’s lives. I knew it was something I wanted to be involved with.”

That early enthusiasm, coupled with a passion for science fiction writers such as Arthur C Clarke and Isaac Asimov, has inspired a teaching and research career which passed the ruby anniversary mark in January of this year. And technology has always been firmly embedded within it, from building his own computer in the late 70s, to using Twitter and blogging as a means of connecting with new audiences in recent years.

Steve’s particular field of expertise is around the use of technology in education, starting out with those early computers and now moving to the fields of social media and smartphones. It has been the subject of a number of research collaborations over the years, and is something he lectures upon to students on a range of Education courses within the University.

“Technology in schools has to be done properly, and that has always been something I try to convey to my students,” Steve says. “I encourage them to question everything they find out, by having an open mind but a critical eye. And I challenge them to think about the issues schools and universities need to solve, and then to identify how technology might be part of the solution. Used properly, there is no doubt that it can be an amazing platform and something that should be embraced rather than feared.”

Over the past decade, as well as working with the next generation of teachers, Steve has travelled the globe speaking at more than 200 conferences in 35 countries about the benefits and pitfalls of using technology in education. This year alone, his diary of international engagements includes keynote addresses in the UK, France, the Netherlands, Ireland, Greece and Denmark, as well as further afield in Brazil, UAE, Singapore and Australia.

As you might expect from someone in his position, he has embraced the digital revolution with around 31,000 followers on Twitter, while the blog he started in 2008 is updated on an almost daily basis and has now been read more than six million times.

He has been an adviser to governments on how they might embrace the digital revolution, and is currently chair of the Network of Academics and Professionals, the membership wing of the European Distance and E-Learning Network (EDEN). Through that, he pioneered the creation of #EDENchat, a Twitter-based discussion through which anyone can share experiences and raise questions related to online and distance learning.

“One of my favourite mottos to live my life by has always been that ‘I live and work in the future, but come home at weekends’,” Steve says. “And it is undoubtedly true that technology has transformed what we do and the way that we, and future generations, will think. But to ignore the pitfalls is to open ourselves up to risk, and sharing experiences is one potential way to overcome that. I have always sought to inform students and colleagues in such a way that they have their eyes wide open, and it is something I will continue to do.”

Steve Wheeler’s fascination with technology can be traced back 40 years to a very particular trip to a museum. A schoolboy in Maastricht in the Netherlands, where his father was stationed in the RAF, Steve visited the technology archive of the Philips electronics company, and as he looked at early examples of computers and video conferencing devices, he instantly recognised its potential.
For Jackie Chu, it’s not so much a day job as an ‘all-day’ job, and one that comes with an office in the open air and a social life on the Bear Grylls side of civilisation.

As a geologist for a mining consulting company, Jackie, a Plymouth graduate from the MSc in Marine Geosciences programme, is sent to remote locations around the world to test for the presence of valuable minerals such as zinc, copper, lead and gold. Camping in the open, often with just the wildlife for company for up to two months, it’s as comprehensive an analysis of his own self-sufficiency as it is a test of his skills in geological mapping and geophysical and geochemical surveying.

“You wake up at 6am and you work until sunset,” Jackie says. “The project sites are usually located in remote regions of developing countries. In Indonesia, for example, I had just two local workers with me, and the first thing we had to do was cut a path through the jungle to the area where I needed to study.

“There is no electricity or water supply, no toilet facilities, and no showers for the entirety of the expedition, and it’s adapting to such an environment that has been the biggest challenge of the work. It’s physically demanding and mentally tough, especially when you’re on your own for weeks on end, and the weather conditions can be rough, from intense heat in the day to freezing nights on the grasslands.”

It was his masters programme at Plymouth, building on his undergraduate degree in environmental science at the University of Hong Kong, which set Jackie on the path to Indonesia, Kazakhstan, China and Russia. Arriving in 2010, he was inspired by both the research climate and the distinctive natural environment of the ‘Ocean City’.

He says: “I just simply love the ocean – I think it is spiritual. I want to be close to it and learn about it. I came to Plymouth because I could do both, and I could study its geology, which is the history of our planet.

“And I learned a huge amount during my time, especially the research. The postgraduate study at the University provided me with a chance to conduct my academic research in geophysics in Cyprus, and I was able to visit the country twice, collecting rock samples for study back in the labs. It was an invaluable experience for me and I enjoyed being in the field – it equipped me with the necessary skills to develop my career as an exploration geologist. It has been the foundation for my career.”

When Jackie, 27, completed his postgraduate degree, he returned to Hong Kong and within weeks had begun to work for a mining consultancy. But what differentiates him from many other early career surveyors is his commitment to sustainability. Jackie is determined to promote greater public awareness of issues surrounding it and earth sciences in general, and has formed a social enterprise called ProjecTerra.

