



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

innovation insights Issue 2 March 2016

The latest innovations, collaborations and technology transfer

OxREACH Pilot Project

Oxford launches first crowdfunding project, LIFE >>>



Targeted tumour treatment



Multivalent dengue vaccine



Smart pumps for determining water levels



Early detection of brain tumours











innovation insights >>

contents

(i) information

- Editorial: Technology, expertise and entrepreneurship from Oxford
- News/Events: The latest from Isis Innovation
- Oxford Innovation Society feature: RTC Innovation, discusses how Oxford and China are working together in technology development
- OxReach crowdfunding platform: OxReach approached Isis Innovation to help launch its first crowdfunding project, LIFE
- investment
- >>> Covatic: Oxford spin-out develops a smart engine that delivers personalised media content
- consultancy services
- Commercialisation Strategies for emerging economies: Advice on innovation capacity and research in EU Indonesia Trade Corporation Facility
- >> Visual Data: Presenting long-term data on how the world is changing
- >>> Leaders in Innovation: Building the capacity of researchers in Newton Fund countries
- Improving patient care: OUC worked closely with the Centre for Evidence-Based Medicine
- Negotiations with Chinese partners: Isis Innovation Hong Kong continues to support the transfer of technologies from foreign organisations
- Solar energy storage in the home: A system which stores solar energy during the day and releases it when required



- Meningitis B Vaccine: A stable, non-functional Neisseria protein that induces cross-strain bactericidal antibody responses
- Diesel fuel from biomass-derived products: A catalyst and process for producing diesel fuel from bio-based oils
- Early detection of brain tumours to improve patient management: Oxford scientists have developed MRS methods which can discriminate between IDH1 and IDH2 mutations
- Smart pumps for determining water levels: A new pump maintenance service which significantly reduces water hand pump downtime and enables improved water access
- Targeted tumour treatment: Fluorogenic compounds release drugs that allow enhanced tracking and imaging of site-specific delivery
- **OSSKAR:** A simple medical device for knee arthroplasty radiographs in the absence of a clinician
- Improved tools for corrective surgery of the tibia: A novel system to improve outcomes and patient experience in tibial osteotomy
- Multivalent dengue vaccine: A universal dengue vaccine to induce cellular immune responses against all dengue virus serotypes
- Blood-based biomarkers for detecting Alzheimer's disease:

 A blood-based protein signature that exhibits increased levels in patients experiencing cognitive decline
- Precise positioning of aircraft: Bio-inspired solution for reducing drag on aircraft which cuts fuel consumption or extends flight duration









Technology, expertise and entrepreneurship from Oxford

In this edition we feature OxReach, the University's new crowdfunding platform, and the first project using it which will use gaming technology on mobile phones to improve training of healthworkers in the developing world. Other articles include introductions to more new technologies, and a review of the last Oxford Innovation Society event which explored the academic and business links between Oxford and China.

The first edition of this new publication (still available online) introduced a wide range of technologies from medical diagnostics to improved rotary engines, stories of academic consultancies, and new companies growing with the support of our investor community. The feature article described a non-invasive prenatal diagnostic technology which offers significant patient benefits.

With 15 new companies (spin-outs and startups) formed already this financial year, innovation is thriving in Oxford. Please do register to find out more at our AlMday in June and our Technology Showcase in July - details on the News and Events page.

We hope that you enjoy reading this publication, and welcome your feedback.

