Issue1 2009

enterprise

creativity

innovation

Enabling advantage World-class learning Stimulating the region

Sustainable futures Nintendo developer status Smart robots

University of Plymouth *the* enterprise university

culture

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V E R S I A O' H A D J A O' H A MOU

Where enterprise lives

Welcome to the first edition of Enterprise. It's a place where you'll find some of the world-leading ideas, thinking and action that distinguish the University of Plymouth as the enterprise university. Inside you'll see how our research and teaching inspire creativity and drive innovation. You'll experience our dynamic and ambitious approach, and you'll understand how our passion for enterprise makes such a significant positive contribution to so many areas of life.

Discover how you could benefit from working with us by calling 0800 052 5600, or email enterprise@plymouth.ac.uk.

Professor Wendy Purcell Vice-Chancellor and Chief Executive





Stimulating the region Filling the gap



Sustainable futures Transferring the benefits to business Real-world research tackl es community issues





Building international relationships









Enabling advantage

Professor Wendy Purcell

Vice-Chancellor and Chief Executive

Our commitment to enterprise means a commitment to collaboration and engagement - with individuals, with private sector businesses and public sector organisations, and with our community as a whole. From engagement comes insight, and a clearer understanding of the skills required by today's workforce, and that of the future. We combine our knowledge with an ability to capture and develop creativity, innovation and entrepreneurship – and then feed this into our curriculum. It's an approach that ensures we produce the highest-calibre graduates, able to successfully apply their skills and compete in the global market place. And it's an approach that also builds unique intellectual capital, which enables economic benefit and creates prosperity.

Many of our activities and projects are genuinely inspirational, and all of us here are proud of what we offer and excited about our future and the opportunities it holds. As the enterprise university, our goal is to seize those opportunities and turn them to advantage.

So what differentiates Plymouth from other universities? What makes us'the enterprise university'? It's something that's embedded in our culture and is a way of thinking, a way of doing and a way of delivering that manifests in many different aspects:

> a track record of excellence across teaching, research, knowledge transfer and community engagement;

> our pursuit of learning, not just for its own sake, but also for the benefit it can bring to society;

> our engagement with the life of the city and our region, combined with a commitment to fostering cultural and international exchange and understanding;

> a long-standing and unwavering belief in widening participation - our network of partner colleges across the region offers some 8,000 students the chance to access higher education from their local communities:

> support and encouragement for entrepreneurship in the broadest sense; around 12,000 of our students take part in a work placement every year and Plymouth is a national leader in delivering Knowledge Transfer Partnerships, and

> recognition of our social responsibilities: sustainability and social enterprise are amongst our key priorities.

opinion

David Lammy MP Minister of State for Higher **Education and Intellectual Property**

Enterprise has been at the heart of the British economy for centuries, ensuring our success in international trade and our competitiveness in the global market. It is still vitally important, and never more so than in the current economic climate.

For the economy to grow and to emerge stronger, we need to continue investing in new inventions and developments. We need to keep educating and training people to increase our skilled workforce. Those who are studying now will be the enterprisers and leaders of the future.

However, enterprise is so much broader than this: it is also a fundamental part of our daily lives. From reading the paper in the morning to catching the train home at night we are benefiting from the enterprise of other people whose innovations have made a significant difference to the way we live.

Importantly it is also a much wider concept than 'entrepreneurship', and it applies not just to business but to all those individuals who are ambitious, innovative and creative in reaching their goals. This means that it can make a significant contribution to all areas of our lives and can help to develop emerging industries, as well as public services and the third sector.

Enterprise has a key role to play in the life of the University of Plymouth and, indeed, all universities, as it encourages both organisations and individuals from across the country to become more competitive.

As the Minister for Intellectual Property I am also keen to ensure that enterprise is protected. Only when people feel secure in their work and know that their ideas are safeguarded will we see the most ground-breaking inventions, which will boost businesses and improve output.

Graduates are much sought-after in the business environment, but an enterprise-led approach to work can be especially attractive to employers.

