The research commercialisation office of the University of Oxford, previously called **Isis Innovation**, has been renamed **Oxford University Innovation**

All documents and other materials will be updated accordingly. In the meantime the remaining content of this Isis Innovation document is still valid.

URLs beginning www.isis-innovation.com/... are automatically redirected to our new domain, www.innovation.ox.ac.uk/...

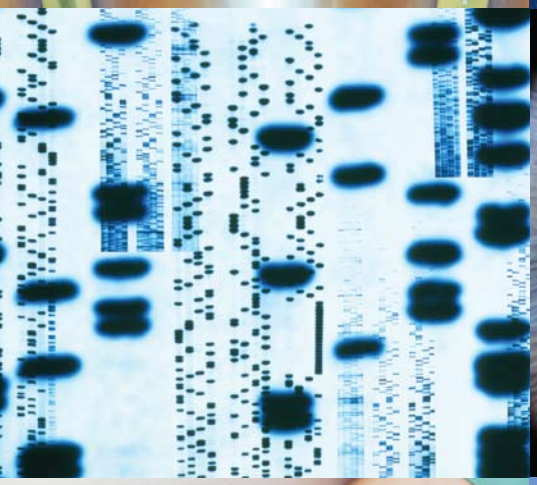
Phone numbers and email addresses for individual members of staff are unchanged

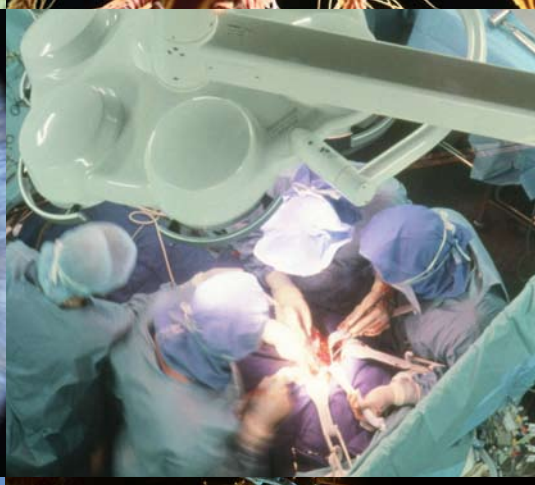
Email : enquiries@innovation.ox.ac.uk

Impacts

ISIS INNOVATION








CONTENTS

ISIS INNOVATION

Isis Innovation Limited is wholly owned by the University of Oxford.

Isis Innovation has three main business activities:

- Isis helps Oxford University researchers to commercialise intellectual property arising from their research: patenting, licensing, spin-out companies.
- Isis manages Oxford University Consulting which helps Oxford University researchers to identify and manage consulting opportunities and helps clients access experts from Oxford's world-class, interdisciplinary research base.
- Isis Enterprise provides consulting expertise and advice in technology transfer and innovation management to clients across the public and private sectors around the world.

INTRODUCTION

The University of Oxford is one of the finest universities in the world.

The aim of this publication is to highlight a number of technologies arising from Oxford University research that are creating a major impact on 21st Century lives. Isis Innovation has been closely involved in managing the transfer of the technologies from the University.

The contribution the University has made in research across all disciplines has had a major impact on the world, over many centuries. The Royal Society was founded in Oxford, by Oxford University scientists in the 17th Century. In more recent times, the development of penicillin, lithium-ion batteries and blood glucose monitoring technology at the University have had positive impacts on the lives of millions of people. The University's contribution to the education of students since its foundation in the 12th Century has also of course had a dramatic impact. Nowhere was this more apparent than at the University's honorary degree ceremony in 2012 when the Burmese opposition leader Aung San Suu Kyi spoke movingly of her time as an Oxford undergraduate student.

Isis is a world leading technology transfer business owned by the University of Oxford. Isis creates links between the outstanding research capability at Oxford, and elsewhere, for the benefit of society in the UK and globally. Since 2000 Isis has filed 850 new patent applications protecting inventions from Oxford researchers; signed 750 technology licensing agreements; signed 1150 academic consulting agreements; and set up 70 new technology spin-out companies, which have collectively raised £400m of investment finance, creating jobs and opportunities for sustainable economic growth in the local and national economy.

The technologies featured here address a number of global challenges in areas of healthcare, disease prevention, energy demand, climate change, environmental sustainability and education. They are drawn from a wide range of the University's research activities, based on original research that has developed over many years. In healthcare and disease prevention: measuring healthcare outcomes; genetic testing; organ transplantation; TB vaccination; pre-natal screening; insect-borne disease control. In energy demand, climate change, environmental sustainability: capturing sunlight; lightweight electric motors; assessing environmental impact. In education: work advising the government on education policies. Two of the features are from universities other than Oxford, in Spain and South Africa. These illustrate the growing impact that Isis is having in helping others develop their technology transfer activities and creating a global network of technology platforms.

Oxford research has a major impact on the world. Oxford researchers identify and address the major challenges of the day. Isis helps transfer a wide range of technologies arising from this research to business, where they receive the necessary investment and attention to become products and services that improve the quality of people's lives.

Tom Hockaday, Managing Director
Isis Innovation Ltd

TACKLING TUBERCULOSIS

Oxford Emergent TB Consortium

Despite the introduction of antibiotics more than 50 years ago, tuberculosis (TB) remains a significant global health problem. Each year there are approximately nine million new cases of TB and nearly 1.5 million resulting deaths. Although a vaccine is available and widely used, it is failing to control the pandemic. Resistance against many available TB drug treatments is also increasing, highlighting the need for an improved vaccine to prevent disease in the first place.

The Oxford-Emergent Tuberculosis Consortium Ltd (OETC) and its partners are commercialising the most clinically advanced TB vaccine candidate, MVA85A. Originally developed by researchers at the University of Oxford's Jenner Institute led by Dr Helen McShane and Professor Adrian Hill, the vaccine entered clinical evaluation in 2002 and by 2008 several Phase I and II trials had been conducted.