Linda Naylor, Managing Director









information

News/Events



Oxford's first crowdfunding platform

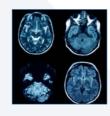
Life-saving Instruction For Emergencies (LIFE) is the first project to launch on the new crowdfunding platform



Orbit Discovery launches peptide-discovery platform

New screening platform will help to identify targeted affordable therapeutic drugs

full article >>>



Device to treat patients suffering from brain aneurysms

Oxford spin-out, Oxford Endovascular, developed advanced tiny metallic mesh tube devices to treat brain aneurysms

full article >>



Oxford spinout launches data discovery software

full article >>

Zegami has developed software that will search, sort and group images in real time

full article >>



Tackling 'Big healthcare challenges in chronic disease'

The Blavatnik School of Government will be the venue for the 2016 Oxford Technology Showcase

full article >>>



Machine learning spinout unlocks big data insights

Mind Foundry have developed technology that uses advanced algorithms to help organisations solve big data problems

full article >>



Connecting industry and academia

The first Oxford Academia-Industry Day (AIMday) will provide a unique opportunity for academics and companies to discuss the major digital health issues

full article >>









invention



Advanced cross strain immunity to meningitis B

There is still an urgent need to develop improved vaccines to protect against menigococcal disease caused by Neisseira menigtidis serogroup B (Men B). One of the major stumbling blocks to developing an effective Men B vaccine is the extensive antigenic variation between strains of the pathogen. This property makes it difficult to develop vaccines that provoke broadly protective, cross-strain immunity.

A key pathogen protein which is involved in evading the host's immune system is factor H binding protein (fHbp) of which there is three variant groups (v1 - 3). Men B vaccines currently in development comprise representative protein sequences from one or two of these variant groups but none includes v2 due to its inherent instability.



The Oxford project has identified a homologue of fHbp that is expressed by the related pathogen, Neisseria gonorrhoeae. This protein, dubbed gonoccoal homologue of fHbp (ghfp) can induce bactericidal antibody responses that are cross-reactive for all three variant groups of Men B fHBp suggesting that it could provide effective, cross-strain immunity to Men B.













The broadcast industry has changed rapidly over the last five years with an explosion of video-on-demand and "TV anywhere" services. Access to content anytime and anywhere has complicated the ability for traditional broadcasters to meet the changing expectations of audiences and retain viewers. Broadcasters are looking at how they can retain or increase their market share by adapting their service to the new ways in which consumers access their content, whilst retaining a strong brand identity.

Covatic will use semantic technologies developed at the University of Oxford to deliver a bespoke TV channel to individual viewers. The TV channel will offer a personalised experience by automatically selecting and augmenting content from a provider (or many different ones) into a single online, on-mobile and on-TV channel. This is different to current offerings, as it combines the curated schedule of a traditional broadcaster with the flexibility of video-on-demand. Major broadcasters have expressed a strong interest in the technology, and the Covatic management team are in talks at the highest level to take this forward.

Visit Site











invention



Diesel fuel from biomass-derived products

Renewable fuels are a growing, international market with significant private investment and government support. Biofuel production capacity is expected to reach over 1 billion gallons worldwide in 2014 and CleanTech Group estimate that almost \$5 billion has been invested in projects in the US since 2007.

Bioethanol and first-generation biodiesel make up over 80% of the market for renewable fuels. However, these products have drawbacks as they are not compatible with standard petrol or diesel engines and can only be used as additives or in blended products. There is now a growing market for "drop-in" biofuels. These are fuels that are made from a variety of biomass feedstocks and can meet current diesel, gasoline or jet-fuel quality standards. Oxford researchers have developed a hydro-deoxygenation catalyst using supported noble metal nanoparticles.













Commercialisation Strategies for emerging economies



Emerging economies are embracing innovation as one of the key ingredients for economic development, and Isis Enterprise (IE) has seen a growing demand for consulting and training in these regions. Governments and universities are investing in capacity building programmes for technology transfer and entrepreneurship, but what models will produce the desired results?

While some seek to emulate leading institutions from the US or Europe, it is important to remember there is no 'one-size-fits-all' approach to commercialisation: different ecosystems and economies require different approaches.

Isis Enterprise's recent work in Indonesia offers a case study for

how to approach this challenge. In October 2015, IE was contracted by the EU-Indonesia Trade Cooperation Facility to advise on innovation capacity and research commercialisation strategies, as part of an economic development programme. Here we present some of our initial observations.