It shows a rounded education and gives students a strong grounding in how to deal with uncertainty in a changing economic environment – something particularly relevant in today's world.

As a government we have been working to increase the voluntary work available to young people, which can offer graduates the chance to emphasise their ability to be enterprising.

University staff can benefit from this too, and I am aware of a project right here in Plymouth, Active in Communities, which offers opportunities to engage with volunteering.

Student employability should be a core goal of any university, with employers and students themselves taking a lead role. We have an increasing need for higherlevel skills amongst all age groups and degree-level gualifications are increasingly valuable commodities.

Plymouth is a particularly good example of how enterprise can connect different people and bridge gaps. Both students and residents in Plymouth have been given the opportunity to study the art of enterprise and they can do so on both a flexible and a modular basis.

The university also offers the opportunity for employers and employees to access accredited programmes, with industry taking an active part in keeping courses up to date and supplying the university with the most up-todate knowledge and skills.

Furthermore, Plymouth has shown real dedication to the development of sustainable travel and research into alternative ways to commute. Lowcarbon transport is an area of rising importance, and it is good to see the university leading the way in terms of research.

I have been very much impressed with the work being carried out at Plymouth to encourage and foster enterprise in both the lecture theatre and the workplace. This is vital to the success of our economy, and students are at the very centre of our drive for a speedy and effective economic recovery, paving the way to a more prosperous future.

World-class research

Research is a vital part of our enterprise culture, and at Plymouth we're widely recognised for the world-leading contributions we make in this area. In the government's most recent assessment of research in universities, the Research Assessment Exercise (RAE) 2008, we performed exceptionally well, placing us in the top 50 UK universities for research (Research Fortnight power table). And in computer science, civil engineering, geography, environmental science and medicine, Plymouth ranks alongside long-established research universities.

RAE highlights include:

of our research was judged as being of international repute

nore staff were submitted in 2008 compared with the RAE 2001 submission

Plymouth submitted its research in [subject areas

of our research in Computer Science and Informatics was judged as being of international repute, with

// U of work recognised as world-leading. This puts Plymouth among the top 15 UK universities for Computer Science and informatics research

Plymouth undertakes world-leading research across the vast majority of our research areas and our students work alongside world-class experts.

Vice-Chancellor Professor Wendy Purcell

Dr Sue Denham is a reader in Computational Neuroscience at the University of Plymouth, and since 2002 her research has attracted international funding in excess of €6.8 million. Sue specialises in understanding auditory cognition – how the brain processes and makes sense of sound – using perceptual experiments and computational models. Her work is amongst the most influential and respected in its field.

"I've always been interested in sounds, and fascinated by the way the brain is able to perceive, differentiate and manipulate them. Our work in understanding the auditory system, and the relationship between sounds, and speech movement and emotional behaviour puts us at one of the great frontiers in science."

With the European funding that underpins much of Sue's work comes the opportunity to collaborate with other internationally leading researchers from member states. Currently, she is working on a number of ground-breaking international projects with partners from all over Europe and around the world.

My most recent grant was one of only 23 awards from 243 submissions. The project aims to develop an acoustic analogy to a camera-based visual scene analysis system – a sort of 'sound camera' - that can detect the presence and characterise the behaviour of living entities. The ultimate goal is to prototype a system capable of forming composite representations of animate entities, exclusively through the use of information that comes from sounds.

With her European partners, Sue hopes to successfully create a system that can be used in real-world situations where visual information may be unavailable or unobtainable.

Amongst other projects and her role as adviser on future European funding, Sue is currently involved in research based in Hungary, where the relationship between infants and their mothers is being tracked for the first year of life. Using video and sound recordings the international team will investigate the development of social engagement by studying the emergence of conversational interactions between

mother and child.

"Commercial exploitation of my research has always been a priority. We plan to establish a Commercial Advisory Board involving representatives from industry to ensure our most recent project is successful in attracting commercial interest - specifically for applications that include 'smart house' monitoring for the elderly, and security systems for property and vehicles."

enterprise in action

As clear as mud

Plymouth's climate change research is internationally acclaimed, and recently reflected in the work of our expert geochemists after they pioneered new techniques to track more than 10,000 years of changes in the extent of Arctic sea ice.