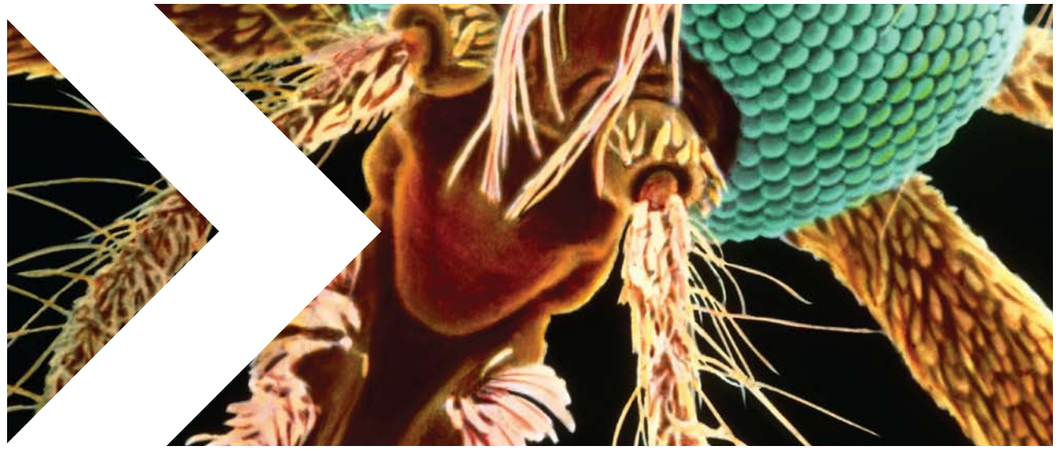
OETC was established in 2008 by Isis Innovation, the University of Oxford and US biopharmaceutical company Emergent BioSolutions Inc (Emergent), to take MVA85A through the next phases of development. Further funding was secured from the Wellcome Trust and the Aeras Global TB Vaccine Foundation (Aeras) to support a Phase IIb efficacy study in South African infants, with a second Phase IIb study in HIV-infected adults commencing in 2011, funded by the European and Developing Countries Clinical Trials Partnership, Aeras and OETC. To date, all clinical trial data suggests that MVA85A is well-tolerated and immunogenic in target populations.

Emerging collaborations

A traditional route to commercialising a new vaccine candidate is to license out the intellectual property for sole development by an industrial partner, since late stage development activities are usually beyond the capabilities of academic institutions. However, for MVA85A, Isis pioneered a joint venture approach to the technology. Emergent, a US-based biopharmaceutical company with expertise in vaccine and biotherapeutic development, had been identified as a potential licensee. As discussions progressed it emerged that creating a new entity in which the University and the commercial developer retained active involvement would make best use of the respective partners' expertise and resources. OETC was established in 2008, bringing together MVA85A intellectual property, clinical expertise in TB vaccines, materials and funding from Oxford, and funding, product development expertise, personnel and manufacturing capability from Emergent. An exclusive licence was granted by OETC to Emergent for rights to developed world territories and a distribution agreement was put in place with Aeras to supply the vaccine in the developing world.

This joint venture approach has been so successful that Emergent has entered into a similar academic partnership developing novel influenza vaccine candidates. It demonstrates a truly innovative route for transferring academic research into the wider world.

INSECT CONTROL



Oxitec

Insects spread human and livestock diseases and ravage agricultural crops, contributing to food shortages in the developing world.

Current methods of control rely on pesticides, which are cheap but have serious environmental consequences, harming many other species including humans. The sterile insect technique has been used with some success: large numbers of the target pest are bred, irradiated to render them sterile, then released to compete with the wild population, reducing their numbers. However this is expensive, has limited effectiveness since irradiation weakens them and cannot be used for all insects, most importantly mosquitoes.

Oxitec was spun out of the University by Isis Innovation, in 2002, based on technology developed by Luke Alphey and colleagues in the Department of Zoology. The company is developing proprietary insect strains, including mosquitoes, which are bred so that their offspring die before reproducing, reducing the size of the disease-carrying population. This approach is just as targeted as the sterile insect technique, but has the advantage of being more affordable, effective and applicable to a wider range of pests.

The company was named a World Economic Forum technology pioneer in 2008 and has been recognised by the Bill and Melinda Gates Foundation 'Grand Challenges for Global Health Initiative' as part of a consortium awarded $20 million to develop genetic strategies to control disease-carrying mosquitoes. Field trials of mosquito strains have been conducted in the Cayman Islands, Malaysia and Brazil with great success. Oxitec are currently developing new proprietary strains targeting other important agricultural and disease-carrying insects, but the technology has the potential to control a very wide range of pest and invasive species, even beyond insects.

OXITEC

Controlling mosquito-borne diseases is amongst the biggest challenges for healthcare in the 21st century. Mosquitoes are responsible for the spread of malaria and dengue fever, both significant health problems in the tropical regions. With an estimated 50 million cases per year worldwide, dengue is an infectious tropical disease that can become life threatening in around 1 in 20 cases. Currently no vaccine or treatment exists. Field trials of the dengue-carrying Aedes aegypti mosquito have recently shown that the technique successfully decreases the wild population of insects. Oxitec's technology could provide a much needed solution to the increasing problem of mosquito-borne diseases.

» DRIVING A NEW GENERATION

Yasa Motors

Dr Malcolm McCulloch, head of Oxford's Electrical Power Group and Dr Tim Woolmer, then a PhD student in the group, devised a small but powerful electric motor for the 2008 Morgan Lifecar.

Isis worked with the inventors to file initial patent applications, build a business plan around the technology and secure both management and investment.

In 2009, Oxford YASA Motors was spun out as a separate company with £1.45 million to develop electric motors for both general use and in specialist areas such as motor racing.