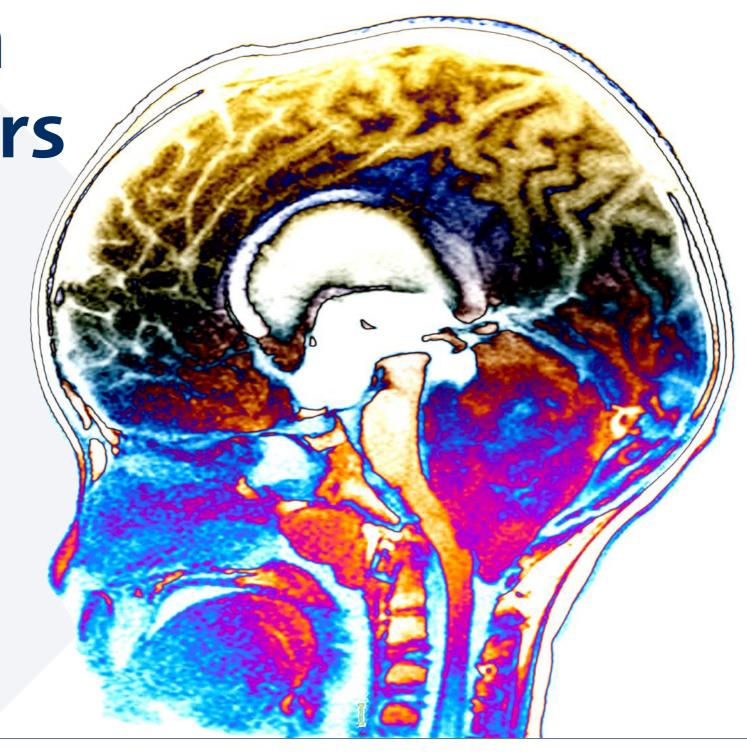




Early detection of brain tumours

Around half of all brain tumours are classified as gliomas; the fastest growing classes of brain tumours fall into this group. Knowledge of tumour sub-type and mutations, which may have occurred, is essential in determining the best route to managing the disease.

Magnetic resonance spectroscopy (MRS) is an MRI technique which looks at chemical signatures in the human body. MRS is known to be useful in identification of 2-hydroxyglutarate (2-HG) producing brain tumours. Some classes of 2-HG producing tumours have increased susceptibility to chemotherapy and so rapid identification of these tumours provides a tangible means of improving a patient's chance of survival.

















consultancy services



Visual Data

Life in the 21st century is getting more and more difficult isn't it? Well, actually, in many important aspects it isn't. A fascinating Oxford project called "Our World in Data" visualises datasets of global trends across time.

The underlying message from the project is good news: the world today is more peaceful, educated and healthier than ever before. The project is the inspiration of Dr Max Roser, a James Martin Fellow in Economic Modelling at the Institute for New Economic Thinking (INET) at the Oxford Martin School. Dr Roser has collated datasets and visualised a huge range of vital topics including population growth, health, food, energy, environmental change, technology, prosperity, standards of living, politics, crime, education, war, values and society. The project web site reports all of these many aspects, where things are getting worse and where the world is making progress.

The result is a fascinating and compelling new perspective on empirical research findings that taps into the infographic zeitgeist and has helped to make Dr Roser one of Oxford University Consulting's most active consultants.