Professor Simon Belt and his colleagues Dr Guillaume Massé and Professor Steve Rowland hit the international headlines for their study of sediments from the seabed of the 'Northwest Passage' in the Canadian Arctic.

The Plymouth scientists are partners in ArcticNet, a network of centres for excellence that brings together scientists and managers in the natural, human health and social sciences with their partners in Inuit organisations, northern communities, federal and provincial agencies and the private sector to study the impacts of climate change in the coastal Canadian Arctic.

"Our technique involves checking the presence in Arctic mud of a particular type of oil released by microscopic forms of algae, revealing how much ice was present each Arctic spring. This should enable the generation of a sea ice record stretching back from hundreds to tens of thousands of years – substantially further back than the past 30 years of data that already exists," says Simon.



The historical sea ice information we obtained from extracted mud has the potential to guide computer forecasts of future climate change.

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"Since the 'fingerprint' oil used to track the historical sea ice record is produced by microscopic algae, which are potentially endangered by the recent decrease in sea ice extent, we should now be able to investigate the consequences of this on other wildlife in the Arctic higher up the food chain."

Plymouth's sampling work is funded by £500,000 from the Natural Environment Research Council, and Dr Massé has also received around £1.5 millon from the European Research Council for his work into climate change at both ends of the Earth.





Professor Simon Belt

Leading lights

Employability is fundamental to enterprise, and we focus on preparing our students for leading roles – either as successful entrepreneurs or as highly effective employees, able to make a valuable contribution wherever they work.

From their first day here, our students have access to careers advice, volunteering opportunities and support in balancing their studies with employment. SkillsPlus, our skills, personal development planning and employability strategy for students, is a key part of our learning and teaching policy. It runs through all faculties and continually encourages students to gain as much practical experience as possible before they graduate.



enterprise in action

Achieving more

Jing Cai came to Plymouth from London in 2002, after achieving a degree in Telecommunications at the Civil Aviation University of China. She started as a masters research student in Digital Signal Processing and Communications and went on to begin her PhD in Coding Theory and Information Theory in 2004.

"The language barrier was an issue for me at first, so I looked for a university that really embraced overseas students. Also the guality of the education was a critical factor in choosing Plymouth. The university has a highly respected reputation – not only for its teaching, but also for its research and innovation capabilities."

As a masters research student at Plymouth, Jing's programme included six months of teaching, and six months of research, after which the university offered to fund her PhD study. Three years later, having established an international patent, completed four publications and presented at international conferences, she was introduced to a Knowledge Transfer Partnership project at Bombardier Transport, global leaders in rail technology, and switched to studying part-time for her PhD.

enterprise in action

21st-century learning

Stephen Gomez, the university's new Professor of Work-based Learning is committed to developing innovation in teaching and learning throughout the organisation:

"We're bringing higher education into the 21st century, developing meaningful ways to fit learning with the demands of modern life, and evolving with technology to tailor teaching methods to individual needs. There are 'hotspots' of activity all over the university, and we're now recruiting a Head of Technology-enhanced Learning to take a strategic lead in spreading and sharing the practice of innovation."

Our collaboration with the University of Plymouth reinforces our ability to deliver innovative solutions to our clients' requirements.

Robert McCarthy Managing Director, Goss Interactive Ltd "The KTP project at Bombardier was a great opportunity for me. It gave me the chance to experience working in a business environment, and to apply my knowledge to real issues in a practical way."

Following her success in the KTP project, Bombardier offered Jing a full-time position as a Design Engineer.

"I'm now working on creating a new generation of train detection system, using mathematical modeling, theoretical safety and reliability proof, and algorithm design. The new product is attracting interest from many countries around the world, and I'm grateful to Plymouth for equipping me with the knowledge and skills necessary to make a successful engineer and industrial scientist."

It's an approach designed to benefit students at the university and to better meet the requirements of learners in the workplace.