Since then YASA Motors has:

- set up manufacturing facilities in Abingdon, south of Oxford and employed engineering and manufacturing staff
- delivered over 100 purpose-built motors
- won awards from The Engineer and national charity the Low Carbon Vehicle Partnership
- installed YASA motors in the new Delta Motorsport E4 coupe, launched at Silverstone in 2011
- signed a joint venture with electric vehicles supplier Sevcon
- signed an agreement with Westfield Sportscars and Potenza Technology to develop the world's first race-prepared electric vehicle, the iRACER and the new Electric GTM sportscar
- powered the Ecotricity Ion Horse in the Isle of Man TT Zero

The company is targeting automotive, aerospace, marine and industrial markets where torque, efficiency and low motor mass are critical ingredients to achieve a high performance drive solution.

Current electric motors are too heavy and large for vehicles such as cars, boats or planes.

Dr McCulloch explains, "The Oxford YASA motor can achieve high torque for its weight, which ultimately means a smaller and cheaper motor. Torque is the twisting force that accelerates the car, and the peak torque we're aiming for is 500Nm from 25kg."

"We've optimised the materials and design, so that the motor is lighter and more effective, giving half the volume and twice the torque for the same power output. This electric motor technology will reduce fuel consumption and also help us move away from fossil-based fuels to alternative energies."

YASA means Yokeless and Segmented Armature, a description of the topology of the motor.

YASA MOTORS

» POWERED BY SUNLIGHT

Oxford Photovoltaics

Current solar cell technology, fully costed, is not sufficiently competitive to have significant impact in energy markets. A spin-out company, Oxford Photovoltaics Ltd, is now commercialising solid-state dye-sensitised solar cell technology that is both cost effective and environmentally friendly.

The key breakthrough, developed in the Clarendon Laboratory of the Department of Physics, is in building robust solar cells from abundant, non-toxic materials. Using a principle similar to the initial stages of photosynthesis in plants, light is absorbed in a dye molecule located at the junction between an n-type metal oxide and a p-type organic semiconductor. Light absorption causes charge transfer to take place, generating free electrons which contribute to a current in an external circuit.

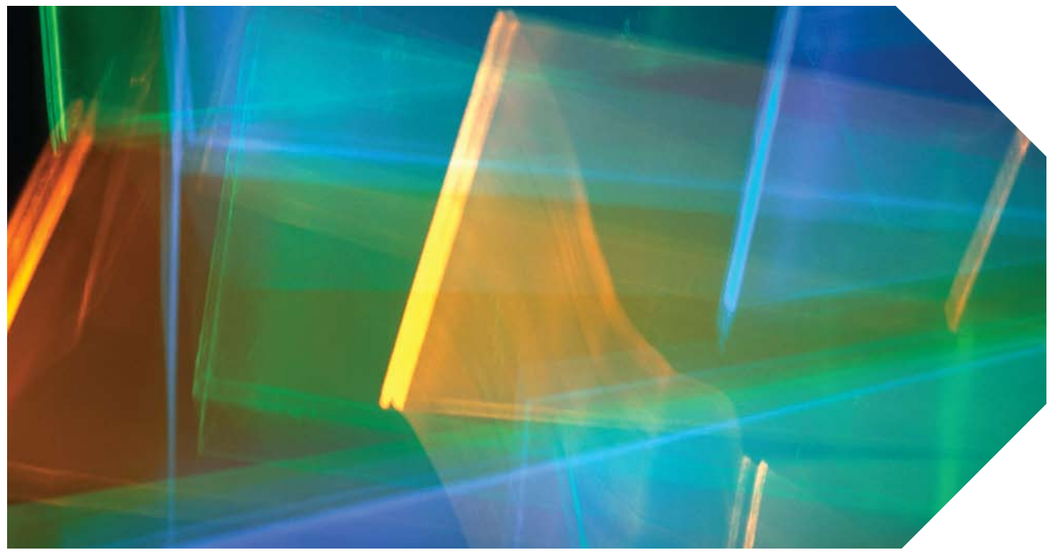
Currently available solar cell technology, based on Grätzel cells, uses liquid electrolytes as the "p-type" material. The work at Oxford has focussed on effectively replacing the liquid electrolyte with p-type organic semiconductors. This solid-state system offers great advantages in ease of processing and scalability.

Oxford Photovoltaics was spun-out of the University by Isis Innovation in Dec 2010, to widespread interest from industry, the media and the general public – evidence of the large potential market for this new technology.

Based at the Begbroke Science Park in Oxford, the new company is scaling the technology from laboratory to production line, with the projected market being photovoltaic cells integrated into windows and cladding for buildings. Negotiations are in progress with manufacturing partners.

Apart from the obvious economic impact of this technology, the environmental benefit of a sustainable renewable energy source without the requirement for rare earths or toxic materials means that the benefits will be felt by everyone.

OXFORD PHOTOVOLTAICS
Solar Power Glazing



The building-integrated photovoltaics (BIPV) market is one of the fastest growing segments of the photovoltaic industry. BIPV are increasingly being used to generate electrical power for new buildings, having the potential to produce surplus electricity which can then be contributed to the national grid. The Oxford Photovoltaics BiPV modules will be printed directly onto architectural glass; the incremental cost of adding the active photovoltaic material is very low when compared to the overall cost of a building façade, and much lower than attaching traditional photovoltaic modules.

» PRE-NATAL TESTING

Sequenom

Safe, reliable, non-invasive prenatal tests have long been a holy grail in medicine. Currently, invasive methods such as amniocentesis run a one percent risk of miscarriage.

A new test developed at Oxford will require only a small blood sample to be provided by a pregnant woman. In 1997 Oxford Professors Dennis Lo and James Wainscoat, based at the John Radcliffe Hospital discovered that foetal DNA could be isolated from a mother's blood plasma and serum.

Isis licensed the technology to US-based genetic analysis specialist Sequenom, which has invested in development and clinical trials to make the test available via testing laboratories and health services in many countries worldwide.