Through ProjecTerra, Jackie runs public tours to abandoned mines and visits schools with exhibition material. And in August 2015, he published Hong Kong Mining History, a bilingual (Chinese and English) book compiling information on Hong Kong’s mining, a copy of which he has donated to the University’s library.

“Earth science is not a topic that is well known in Hong Kong,” he says. “Ours is a country that has consumed many of the best materials in this part of the world and benefited as a result, and I want people to understand the sources of these raw materials.”

This commitment to promoting earth sciences and sustainable mining brought Jackie to the attention of the British Council and their Education UK Alumni Awards, this year. Chosen from among 800 candidates, Jackie reached the final three in the Social Impact category and was invited to the gala ceremony in Hong Kong, accompanied by two guests from the University, Dr Andreas Walmsley, Associate Professor (Senior Lecturer) in Hospitality, Events and Tourism, and John Bull, Academic Lead for International Recruitment.

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HARRISON NASH
AWARD-WINNING SOCIAL WORK IN SOUTH AFRICA

“I am certainly seeing the socioeconomic challenges here,” says Plymouth graduate Harrison Nash, when he reflects upon life in South Africa. “It saddens me what children are exposed to at a younger and younger age.”

Speaking from his adopted home in Port Elizabeth, Harrison’s words are not those of someone resigned to the hardship and inequality of life in the country, but a reminder of the daily challenges he faces in his work with children and teenagers. For, since 2012, the BSc (Hons) Social Work alumnus has been using all of his skills and expertise to lead developmental, recreational, therapeutic and caring services for the younger generation on behalf of the Maranatha Streetworkers Trust.

“It is a lot of work and long hours with weekends included as I strive to know all the children and keep myself available as a support for all of them.”

Harrison first developed ties with South Africa in 2007 when he volunteered as a teacher and activities coordinator during his gap year in order to “broaden his horizons.” It proved a transformative experience.

“I was struck by these children so much, especially having never worked with kids before that point,” he says. “Their resilience and zest for life, despite all they had been through, resonated so deeply with me.”

A second gap year followed, and a rethink of his degree plans: marketing was supplanted by social work so that he could use his skills directly to benefit the people. During the first year of his degree, Harrison founded the Maranatha Care Children charity to help fundraise for some of the projects he had been involved with, such as Protea Primary and a new community project in a rural area of Nieu-Bethesda. And he also supplemented his degree with training on play therapy and other counselling techniques.

He says: “As a newly qualified social worker, leaving university with a statutory placement experience at Plymouth City Council behind me, I knew that I had many opportunities locally. But I still felt my passion would be to make a difference in an international context, and so I threw caution to the wind, sold my car, and relocated.”

In January 2016 he was presented with the British Citizen Award, an honour which left him “truly overwhelmed.”

“Since being in South Africa I have been able to share in many amazing experiences with the young people I work with on a daily basis, and they are the real heroes,” he says. “My most valuable achievements are seeing the development of such children who came from the worst circumstances imaginable to actually become successful independent adults in their own right.”

“So yes, there are great challenges,” Harrison adds. “But at the same time, I have seen young people go on to function so well in society, which shows you that there is always hope. They are the ones who will shape the future of the country.”

Of course there can be challenges with children addicted to substances, for example, but we work holistically and have seen some incredible success stories.

Harrison has since developed what he describes as a “wonderful support network of friends”, with whom he socialises on a weekly basis. His parents also flew out to see him last Christmas, and took part in celebrations at the youth centre. And his work has earned him recognition at the highest level, as in January 2016 he was presented with the British Citizen Award, an honour which left him “truly overwhelmed.”
Final year projects spanning the breadth and imagination of the arts have been on display across the University in HOT ’16. The arts degree show featured some 500 pieces of work across 3D Design, Fine Art, Illustration, Media and TV Arts, Photography, Digital Media and Animation, Architecture, Graphic Communication with Typography, and Digital Art and Design.

There were sculptures, paintings, photographic collections, illustrations and digital innovations, many with interactive elements designed to capture visitors’ imaginations, all on display in the Roland Levinsky Building and Scott Building on the University campus, and the Mills Bakery at Royal William Yard.

For many, it was a first opportunity to engage with a critical audience, and in some cases openly put their works on sale. Guneet Sidhu, BA (Hons) 3D Design, for example, demonstrated her project, the Augmented Internet, which included designs for different wearable technologies, for which she was awarded the Product Designer Prize. She said: “I’ve had some great opportunities at Plymouth, such as being able to go to India in January to practise human-centred design, which is my main goal for the future: to expand on that and to work with people.”