research





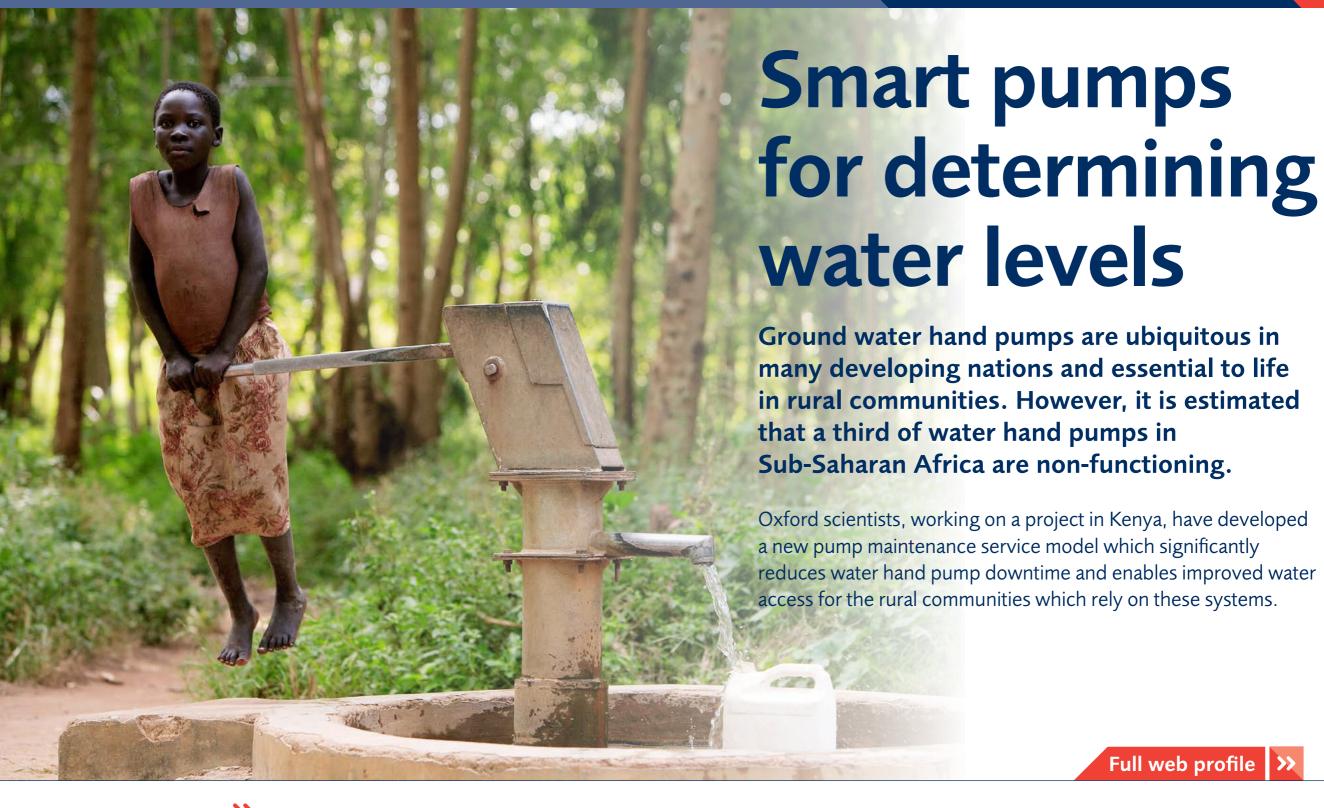




















consultancy services



Innovation and entrepreneurship training Newton Order Order Lengineering



Leaders in Innovation Fellowships Programme delegate

This is a welcome opportunity for IE to expand its global network of innovators, and another example of successful technology commercialisation training from IE.

Leaders in Innovation Fellowships programme: building the capacity of researchers with expert coaching and mentoring.

For two years running Isis Enterprise has designed and delivered specialised training programmes for the Leaders in Innovation Fellowships programme organised by the Royal Academy of Engineering (RAE). In December 2015, 45 innovators from Mexico, Brazil, and Chile spent two weeks in London learning about innovation. Isis Enterprise provided training in business modelling, leadership, finance, Intellectual Property, and regulation, and coached fellows on how to present their technologies and pitch to investors.

The aim was to help fellows develop business propositions for their innovations. In February and March 2016, cohorts from another nine countries took part in the programme.