The first diagnostic to be launched was for Rhesus D, which causes haemolytic disease.

Professor Wainscoat explains, "The test can be used to determine if the baby is Rhesus positive, which allows for appropriate treatment, and also means that we can now avoid treating women unnecessarily with possibly risky blood products."

A non-invasive test for Down's syndrome was also launched in the US in 2011, following the results of a clinical study showing that it detected over 99 percent of Down's syndrome cases.

The technology has the potential to be applied to a broad range of conditions, including cystic fibrosis, sickle cell anaemia and thalassemia.

How does it work?

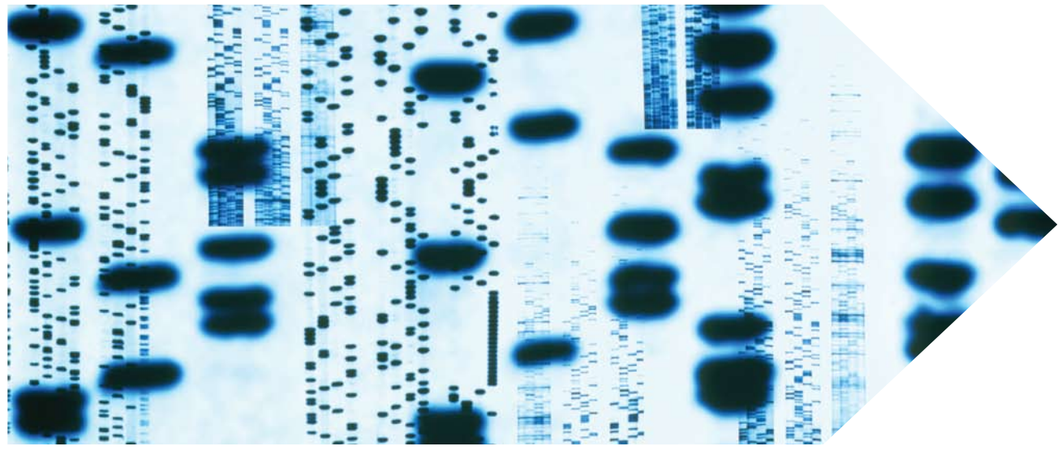
Professor Wainscoat explains how the team cracked the problem of isolating the baby's DNA from a mother's blood.

"There are a very, very tiny amount of foetal blood cells in the mother's blood. But we found that what is important is that there is actually a significant percentage of foetal DNA in the mother's blood plasma, up to 20 percent, and this can be used for a non-invasive test."

"A non-invasive test is important because as soon as you do any medical intervention there is a risk associated with it. In the case of amniocentesis, it is a one in 100 chance of miscarriage, so not insignificant."

SEQUENOM®

» TRANSFORMING GENE TECHNOLOGY



OGT

Microarray technologies are now a staple of the molecular medicine toolkit and are used by scientists worldwide. These 2D 'labs-on-a-chip' allow for high throughput processing of large amounts of biological material (genes, for example) simultaneously, enabling many thousands of genetic tests in parallel and dramatically accelerating the speed of biomedical research.

Microarray technology was developed in the laboratories of Prof Sir Edwin Southern, the pioneer of Southern Blotting, at the University of Oxford. Oxford Gene Technology (OGT) was spun out of the University by Isis Innovation in 1995 to exploit this technology. In 2003, OGT began providing a complete customised end-to-end microarray consultancy service, from experimental design right through to data analysis and interpretation, and their own standalone microarray product was launched in 2006. OGT has also licensed its fundamental array patents to biotech and pharma companies, including GE, Roche, Life Technologies and Agilent, around the world, generating significant revenues that have enabled them to develop their own discovery research base, generating further important advances in molecular medicine.

OGT now provides the CytoSure range of cytogenetics products and services for high-resolution detection of chromosomal abnormalities. In addition, their Genefficiency genomic services were selected by the Wellcome Trust to run the world's largest copy number variation study (see story, below), and Agilent named OGT as their first high throughput microarray certified service provider, confirming OGT's world-leading expertise in large scale microarray studies.

Bolstered by the acquisition of Sense Proteomic Ltd in 2009, OGT is developing tailored biomarker discovery solutions to identify novel markers for a variety of human diseases, including cancer, furthering its mission to provide innovative clinical genetics and diagnostic solutions to advance molecular medicine.

Understanding the genetic basis of diseases promises to revolutionise medicine. In 2009 OGT completed the world's largest copy number variation (CNV) study as part of the Wellcome Trust Case Control Consortium (WTCCC), a pioneering programme which aims to understand the origin and functional impact of CNV in the human genome. The WTCCC involved a collaboration of 24 leading human geneticists analysing over 20,000 DNA samples in order to identify genetic variants that could play a role in a variety of human diseases, including hypertension, coronary artery disease, diabetes, breast cancer, rheumatoid arthritis, Crohn's disease, and bipolar disorder[1]. OGT's expertise in genetic analysis enabled the delivery of over two billion high-quality data points and completion of this landmark project in just 20 weeks.

1 Conrad, D.F. et al (2010) Nature. Apr 1; 464.

» INFORMED ENERGY CHOICES

Pilio

Pilio, the first start-up company from Isis' Software Incubator, offers building energy analytic services and online energy management software to help businesses identify opportunities to cost effectively reduce their energy use by up to a third.

The sMeasure (for business) online software products were developed and piloted at Oxford University's Environmental Change Institute. Cutting-edge techniques in energy-weather analysis and efficiency performance comparison are used to help people understand energy use, take meaningful actions and quantify the savings. Users of the software need only to input energy meter readings – no additional devices are required to gain the benefits of the analytics. For the energy-weather analysis the software seamlessly integrates heating and cooling degree day data from Pilio's degree day dataset for over 5,000 weather stations worldwide.

According to Pilio CEO Catherine Bottrill, "sMeasure gives individual organisations and communities of organisations the information to hand to stop energy waste and know what savings have resulted from the actions taken and energy efficiency investments made."