Steph Howard, Graphic Communication with Typography, showcased her project, “It Feels Like”, a series of publications covering the topic of mental health at university. She said: “The idea is about metaphors: the use of metaphors helps you to understand and overcome different types of mental illness.”

Meanwhile, fellow Graphic Communication student Chris Howard created a series of magazine covers celebrating the musical culture of Plymouth in a project entitled ‘Pulse’. “Specialising in typography really makes the degree here stand out from other design courses,” he said.

THE SEA AND ME

Students in marine science and photography joined together on an interdisciplinary project to creatively capture the relationship between man and the sea.

“The Sea and Me” saw 20 students work collaboratively to create pictures that explored issues of sustainability and the natural world. They were then put on display to the public for an evening at the Plymouth Arts Centre.

Dr Heidi Morstang, Lecturer in Photography, and Dr Simon Ingram, Lecturer in Marine Conservation, led the project, which involved a number of field trips around Plymouth to serve as inspiration for the students.

Eliza Nash, BA (Hons) Photography, said: “Taking part in The Sea and Me project was an exciting way of merging scientific data and art, something that very rarely happens between the two subject areas. It enabled us to work alongside a faculty that we, as photographers, would not have necessarily crossed during our education, and to engage with data, statistics and other factual insights that the marine students were used to working with.”

Professor Martin Attrill, Director of the Marine Institute, chose a winning entry on the night and awarded a prize to students Emilie Johnsen and Liz Evans for their picture.

Martin said: “It was a real pleasure to be able to judge the work produced by the students, and it exemplifies the interdisciplinary nature of what we do here within the marine area and the broad portfolio of expertise that the Marine Institute represents. This was not only a valuable and enjoyable exercise for the students, working with someone who may have a very different way of viewing the world, but they also produced some remarkable pieces. It was certainly a very tough decision to award the prizes, and all the pairs need to be congratulated on what they produced.”
SUSTAINABLE EARTH CONFERENCE

Prominent national figures from the fields of scientific research, communication and policy attended a major conference in June organised by one of the University’s new research institutes. Sustainable Earth 2016 featured two days of keynote speeches, from the likes of Sir Mark Walport, Chief Scientific Adviser to the government, and Craig Bennett, CEO of Friends of the Earth, as well as networking sessions and workshops. There were also research presentations and seminars led by academics at the University, and representatives of organisations including the University of Iceland, the Environment Agency, Westcountry Rivers Trust, and the Salvation Army.

COLOUR DASH FOR BRAIN TUMOUR RESEARCH

A first-ever colour dash on campus by students at the University raised more than £4,000 for charity Brain Tumour Research, in June. Almost 300 students took part in the event, which saw them donning bright white gym kit and running around an obstacle course on the University campus, while being pelted with brightly coloured powder paint. Led by Student RAG (Raise and Give), the dash was one of a number of events to support BTR, and which raised a combined total of £7,000 for its research work.

UPSU TAKES TO THE ROAD

The University of Plymouth Students’ Union has put the wheels in motion to improve the level of support that they can offer partner colleges across the South West and into London. After budgeting for four years, UPSU has invested in a new ‘mobile Students’ Union’ – a 2015 Volkswagen Transporter T5.

The eye-catching VW has power sockets, a table and chairs, a canopy extending the space outside, and a roof which lifts up to form a bed space, hinting at the surfing community associated with the South West. But its real use will be to enable sabbatical officers to drive to colleges and set up shop to promote the societies and services under the UPSU umbrella.

Davide Bertelli, UPSU Vice President, International and Outreach, said: “With the mobile SU, we’ll finally be able to take the Students’ Union out to our partner institutions. We understand that there is an identity issue and many students off campus find it hard to relate to UPSU. This is a problem we can finally address now: by consistently reminding our off-campus students what UPSU is and what we can do for them, we hope to see more engagement and interaction.”

A successful pilot project using a hired van convinced the union to invest their commercial profits into the mobile SU, and a plan is being drawn up as to where and when it will go.

Gina Connelly, UPSU Chief Executive, added: “We are all delighted here at UPSU to finally have our new mobile SU! It’s the realisation of a long-held vision to raise our profile and engage further with our students who are located off-campus.”
Tens of thousands of visitors to the Tate Modern Switch House in London had a glimpse of the future thanks to the University’s digital arts research laboratory, i-DAT. The team was commissioned to produce an immersive and interactive sculpture for the new building – entitled ‘This is Where We Are’ – which uses climate and physical data, and social media interactions, all recorded around it, to change the nature of the display on its many panels. i-DAT worked with the Tate Collective, in partnership with Affinity with Plymouth University, InterCity, GaiaNova, Immersive and TR2 to create the 5m by 3.5m sculpture.