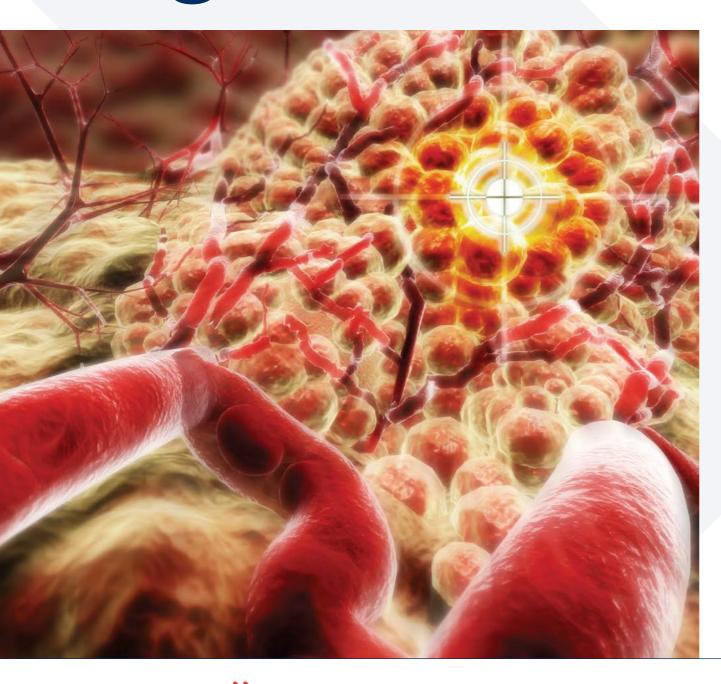








Targeted tumour treatment



Hypoxia (low oxygen concentration) in cancer arises as a consequence of poor vasculature and irregular blood vessel distribution, leading to solid tumours that exhibit heterogeneous oxygen tensions throughout.

This commonly occurring and clinically relevant condition drives tumour progression and promotes more aggressive characteristics, including malignant phenotypes, genomic instability and metastasis. Despite this, the most aggressive components of tumours exist and thrive in hypoxia, where these cells have increased resistance to multiple modes of cancer therapy.

However, the chemically reducing nature of low oxygen tensions provides an opportunity to selectively deliver chemotherapeutics in cancer and consequently increase sensitivity to current treatments.

Oxford academics have developed chemical groups, which upon reduction in a hypoxic environment such as tumours exhibit fluorogenic activity, thereby acting as a marker of prodrug activation in hypoxia. Furthermore, this group simultaneously acts as a vehicle for the selective delivery of compounds, including chemotherapeutic agents, to hypoxic tumours.

Full web profile











Oxford, China Innovation

The winter Oxford Innovation Society meeting was sponsored by RTC Innovation, which specialises in investment and technology development between the UK and China.



Headquartered in Birmingham and with offices in China, the company has been working with leading Chinese investment funds, private investors and industry contacts since their launch in 2009, sourcing strategic investment and routes to market for innovative UK-based technologies.

Having worked closely with Isis Innovation since 2010, RTC Innovation have been a key partner in the creation of a number of Oxford University spin-outs, such as Oxford Multi Spectral, Oxford Vacmedix, Assisted Vision, Oxford PV and the recent Oxford Enhanced Medical Limited, a spin-out developing imaging technology for the detection of cancers.

UK Director Dr Jian Cao and Project Manager Ms Kulvinder Johal, along with their Chinese partner, Sino-Europe Innovation Network, were happy to sponsor the meeting at the Oxford University Museum of Natural History in November 2015. The meeting highlighted Oxford China Innovation – with the Oxford Vice-Chancellor (2009-2015), Professor Andrew Hamilton as the academic speaker.

Visit site











invention



Hands-free stress imaging of the knee

Placing a patient's knee in a 'stress' position while taking an x-ray enables full cartilage visualisation, a prerequisite for determining their suitability for total vs. partial knee replacement. As the latter is associated with both improved patient outcomes and health economics, stress knee radiographs are of high value in clinical decision making.

At present, stress positioning is carried out using complex medical devices that are heavy, expensive and unpleasant for the patient. Alternatively, the lower limbs can be manually held in place, which is not only expensive but involves the clinician experiencing radiation exposure. Due to these limitations, stress-positioning radiography is often not carried out and patients are inappropriately referred for total knee replacement.