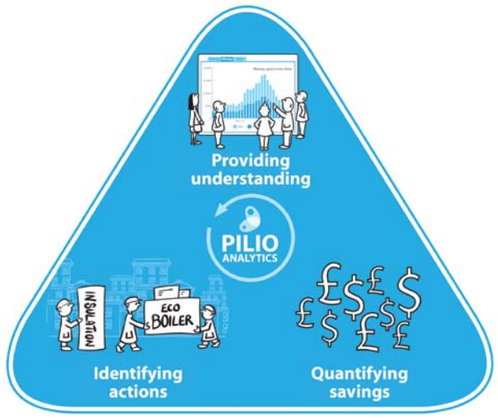
Using the software requires only five minutes a week to input meter readings. Organisations can look at their patterns of energy use over time so that they can spot peaks, troughs and abnormalities, which will alert them to problems for example with their building control settings or prompt them to carry out maintenance work.

Pilio is working with the Church of England and Julie's Bicycle (for the Arts) to help these organisations understand and take strategic actions across a whole estate of Church and arts buildings, respectively. Internationally, Pilio is part of the Innovator Pilot Project administered by the US Pacific Gas and Electricity Company, where sMeasure is open to small and medium sized businesses in California to use.

The company is named Pilio in reference to the butterfly effect whereby small changes can have a big impact. This symbolises the positive effect that informed energy usage can have on the environment.

The Isis Software Incubator, created in 2010, supports qualifying individuals and teams with software venture ideas to develop their product and start trading. By minimising overhead costs and risks in the most fragile stage of the venture creation, the Incubator helps to bring the venture to a state where it can stand on its own feet, make an attractive investment proposition or even be ready for a trade-sale. For a business venture that has not yet been formed into a company, the Isis Software Incubator provides the infrastructure such as accounting and legal services which enable early trading, as well as desk space in Isis' offices.

Pilio spent one year as part of the Incubator. CEO Catherine Bottrill puts the total amount of support received through being involved in the incubator at £500,000, taking in grants, services gained, contracts won and salaries paid.



Pilio

» CREATIVE MOTION

NaturalMotion

NaturalMotion's technology first captured the imagination of the gaming industry in Los Angeles in 2006, when the dynamic character animation system was demonstrated in next-generation Star Wars and Indiana Jones games at a leading trade show.

NaturalMotion had created 3D character animation software – the first company to do so – based on Dynamic Motion Synthesis (DMS), a technology that simulates the human-nervous system.

Based originally on Oxford University research into the control of body movement, NaturalMotion's technology has permeated the games world over the last few years.

Playstation3, Xbox360 and PCs all use NaturalMotion's euphoria, which synthesises 3D character animation in real time to create unique game moments and previously unachievable interactivity.

Endorphin, NaturalMotion's other DMS product, creates off-line animation quicker than traditional techniques, and is widely used in the film and games sectors by the likes of Sony, Giant Killer Robots, The Mill, Capcom, Namco and Konami.

NaturalMotion Games develops and publishes games for iOS and Android. With over 30 million downloads it is one of the fastest growing publishers on these platforms. The 'CSR Racing' game has topped worldwide charts since its launch.

The Grand Theft Auto franchise, one of the most successful games series of all time, has been made even more vivid through its recent collaboration with NaturalMotion.

Natural Motion's CEO, Torsten Reil, describes the company's collaboration with Isis.

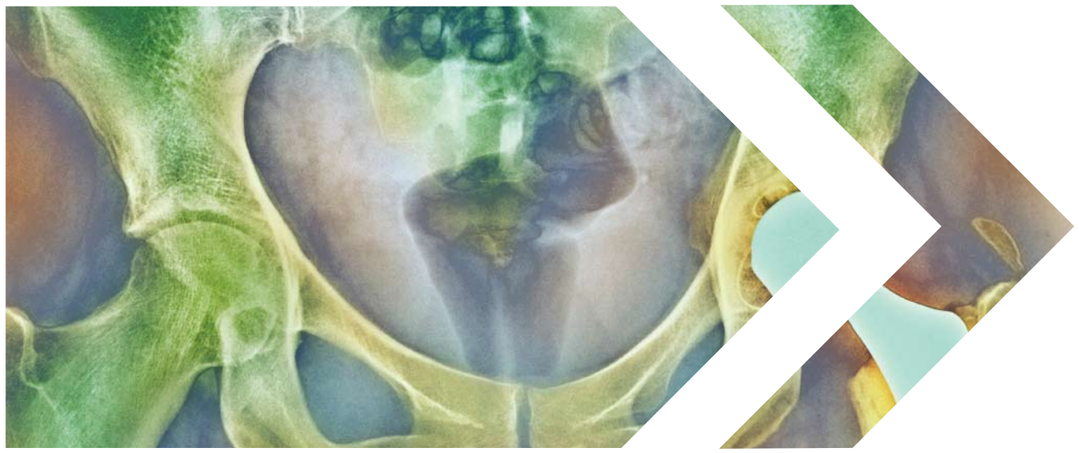
"I don't think we would have started the company without Isis. I didn't have any contacts and I wouldn't have known where to start. We applied for a patent through Isis and they were very useful in helping us negotiate with the angel investors.

My research was in simulation of human locomotion. I worked with an Isis Technology Transfer Manager who was a programmer, to create prototypes that we could show to investors.

A UCSF grant provided the crucial funding to get this programming started. Eventually we closed the deal. It would have been impossible without Isis – they acted as a catalyst and enabler to get this done."

naturalmotion GAMES

THE PATIENT PERSPECTIVE



Patient Reported Outcome measures

Patient experience is becoming ever more central to the 21st Century healthcare system. This changing focus requires robust and clear methods for assessing a patient's view specific to condition and the impact of treatments they receive.