"The idea is to make the university and learning more accessible. From virtual-world Open Days, to the immersive work spaces we are creating for students and staff, where people can meet virtually to share knowledge. It's not meant to be a substitute for face-to-face teaching, but it adds flexibility and a new, dynamic dimension to learning."

"Giving our students greater control and choice in when and how they learn is key. Everyone works at a different pace, at different times, and we're accommodating those differences by using technology to be more versatile in our teaching, guicker in our feedback and, crucially, more interactive."





The University of Plymouth has never failed to live up to my expectations. Since I started in 2006, the city and the university have grown extensively, providing modern technology and a comfortable environment to work in. I began my placement in 2008, and since then have continued to develop mentally, physically and professionally. Choosing a sandwich degree was the best decision I've ever made.

Hannah Saxby, Business Studies student on work placement at the South West Regional Employment & Skills Partnership

For students in the workplace, on-demand learning will make the achievement of higher-level skills easier. Accessing coursework and tutors online or through a mobile phone reduces the need for attendance time at the university and means employers are not losing productivity. As Stephen says,

"It's all about fitting in with other people's lives. That's why we're now looking at accrediting learning in the workplace as part of a degree. And it's why we've recently introduced a degree in Professional Development that comes in bite-sized chunks that accumulate towards the qualification. Technology is a great enabler – and we're using it to give more people the chance to learn."

Stimulating the region



We make change happen, and are pivotal in facilitating and delivering economic, social and cultural regeneration in Plymouth and beyond. For example, our internationally acclaimed partnership with further education colleges across the region makes higher education more widely available. And we are involved in numerous arts and cultural programmes, including a central role in this year's national Darwin 200 celebrations, along with community outreach projects that enrich the lives of local people.

The university's Peninsula Arts is an exciting cultural initiative, offering everyone in the South West the opportunity to share and contribute to highquality art, music and cultural activities through exhibitions, events, talks, workshops and masterclasses.

Earlier this year, Japan's most revered theatre director, Yukio Ninagawa, participated in the city's first Shakespeare Festival, where the university collaborated with the Theatre Royal to stage a series of events, films, performances and talks about the Bard. With his theatre company, Ninagawa Studio, the director is famous throughout the world for his experimental productions, and is staging a Kabuki-style version of *Twelfth Night* in London as part of the Barbican's bite09 festival. In recognition of his work, the university has recently awarded Ninagawa an honorary doctorate of arts at a special ceremony attended by city dignitaries, and staff and students of the university.

The work of internationally renowned directors like Ninagawa is an inspiration to many, and the university is delighted to recognise one of only a handful of theatre directors with a truly global reputation.

David Coslett Dean of the Faculty of Arts and Pro Vice-Chancellor Member of the Plymouth Culture Board



The Peninsula Dental School was established in 2006 following a successful £40 million funding bid by the Peninsula Medical School, and is a partnership between the Universities of Plymouth and Exeter and the NHS in Devon and Cornwall. With other sites in Exeter and Truro, the Peninsula Dental School's Dental Education Clinic in Devonport, Plymouth, is the first purpose-built dental education facility in the UK for 40 years. Dean of the Peninsula Dental School, Professor Liz Kay, who took up her position shortly after the bid was won, says:

We had a year to get the new school off the ground, which was a challenge. But the opportunity to start from a blank sheet has created a superb facility, with 40 dental chairs, laboratory, seminar rooms and an IT suite. It also means that our recruitment criteria and curriculum are driven by the latest research and evidence – an approach that has given us a much better insight into the attributes required by a good dentist, and the best ways for our students to learn the skills they need.

The school offers the local community a range of much-needed free dental care from students under the supervision of a qualified dental tutor, as well as advice on dental care and oral hygiene.

At full capacity, the school expects to treat 512 NHS patients a day across its three locations.

Unlike most other dental schools, Peninsula provides primary dental care – in other words, students are 'on-the-street' dentists. This is a huge advantage for both the students – who are trained and educated in the environment they will enter on graduation – and for the patients who benefit from free, high-quality dental care and advice.