OSSKAR (the Oxford Stress System for Knee Arthroplasty Radiographs) is a new approach to stress positioning, providing a simple and light-weight

medical device for comfortably placing patients in standardised stress positions for x-ray radiography while removing the need for a clinician.



755KAR











Evaluating Evidence Use



Improving patient care

Patient treatment that fails to consider available evidence can inadvertently lead to harm. Evidence based medicine (EBM), which incorporates patient's choices and values with clinical expertise and the best available evidence, is now regarded as the de facto way that healthcare should be provided at individual and population levels.

*Evidence-based**

*Evidence-based**

*Practice**

Misunderstanding or not recognising the importance of clinical evidence is a risk for companies bringing products or treatments to market. Understanding how to acquire evidence, critically appraise it, and apply the conclusions to patients reinforces effectiveness and value of treatments.

Oxford University Consulting (OUC) works closely with the Centre for Evidence-Based Medicine to deliver bespoke problem-oriented, learner focussed workshops in the field of EBM. These include short courses that introduce the basic concepts of EBM to more advanced courses on Study Design & Research Methods, systematic reviews, clinical trial management, guideline development and turning knowledge into action.

Applying Evidence to Practice

Appraising Evidence

Searching for Evidences

Formulating

subscribe

Your Clinical

Question

Full web article

INNOVATION











Tools for corrective surgery of the tibia

High tibial osteotomy surgery is conducted to correct the alignment of the lower leg. So far, minimal surgical planning technology is used and only rudimentary instrumentation is available.

As a result, the outcome following surgery shows varied patient satisfaction and patient complaints of ongoing pain and discomfort around the operative site. The reasons for this are complex but are thought to relate to non-anatomical plate design and difficulties in the precise delivery of a sensitive bony correction.

Novel plate, wedge and cutting system have been developed to improve the experience of patients in these key orthopaedic procedures.



Full web profile











6 ways to streamline negotiations with Chinese partners



Negotiations between foreign and Chinese partners are complicated by differences in industry structure, role of government, respective corporate competencies, business culture and language. But the benefits, when successful, can be immense.

Exposure to Chinese investment capital and the rapidly developing Chinese internal market for more advanced products and services drive growing technology companies to develop their China strategy.

Isis Innovation, from its base in Hong Kong, is supporting the transfer of technologies from foreign organisations, including Oxford spin-outs, to Chinese partners through licensing agreements and the creation of joint ventures. In this article Dr David Baghurst, Managing Director of Isis Innovation (Hong Kong) offers advice and recommendations for negotiations.

Full web article











Multivalent dengue vaccine



Dengue fever is the most rapidly spreading mosquito-borne viral disease in the world. The World Health Organisation estimates that almost half of the world's population lives in at-risk areas, with around 390 million new infections every year. The disease is caused by four dengue virus (DENV) serotypes; infection with one serotype only confers protection against re-infection with the same serotype.

Multiple serotypes commonly circulate together in a particular geographical region and secondary infection with a different serotype carries the risk of developing haemorrhagic fever and shock due to antibody-dependent enhancement (ADE) where non-neutralising antibodies facilitate virus entry into host cells, leading to increased infectivity.

A safe and effective DENV vaccine must induce strong, long-lived protection against all 4 serotypes in order to avoid the risk of ADE.

An alternative approach developed by Oxford researchers is to use non-replicating viral-vectored vaccines to induce T-cell immune responses against the most conserved non-structural DENV proteins, aiming to increase coverage and generate full protection against all four DENV serotypes.

Full web profile













Solar energy in the home

An important consideration for the growing household solar energy market is the need for battery technologies which store the energy captured during the day for use in the evening as daylight fades and household energy requirements peak.

OUC have recently arranged a consultancy for Associate Professor David Howey from the Department of Engineering with Powervault, a UK company which is developing affordable and practical household solar energy storage devices tailored for the British market.