Patient Reported Outcome (PRO) measures – health questionnaires completed by patients themselves – are increasingly being used for assessment of a broad spectrum of clinical conditions and interventions. PROs can also provide invaluable data in clinical trials for developing new therapies, often being used to support biochemical data such as blood tests, in addition to assessing how well existing treatments are working.

Isis Outcomes, an activity within the Technology Transfer group at Isis Innovation, provides access to a broad portfolio of condition-specific PROs developed by researchers at the University of Oxford covering areas from orthopaedics to neurodegenerative diseases. Invaluable consulting expertise in the best-practice use of PRO measures and interpretation of results is also available through Isis Outcomes.

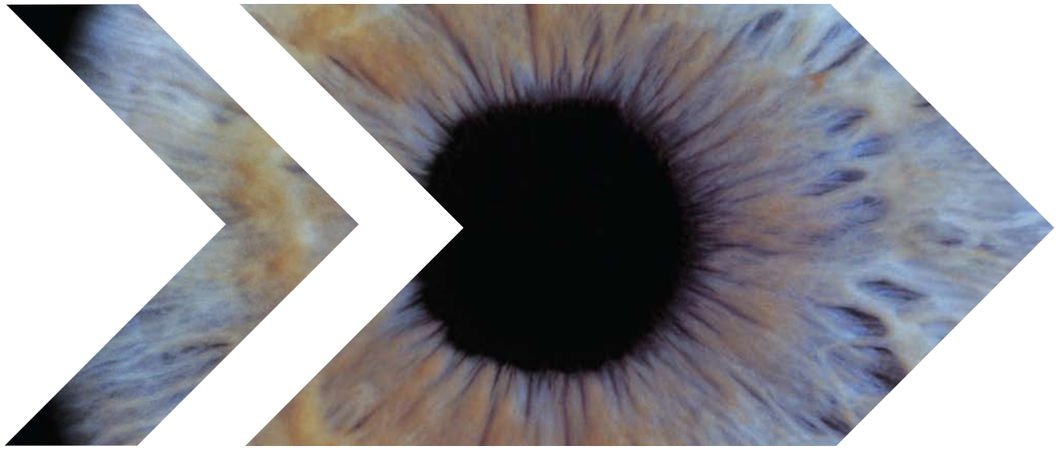
From the portfolio of Oxford PROs now in use, those for orthopaedic assessment have arguably had the greatest effect on healthcare to date. Developed by researchers within the Health Services Research Unit (HSRU) within the Department of Public Health at the University of Oxford in association with surgical colleagues in the Nuffield Orthopaedic Centre, these PROs cover joint specific measures for the knee, hip, elbow, shoulder and ankle/foot. The Oxford Hip and Knee Scores have been adopted by the National Health Service to assess the outcome of over 120,000 total joint replacement hip and knee operations conducted in the UK every year. Health providers in multiple countries around the world are now also adopting these measures to assess the outcomes of hip and knee interventions.

The Oxford Hip and Knee Scores have been adopted by the NHS to assess over 120,000 total joint replacement operations every year

PROs

PROs are also useful in assessment of neurological conditions, allowing greater understanding of the often subjective nature of these conditions. The Parkinson's Disease Questionnaire (PDQ) is the most widely used PRO measure of function and well-being for Parkinson's patients, and is now considered the industry 'gold standard'. Originally developed by academics in Oxford University's Department of Public Health, led by Professor Crispin Jenkinson, it has been designed primarily for use in clinical trials of potential therapeutics and has been used extensively throughout the pharmaceutical sector as a secondary or, in some cases, a primary outcome measure. To date it has been translated into over 80 languages and licensed to over 160 research organisations running clinical trials for Parkinson's disease treatments.

EYE OF THE NEEDLE



Oxford University Consulting & Lein Diagnostics

A method which will allow people with diabetes to measure their blood glucose level via an image of their eye has been developed by Reading-based Lein Applied Diagnostics following consultancy work arranged by Isis' Oxford University Consulting group. Lein approached Dr Gari Clifford, University Lecturer in Biomedical Engineering at Oxford, to explore how his work in neural networks and machine learning could be applied to some of Lein's complex datasets in order to evaluate the relationship between the data collected from the patient's eye and their blood glucose level.

Measuring blood glucose levels is critical in the clinical management of diabetes. It helps patients and clinicians tailor the correct dosage of medication and avoid hypoglycaemic events.

Monitoring is currently performed using needles that cause pain and carry the risk of infection, which can mean patients do not test themselves with sufficient frequency to detect minor but significant changes in their blood glucose levels.

Lein, a medical technology company, are developing their proprietary confocal optical technologies into a non-invasive monitoring system that patients will use by simply holding a mobile-phone sized device in front of their eye and taking a "snap-shot" of their blood glucose levels.

The contract for the consultancy with Lein was arranged through Oxford University Consulting, which worked closely with both parties to ensure that all needs were accommodated and a tailor-made solution was provided. For a number of companies seeking to gain an edge in the development of new medical technologies, the range and depth of expertise at the University of Oxford has provided invaluable support and insight.

Lein
Applied Diagnostics

Dr Dan Daly, of Lein Applied Diagnostics, explains how the company came to work with Isis and describes the global impact the new technology promises to make.

"Diabetes is a worldwide problem that is growing at a frightening rate. A meter that allows pain free and more convenient glucose testing for the person with diabetes will provide a dramatic improvement in the quality of life for many millions of people.

"Oxford University, due to its long history of undertaking high quality research, was a natural partner for Lein. Having made contact with Gari Clifford and his team at the IBME it was clear that they had a lot of value to add to our work so we were introduced to Isis to make the collaboration happen. Isis has acted as the commercial interface between Lein and the academic researchers at Oxford. They have negotiated the contract terms, including the IP issues that are always very important in these agreements, and have made the interaction smooth and efficient."

» SUSTAINING ORGANS

Organox

The OrganOx device was developed to address an urgent unmet need – the shortage of donor livers available for transplantation.