Professor Liz Kay Dean of Peninsula Dental School

enterprise in action

Filling the gap

We teach our students to be professionals. We teach them the technical and people skills they need to do a good job. And we teach them about social responsibility – they are embedded in the culture of the local community.

In addition, the school has created new employment and increased custom for local businesses.

A global outlook

With a diverse staff and student complement representing many different countries, cultures and alliances around the globe, Plymouth is a world-class university fully committed to a genuinely global outlook. It provides a rich and welcoming environment for international staff and students, and an inclusive international dimension for its home students.

This means that worldwide issues and perspectives underpin our curriculum, enhancing the skills and knowledge of graduates and preparing them for increasingly global workplaces.

We collaborate with many higher education providers and organisations around the world, working to give students opportunities for overseas experiences and to develop their awareness of the cultural, financial, legal, ethical and business issues that surround an international market place.

enterprise in action

The NASA connection

Even travelling at the speed of light, communication from distant planets such as Mars takes over 20 minutes, and data errors are unavoidable. Data is therefore coded so that when it reaches Earth, errors are automatically corrected – even though it's not obvious where the errors are. The robust performance of error-correcting codes is a vital part of effective space communication. For more than ten years, Professor Martin Tomlinson (pictured above) and his team at the University of Plymouth have worked with the renowned NASA consultant scientist, Professor Shu Lin at University California, Davis, to evaluate the performance of automatic errorcorrecting codes suitable for space communication. Martin says:

> The number of different ways that errors can occur is huge. It would take over 100 years to assess one code using a normal personal computer. Using a cluster of highpowered computers developed over the years on the Plymouth campus, and specialist software refined in the last year, we're able to exploit the mathematical properties of the error-correcting codes using a sophisticated algorithm, and run the task in parallel on a number of computers.

> > The world-leading work of the Plymouth team has brought international recognition and has helped identify error-code weaknesses that have enabled their partners at Davis to make significant improvements for NASA applications.

enterprise in action

Working with China

The university has been working with China Agricultural University (CAU) in Beijing for six years. A top-rated university, it leads its field in agricultural and related research.

Plymouth has been chosen to work collaboratively with CAU on a two-year scheme as part of the Prime Minister's Initiative for International Education. Academics from the Plymouth Business School have met their counterparts in Beijing to research examples of teaching and best practice, and Chinese academics will visit Plymouth in 2009 to find out more about course content and teaching methods here.

The project will also involve working with employers across China and the UK to better understand the accounting, marketing and human-resources skills required from graduates so that courses can be developed in line with global businesses' needs.

CAU has recently established a coastal campus in Yantai in Shangdong Province, and while CAU has world-class expertise in terrestrial agricultural systems, it was keen to further develop its knowledge of marine agriculture and related sciences – an area in which Plymouth has built considerable experience, particularly

enterprise in action

Building international relationships

For more than ten years, Plymouth geology students have benefited from field trips to California. Arriving in Los Angeles, they travel from one of the largest urban areas in the world to one of the most inhospitable, visiting the San Andreas Fault before spending several days in Death Valley, and then returning via Las Vegas.

The students get to see first-hand the dramatic landscapes they have been studying, and learn the skills needed to work in remote areas. The trips broaden their cultural horizons too, with time spent in two of the liveliest and most diverse cities on the planet.

Students also benefit from the links forged by staff with oil exploration and consultancy companies across Europe and America. Collaboration with one firm of consultants gives students the chance to undertake applied research in the field, with financial support for undergraduate prizes and an industry-specific seminar programme.



with its partners in the Plymouth Marine Sciences Partnership. Professor Wendy Purcell, Vice-Chancellor of Plymouth, recently visited China to discuss how the two universities could work together to the benefit of science, students and both universities.

Peter Ingram, Head of Plymouth's International Office, says:

> Areas that show promise relate to collaborative research and joint PhD supervision, as well as staff and student exchanges. The majority of fish eaten

in China is farmed in fresh water systems, but increasingly research into salt water-based farming has demonstrated great potential. With our established expertise in marine sciences we are in an excellent position to help CAU develop its skills in this area.