Powervault battery units store between 2 and 4 kWh of energy, and are at the forefront of the market in terms of ease of installation and affordability. This consultancy is focusing on Powervault's investigation into the use of "second-life" batteries from electric vehicles. Professor Howey provides advice on battery performance and degradation and procedures for characterising cells for integration into packs to assist Powervault in making their products greener and improving customer returns.

Visit site

















Blood-based biomarkers for detecting Alzheimer's disease

Oxford researchers have identified a group of proteins found in peripheral blood that function as a biomarker panel for detection and prediction of Alzheimer's disease (AD).

Alzheimers is the commonest form of dementia, which affects over 36 million people worldwide and costs health and social services more than cancer and cardiac disease combined. Disease modification therapies are being developed and will almost certainly be dependent on biomarkers for early detection in both drug development and clinical utility phases.

Currently, biomarkers including CSF analysis of proteins and PET imaging are becoming an essential component of clinical trials and are used increasingly in clinical practice. However, both approaches have limitations, which are relatively invasive and not universally available. As a consequence, there is considerable value in blood as a source of biomarkers for neurodegenerative conditions such as AD.















Precise positioning of aircraft

Aerodynamic drag exerts a force on an aircraft in the opposite direction to the intending direction of travel. Drag is the principal determinant of fuel consumption, but options for directly reducing drag are limited so much attention has understandably been directed at reducing fuel consumption through more efficient engines and using lighter materials such as composites

to reduce aircraft weight.

When more than one aircraft is flying the same route, an additional possibility is available, reducing drag by flying in formation. In order to do this the trailing aircraft must be precisely positioned to benefit from the drag reduction available from the leading aircraft's flight.

Researchers have invented a means for finding and positioning the trailing aircraft in its optimum location with respect to the leading aircraft, enabling significant drag reduction and improved fuel consumption and other benefits which follow from that. These benefits are of value to aircraft operators across the aviation sector.

Full web profile >>>











#Crowdtogether

It is with great pleasure that Isis Innovation announces the launch of the OxReach crowdfunding platform. OxReach is a philanthropic fundraising site dedicated to supporting innovative ideas and ventures from the University of Oxford.

An increasing number of universities are turning to crowdfunding to support the innovative ideas of their community members.

University crowdfunding encourages academics, students and alumni to make use of the different networks connected to universities to ask for funding for their creative projects.

Activities that have been supported in the past include research programmes, philanthropic projects and spin-out companies. Benefits to the universities include increasing the number of innovative projects financed, and enhancing community engagement.

A few recent, successful campaigns from other universities include:

FORM1: Researchers from MIT have started the FORM1 project to create an affordable, professional 3D printer. More than 2,000 backers have pledged over £2 million (breaking through the project's £70,000 goal), evidencing major support for FORM1 and consumer-level 3D printing.

CUER: Cambridge University Eco Racing raised over £10,500 from 192 backers to build a new solar car. The car competed in a 3000km solar marathon across Australia.

Please support our first campaign by sharing on social media or donating through OxReach.



Visit crowdfunding site



continued











information

The serious game of saving lives

Neonatal emergencies cause over 1 million deaths per year in Africa. Many of these deaths are preventable with good emergency care.

In Africa, healthcare workers managing the greatest number of emergencies have the least access to training. Providing good face-to-face training can cost a prohibitive \$150 per day per person in Africa. In addition healthcare workers are scattered over large areas and there are few experienced trainers. Only a fraction of healthcare workers get the training they need.



A new approach

Mobile phone penetration in Africa is growing rapidly with Africa having more mobile phone users than the U.S. or E.U (World Bank). Mobile applications provide an unparalleled opportunity to improve the coverage and affordability of training for healthcare workers in Africa.