Over 370 patients are waiting for a liver in the UK at any one time[1], and there are around 30,000 patients on liver transplant waiting lists in Europe and the US. However, only 12,000 liver transplants take place per year in these countries[2] and up to 15 percent of patients die while waiting for a transplant.

Organox hopes to double the supply of livers available for transplantation.

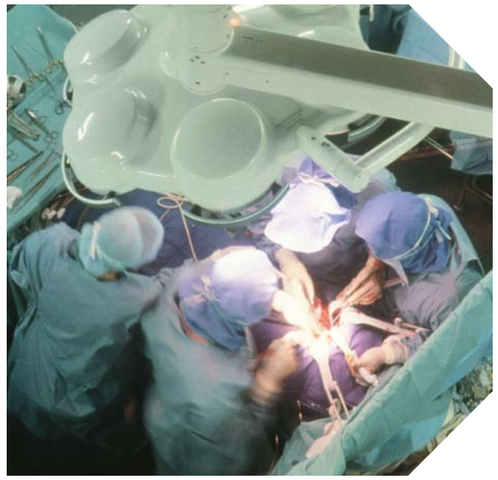
The OrganOx device sustains organs outside the body using blood at normal body temperatures. It was developed by academic founders Professor Peter Friend, a leading transplant surgeon at the Nuffield Department of Surgical Science, and Professor Constantin Coussios, of Oxford's Institute of Biomedical Engineering. The intellectual property centres on enabling an organ to self-regulate its blood flow and blood pressure, causing minimal harm to the organ during its journey from donor to recipient.

Isis Innovation managed the project and early experiments were funded by the Oxford University Challenge Seed Fund. In 2008 a consortium of five investors provided £1.5 million to establish the company.

OrganOx has now developed prototype devices for its first clinical trial, due to take place in 2012. The company expects that the device will be available for sale to liver transplant centres and organ retrieval teams in 2013.

The OrganOx apparatus is applicable to other organs, and could also be used for localised chemotherapy to the liver and in drug development.

"These are patients in the most productive part of their lives."



A precious resource

Professor Peter Friend, surgeon and inventor of the OrganOx device explains that organ transplants can have long-term success, "The chance of a patient being alive 10 years after a transplant is about 70 percent. These are patients who are mostly young or middle aged, in the most productive part of their lives. The commonest causes of liver failure include Hepatitis B and C, autoimmune conditions, alcohol, enzyme defects and liver cancer.

"Liver disease is increasing and waiting lists are going up," said Prof Friend. "The OrganOx device maintains the liver outside the body before transplant, and also allows the function of the organ to be assessed, allowing us to tell if the liver is likely to work if transplanted," he said.

OrganOx
living organs for life

1 Transplant in the UK Activity Report 2009
http://www.uktransplant.org.uk/ukt/statistics/transplant_activity_report/archive_activity_reports/archive_activity_reports.jsp
2 These figures are collated by Organox

» EDUCATION POLICY

Oxford University Consulting, CfBT, Pearson, British Education Research Association

Oxford has been making a major contribution to the study of education as a field for over 100 years and today the University's Department of Education has a world class reputation for research. The Department shares the expertise gained from its research by providing consultancy services through Oxford University Consulting to governments, NGOs and commercial organisations. The consultancy ranges across the spectrum of educational age groups, from nursery associations such as the NDNA, to school improvement programmes with Pearson Education, to higher education with the British Education Research Association.

"Oxford University Consulting has provided us with world-class, expert analysis of our approach to school improvement," says Dr Kate Edwards, Head of Research and Communication at Pearson.

"They've provided us with an objective, external perspective on our work that we think has helped to stimulate our thinking and refine our approach."

The Department of Education has also provided consultancy through OUC to produce four literature reviews for the CfBT Education Trust on different aspects of the effectiveness of schools.

CfBT is a charity employing 2,500 people worldwide. With a turnover exceeding £100 million it has been ranked 30 out of 3,000 charities in the UK in terms of income by Caritas Data. CfBT's aim is to ensure that investment in educational research has a direct impact on beneficiaries via practitioners and policy makers.

The findings from these reviews will be used to identify the key challenges to increasing the effectiveness of schools in the Gulf region, serving as background papers for a symposium which took place in Dubai in December 2010.

Societal Impact

Karen Whitby, Research Manager at CfBT, describes the societal impact her organisation is making with the support of Isis Innovation's Oxford University Consulting.

"CfBT contacted OUC because we wanted to contract Professor Pam Sammons and we also felt that the 'brand' of Oxford University would appeal to our partners in the UAE. Pam requested that the work we commissioned be contracted through Isis and they have helped us with our research.

"As one of the top 30 charities in the UK, we work for and with individuals and communities in order to help them reach their potential. As a not-for-profit organisation we commit around £1 million of our surpluses every year for practice-based educational research. There is an ambition within CfBT to ensure that the organisation's investment in educational research has a direct impact on beneficiaries via practitioners and policy makers. This investment is now channelled through our Evidence for Education (EfE) Research Programme; a distinct and original research programme designed by CfBT with the intention of helping to establish education as an evidence-based profession."

OXFORD UNIVERSITY CONSULTING

COMMERCIAL NANOFIBRE MANUFACTURING

Stellenbosch University

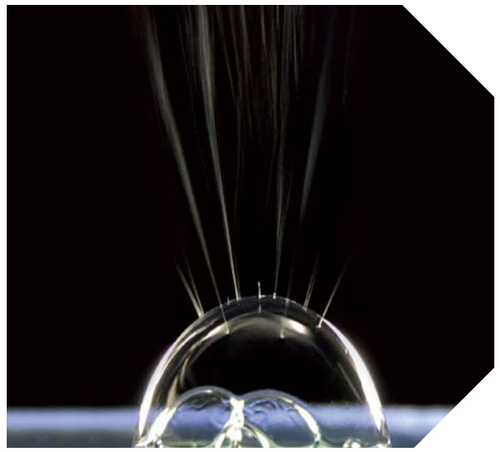
Isis assisted Stellenbosch University in South Africa to bring their innovative nanofibre manufacturing technique to market by developing strategy and making the right contacts with companies involved in nanofibre development and manufacturing.