As well as research collaboration and staff exchanges, a number of joint postgraduate degrees are possibilities for the future to help prepare students for careers in the booming aquaculture industries – and Plymouth is set to be a key contributor in developing the science behind this area.

the proportion of waste recycled 100 to

enterprise in action

Sustainable Futures

According to People & Planet, the leading student network campaigning on the environment, when it comes to green credentials, Plymouth is the UK's bestperforming university. In fact, it's the only university to be ranked in the top two of People & Planet's Green League of 119 universities in 2007 and 2008.

The university is the home of the Centre for Sustainable Futures - a Centre for Excellence in Teaching and Learning that focuses on embedding sustainability in the curriculum, campus, community and culture. The Centre for Sustainable Transport, a place of national and international excellence, is also based at Plymouth. Here, members have established a first-class reputation through transport-related research in fields including geography, sociology, economics and law.

Across the organisation, staff are actively engaged in developing sustainable practices, working closely with the Students' Union's Green Agenda, and with a strong, ongoing commitment from senior management.

As seen here, outcomes since 2004 have been impressive. carbon emissions are on target for a

staff use of public transport has increased by

the university has switched to electricity generated from

renewable resources

water consumption has been reduced by



tonnes

waste production has reduced from 537

reduction, with further reductions expected following a successful funding bid obtained for additional carbon reduction projects

Plymouth is amongst the UK's top ten students' unions for environmental achievements.

Innovative examples of sustainability at the university include the use of solar cells on the roof of the landmark Roland Levinsky Building to convert light into electricity, heating pipes that preheat hot water in the Portland Square and Nancy Astor Buildings to reduce energy consumption, and leading-edge design features in all new buildings to reduce the need for air conditioning.

The university is now working to achieve ISO 14001 accreditation.

olar cells on the Roland Levinsky Building

enterprise in action

Transferring the benefits to business

Plymouth Chemical Engineering graduate Eva Espanol The university is at the forefront of using Knowledge Transfer Partnerships (KTPs) to pass on and implement was appointed to tackle the two-year project, with help the benefits of sustainable practices to other businesses and assistance from Dr Murray Bell and Robert Allen at and organisations. KTPs involve combining the the School of Engineering. With funding support from the South West Regional Development Agency, Eva knowledge and expertise of an academic institution like Plymouth with the appointment of a talented graduate initially assessed BD's existing environmental energywho works within the business or organisation on a saving initiatives and then established an Energy Policy strategic project. and Resource Efficiency Team to address resource management issues.

For leading global medical technology company Becton Dickinson, their KTP with Plymouth has resulted in a massive reduction of energy usage, and a huge saving in costs.

Having a dedicated Energy Engineer through our KTP collaboration with the University of Plymouth has been tremendously beneficial to BD, and has resulted in a cost saving of more than £870,000 and a reduction in CO₂ emissions of 3,218 tonnes.

David Slade, Facilities Engineering Supervisor Becton Dickinson UK Ltd

enterprise in action

Real-world research tackles community issues

The university's annual Community Research Awards, launched in 2008, provide local community groups with the opportunity to commission research to tackle their real-world issues. The Samaritans, Brentor Commons Association, The Familial Spastic Paraplegia Support Group, Stoke Damerel Parish Centre Management Group, and Citizens' Advice Bureau are now benefiting significantly from this initiative, and were all part of a major conference that showcased research at Plymouth.

The Samaritans have used the award to research two important issues, one of which investigates the discrepancies between people's expectations and experiences when they agree, and then undergo, volunteer Samaritan training. The organisation hopes the final results will help them provide a clearer understanding of how to increase volunteers' commitment when time is precious, but their services are in increasing demand.



After introducing some basic changes, Eva focused on the more substantial issues by measuring and targeting utilities consumption within the manufacturing process, and engaging with staff to completely involve them in her work.