The LIFE team are raising £100,000 to develop a first version of the game in 2D, 3D and virtual reality scenarios, and refine it with repeated user testing in UK and Kenya. Please help us to reach this goal and impact the lives of thousands of new-borns and mothers across Africa.

continued >







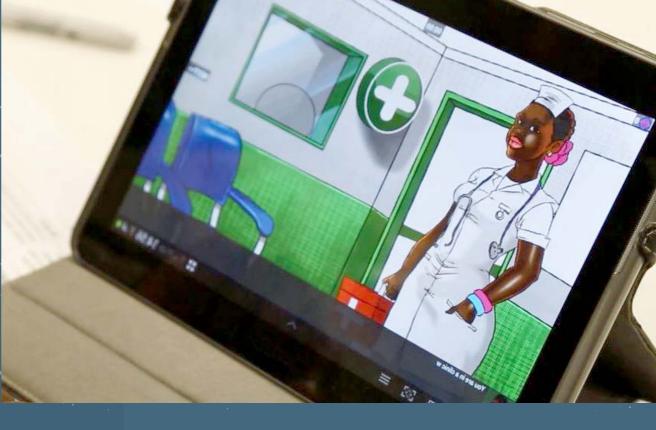


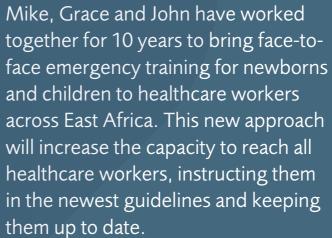
innovation insights >>

information

The rationale for using a serious game is that emergency care training teaches healthcare workers to follow structured care pathways (or algorithms). Key pieces of information (cues) are sought at each step that determines the next action. Executing the cue-response sequences perfectly, rapidly and automatically, supports effective care. Because games are essentially complex algorithms, interest has grown in how to optimise serious gaming to foster learning in healthcare. Systematic reviews show that technology enhanced training (Cook et al, 2011) and serious games (Sitzmann, 2011) can be associated with large effects on knowledge, skills and behaviour.

> Through LIFE, African healthcare workers even in the remotest settings will be equipped with the latest knowledge so that their first instincts are to act correctly.







Visit LIFE website >>>

















an intelligent partnership

Providers of innovative banking, legal, accountancy and business advisory solutions for technology based businesses in Oxford and beyond.

Andrew Davies
Corporate Director
Barclays Bank
T: 07775 548803
E: andrew.j.davies@barclayscorporate.com

Attilio Leccisotti
Solicitor
Blake Morgan
T: 01865 254217
E: attilio.leccisotti@blakemorgan.co.uk

Sue Staunton
Partner - Technology Group
James Cowper
T: 01865 200500
E: sstaunton@jamescowper.co.uk

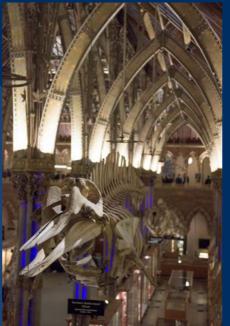






Information







Oxford Innovation Society 2016

The Oxford Innovation Society (OIS) is an open innovation network for industry, academia and investors. This years meetings will be held on:

- Thursday 17 March
- Wednesday 6 July
- Thursday 15 September

Meetings are held in Oxford for OIS members and invited guests, and are followed by a formal reception and dinner. Details on www.isis-innovation.com/ois

Isis Innovation Limited, Buxton Court, 3 West Way Oxford OX2 0JB T +44 (0)1865 280830 F +44 (0)1865 280831 E innovation@isis.ox.ac.uk W isis-innovation.com © Isis Innovation Limited 2016

















Research Innovation Impact Partnerships Space

Begbroke Science Park sits within the heart of Oxford's science and engineering activity - the only science park wholly owned and managed by Oxford University. If you're an emerging science-based business we know who you need to know. We'll connect you to Oxford's world-class interdisciplinary research, and to organisations across the Oxfordshire Knowledge Spine.

OPENING SUMMER 2016

ADDITIONAL mixed-use flexible offices & labs

RESERVE YOUR SPACE NOW! Call us on 01865 283700

