Stellenbosch is recognised as one of the top research universities in South Africa. The team of researchers from Stellenbosch invented a family of clever technologies that finally make large scale, inexpensive nanofibre manufacturing possible. Stellenbosch launched a spin-out company to further develop these technologies and is negotiating licensing and joint development agreements with several large multinational companies.

The newly invented bubble electrospray process enables the manufacture of very large quantities of aligned nanofibres and continuous spinning of the fibres into yarn. This process works for a wide range of materials and applications, with either water or solvent based solutions. The research team have successfully spun fibres from a number of polymers, carbon precursors and other compounds. By using surfactants to stabilise the bubbles, large numbers of nanofibres can be extracted simultaneously.

For those liquids that do not easily form bubbles, the Stellenbosch team has invented what they refer to as 'solid bubbles'. This technology uses solid glass spheres that are continuously rotated through the desired solution. The nanofibres are extracted by an electric charge from the surface of the spheres in the same manner as from the ordinary bubbles, allowing nanofibres to be spun from a very wide range of substances.

The Stellenbosch researchers have also invented a novel antimicrobial polymer compound that can be spun into nanofibres that are intrinsically antimicrobial, opening up a wide range of potential new healthcare products, as well as air and water purification applications.



About Nanofibres

Nanofibres have captured the imagination of researchers for decades now. Many potential applications have been identified including better composite materials, advanced membrane and filter materials and a variety of potential medical products. However, the inability to manufacture large quantities of nanofibres economically has held back these technologies from achieving their potential.

Using the Stellenbosch process, the diameter of the nanofibres can be controlled by varying the viscosity of the solution and the size of the bubbles or spheres. Projections indicate that the bubble electrospinning process could produce fibres at rates of between 500 g and 5 kg per hour per square metre of spin-bath surface area, depending on polymer and spin solution concentration.

UNIVERSITEIT STELLENBOSCH UNIVERSITY

SEED FUND SUCCESS

Fundación Barrié

The Fundación Barrié is a private foundation devoted to promoting the development of Galicia in Spain through the support of research and the realisation of its results in the commercial market.

The foundation created a Technology Fund to support the exploitation of the results from research undertaken in Galicia with assistance from Isis. Isis is providing a comprehensive set of services – helping to ensure that investments are correctly made and that projects have the highest chance of being successfully commercialised.

At the proof of concept phase of the fund, Isis carries out preliminary due diligence on a broad selection of projects to identify and prioritise those projects with the greatest promise.

Following the pre-screening phase, Isis staff assist the Fundación team by carrying out more detailed due diligence studies on those selected projects, ascertaining the potential return on investment, the level of competition and the market size. This information is then presented to the Director of the Fundación, following which the project team, led by Isis, pitch for investment.

For particularly promising projects that receive investment, Isis can provide specialist support leading the commercialisation with the local university technology transfer team, managing the process from the market strategy to raising investment. Of the first 18 technologies reviewed for the fund, around half progressed through to the due diligence stage. Isis is confident that in years to come the Fund will mirror the success of the Oxford University Challenge Seed Fund which has made over 100 awards.

Fundación Barrié

The Foundation owes its origin to the generosity of the entrepreneur and patron Pedro Barrié de la Maza. Created in 1966, the Foundation has devoted its resources to programmes and projects aimed at promoting the sustainable development of Galicia, with particular emphasis on initiatives concerning education and developing talent.

The Foundation applies strategies that place a high priority not only on innovation, rigour and excellence, but also on proximity, encouraging participation and ensuring that its services and activities are accessible to all residents of the region. The long-term vision of the Fundación is to establish and develop sufficient capacity within Galicia such that the technology transfer staff undertake the management of projects independently. To help facilitate the transition, in addition to conducting project due diligence and management, Isis Enterprise hosts Technology Transfer Training secondments at Oxford for university technology transfer staff.

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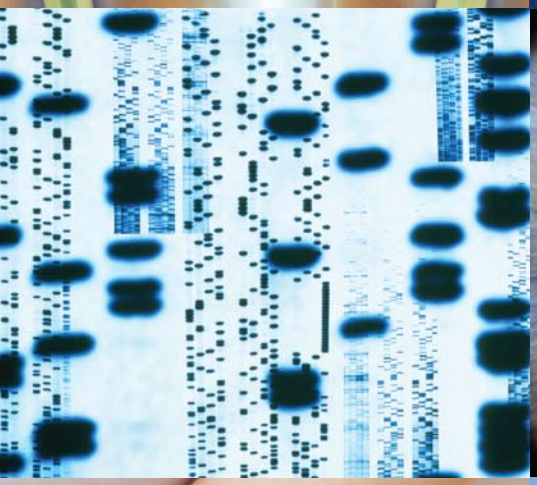

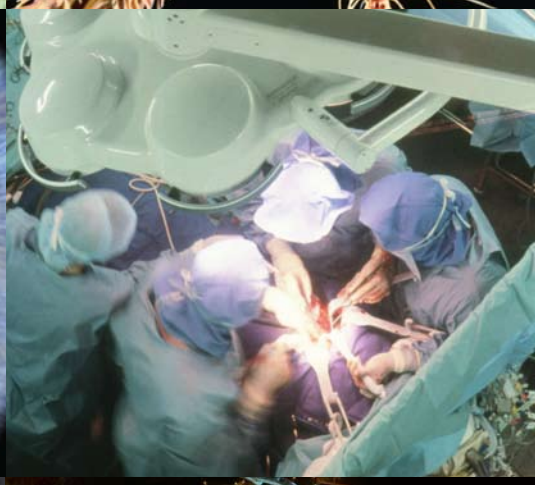


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