The successes of the project are clear, from both an environmental and a commercial perspective. Gas and electricity consumption has been reduced by 18% and water consumption by 13%, helping to lower CO emissions by 15% – equivalent to the emissions of 550 average households. The resulting £870,000 saving on energy bills has led to improved profitability and an 'energy aware' culture within BD, as well as a Low Carbon Business Award from the Devon Environmental Business Initiative.

citizens advice bureau





Encouraging entrepreneurs

Entrepreneurship is the lifeblood of business success. It's a belief and culture that runs through every level of the university and is fundamental to the strong relationships we have built with businesses across the region, and the important role we play in providing businesses incubation space and pre-incubation support. The university is committed to helping organisations exploit their knowledge and expertise, and our students are quick to seize opportunities for developing skills and experience that originate from beyond

enterprise in action

Nintendo developer status

A games studio set up by three Plymouth graduates has recently been awarded authorised developer status by Nintendo for the Wii and DS games consoles. Remode, based at the Tamar Science Park, focuses on the use of next-generation 3D games technology for applications such as training, education and marketing. Nintendo authorisation has allowed them to seek publishing deals for the consoles, as well as having access to Nintendo software development kits that can be integrated with the Remode game engine to build products for consoles.

their studies.

remode

Since gaining the authorisation, Remode has been able to raise more funding to develop a casual game and has taken on its first full-time employee. The company is now well advanced with its development of the game, using its game engine, which will be completed later this year. The plan is to release it via digital distribution, first on PC before looking to get it onto console. Remode has also been commissioned by a company to develop a simulation product for airfields, which will run on PC and be distributed worldwide to both civil and military airfields.

The firm's three executive directors are all graduates of the iDAT – Digital Art and Technology – course, and in 2008 the company, under its former name Hot Pixel, won an award at the university's Business Ideas Challenge (BIC) for its game prototypes. Martin Darby, Andy Russell and Ella Romanos, all decided they wanted to go into business while still at university. The company was set up by Martin and Andy, with Ella joining in 2008 after she was part of Yoghurt Games, which also won an award in the BIC 2008.

With the financial backing of an investor and a grant from the Devon & Cornwall Springboard fund, Remode is now perfectly placed to capitalise on a rapidly expanding market.

enterprise in action

Incubating ideas

The university is one of the founding partners of the Tamar Science Park, and the strong relationship between the two organisations is a key focus for knowledge transfer activities in the South West.

In 2007, the university established Formation Zone, to provide incubator and pre-incubator space for new and developing creative businesses – an integral part of the work that is taking place in the South West to increase the number of businesses in this sector, worth £9.3 billion to the regional economy.

Launched in April 2009 with the help of £425,000 in matched funding from the government's Economic Challenge Investment Fund, Enterprise Solutions provides an information, diagnostic and matching service to meet the needs of business and individuals with:

> enhanced access to the university through the expanded Information Gateway service in the Roland Levinsky Building

> an innovative, flexible voucher scheme worth up to £3,500 to enable access to university facilities and services

> new incubation space for science, technology and engineering-based businesses on the university campus > more internships and work placements for graduates.

The main reason we wanted to start a business is because we have an absolute passion for what we do and are prepared to live by the decisions we make," said Martin, 24."Running the business has been a steep but enlightening learning curve – recognising any weaknesses has been as important as recognising strengths. Our degrees gave us a bedrock of knowledge directly applicable to industry sectors that are vibrant within the UK. So for us, studying provided a good foundation on which to start a business.

Martin Darby, Remode

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Harnessing technology

Technology drives innovation and, at Plymouth, there is a university-wide recognition of the importance of new technology. Our world-leading research in areas like robotics and computer science helps us create strong, mutually beneficial relationships with businesses in the UK and overseas. Buildings on our modern, city centre campus have the latest 'intelligent' design features, and our staff are encouraged to pioneer and develop new methods of teaching and learning.

enterprise in action

Smart robots

The University of Plymouth is leading an international consortium in a new £4.7 million grant-funded, four-year project that aims to develop complex behavioural, thinking and communication skills in humanoid robots through individual and social learning. The ITALK (Integration and Transfer of Action and Language Knowledge in Robots) project is being coordinated by Plymouth's Angelo Cangelosi, Professor in Artificial Intelligence and Cognition, and is the first of its kind in the world.

"ITALK brings together a multi-disciplinary team to work with four iCub humanoid robots. The idea is to teach the robots how to handle and manipulate objects and tools autonomously, to co-operate and communicate with each other and humans, and to adapt to changing internal, environmental and social conditions," says Angelo."In the past, we would have loaded the robots with digital dictionaries of words and libraries and actions – and hope they worked together. With ITALK, our robots have artificial brains that can combine motor and linguistic information, just like a human brain."

Using research conducted by language development specialists on how infants develop linguistic skills, and the relationship between language and movement, the team hopes to establish the principles of creating an autonomous robot. The outcomes of the ITALK project will have a significant impact on future generations of interactive robotic systems, and will make Europe world leaders in this area.

Our findings will bring substantial benefits to industry. Businesses will be able to teach robots how to think, move and communicate using any language they are exposed to. Robots will learn in the same way that a child does from its parents – slowly at first, then more rapidly over time so that they become more efficient and proficient with age.

Angelo is also co-ordinating RobotDoc – Robotics for Development of Cognition, a £3.3 million initiative involving academic and industrial partners across Europe, Japan and the USA. The project will establish a doctoral network for research in developmental and cognitive robotics for humanoid platforms, offering interdisciplinary training and research opportunities for 16 'Fellows', including three from Plymouth.

"We will be organising six-monthly training workshops, a summer school and an international conference," says Angelo."The project will cover many different areas and will incorporate guidance for students on how to effectively transfer their skills, as well as focusing on developing enterprise through entrepreneurship workshops."

Professor Angelo Cangelosi

and the iCub



Widemouth Bay in Cornwall

enterprise in action

Creating waves

The Peninsula Research Institute for Marine Renewable Energy (PRIMaRE) is a £15 million institute for research into harnessing energy from the sea, established in the South West. It's a collaboration between the universities of Plymouth and Exeter, and brings together research excellence in renewable energy, environmental technologies, marine science, coastal engineering and social sciences.

PRIMaRE is one of the main driving forces behind the construction of the Wave Hubs – a new wave farm being established ten miles off the North Cornwall coast. The Wave Hub will enable companies developing wave energy conversion devices to test their technology on a scale never before possible, generating power to the National Grid system. The institute will also influence potential renewable energy developments in the Bristol Channel, including Europe's largest wind farm and the Severn Barrage scheme.

Social enterprise

At Plymouth, we recognise not only our role in developing skills and improving business performance, but also the responsibility we have to the city and the South West region in helping transform the social and economic environment.

As the enterprise university, social enterprise is a natural part of our approach. We have an excellent record in sustainability and environmental awareness and are committed to using our experience and expertise to further develop opportunities, knowledge and skills for students, staff and the community. Over and above the contribution we are able to make to economic regeneration and development, we are focused on making a real difference to the cultural life of our city and our region.

As the UK makes the shift towards an economy that is more reliant on knowledge, innovation and skills, the need for universities to build stronger relationships with cities increases. That means much more than just engagement with business. It means unlocking, nurturing and championing socially responsible business and community activity. And it means developing opportunities for business and for communities, harnessing talent in ways that are socially inclusive.

The University of Plymouth is taking a leadership role in creating a city and a region with longevity, empowering the local economy by promoting and enabling social entrepreneurship. We are developing the skills and ethos of the enterprise university to ensure a vibrant enterprise city and region.

> The university is in a unique position to build on and work with the many strengths of the social enterprise sector in the city. As government policy has made clear, social enterprises have a role at the forefront of economic and social development through their innovative business solutions. The university can bring its knowledge and leadership strengths to bear on the further development of a vibrant and growing sector. I look forward to working with the university to make Plymouth a centre of social enterprise excellence.

> > Judith Reynolds Chief Executive, Co-active University of Plymouth governor



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Professor Julian Beer Director of Research and Enterprise



University of Plymouth *the* enterprise university

University of Plymouth Drake Circus Plymouth Devon PL4 8AA

Tel: 0800 052 5600 Email: enterprise@plymouth.ac.uk www.plymouth.ac.uk



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