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BIG IDEAS

SHOWCASE 2009

New technologies for world markets

Tuesday 13 October 2009 | Croke Park, Dublin

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A WORD OF WELCOME

The Big Ideas Showcase 2009 represents a collection of investment opportunities, each with its own merits and business potential. Each idea showcased today is the culmination of years of research and the application of that research to real problems by some of Ireland's finest researchers. Enterprise Ireland extends a warm welcome to the investors who have come along today to see which products and services developed by the research community will assist them with their businesses internationally. Your participation in this process is crucial to the success of these future companies and technologies.

Enterprise Ireland has assisted the researchers you will meet today to bring their technologies to the global marketplace. Some of these technologies are ground-breaking and in some cases life-saving. Amongst the twenty one big ideas on display here today are new medical devices, environmentally friendly products, exciting breakthroughs in mobile communications and underwater exploration machines to highlight a few.

The discovery, protection and transfer of commercially valuable intellectual property from 'bench to boardroom' is essential for Ireland to generate more high-value jobs and exports. Consequently, we are focused on increasing the commercialisation of research funded through State agencies, most specifically the Higher Education Authority, Science Foundation Ireland and Enterprise Ireland.

A national technology transfer infrastructure has been put in place under the Government's Strategy for Science, Technology and Innovation 2006-2013 to create a network of dedicated staff. The Technology Transfer Offices are placed within the commercialisation function of the higher education institutes, to work directly with them to ensure that best use is made of their research outputs with commercial potential.

Enterprise Ireland, in partnership with the technology transfer offices in Ireland's higher education institutes, has put in place a support system for capturing the commercial outputs of research in key areas like food, healthcare, IT, telecommunications and renewable energy and environmental technologies.

We want to increase the number of successful and innovative spin-out companies emerging from publicly-funded research.

This publication highlights the fact that State investment in research performing organisations is delivering tangible results that benefit both the economy and society, and I look forward to seeing the big ideas presented today trading on the world markets in the near future,

Feargal Ó Móráin

Executive Director
Enterprise Ireland.

FOREWORD

Artistent

Presenter:
Gerry Burke

Inventor
Dr. Daniel Kelly, TCD

Technology
Artistent

In recent years stents have blown open the field of treating narrowed or blocked arteries. Where once a patient might have required invasive surgery, now a widening stent device can be delivered to the problematic stretch by inserting a catheter in through the bloodvessel itself.

But bloodvessels in different parts of the body have different properties, and a stenting strategy that tackles a discrete blockage in an artery near the heart may not be enough to manage a larger lesion at the kidney or lower leg.

Artistent is designed to help overcome the issues of stenting peripheral bloodvessels, explains Letterkenny-based Gerry Burke, who initially heard of the project through the Enterprise Ireland Business Partners Programme.

"Peripheral vasculature is a huge growth market, the compound annual growth rate is between 10 and 15 per cent," he notes.

The Artistent design, which arose from research by Dr Daniel Kelly at Trinity College Dublin, allows a cardiologist to insert several small, unconnected stents through a catheter into a diseased artery in a single go.

The approach can save time, and facilitates the use of multiple stents rather than using a large single stent that may lack the engineering properties needed to withstand the kind of everyday wear and tear a peripheral bloodvessel experiences.

The market is competitive and fast-moving and the patented technology has just started preclinical trials, says Burke, an Enterprise Ireland Business Partner with three decades of experience in the medical device sector.

And he believes that eventually Artistent could be adopted for hard-to-treat areas like lower limbs in patients with diabetes who otherwise face amputation.

And he plans to keep resulting jobs at home. "My plan is to set this up as an indigenous company here in Donegal".

BIG IDEAS

Radical

One of the ironies of healthcare facilities is that vulnerable patients can catch new infections while being treated there. A recent report suggested that in Ireland around five to 10 per cent of patients in acute hospitals contract such a "healthcare-associated" infection.

Hygiene guidelines are in place to help control disease-causing microbes, but scientists at DIT are developing another layer of protection to kill bugs on surfaces like worktops, walls, doors and ceilings. And once in place the anti-microbial system easy to activate: you just turn on the light.

The product is an additive or powder that's added to a coating or glaze and applied to a surface, explains Dr John Colreavy, director of the CREST centre at DIT, where spin-out company Radical is commercialising the invention.

When light activates titanium dioxide in the coating, it results in a hydroxyl radical being generated on the surface. That radical acts like a molecular buzz-saw, cleaving organic material that it contacts and so attacking microbes, although at that scale the process is not harmful to humans, he says.

The product, which is activated by indoor, visible light, has known activity against MRSA and E. coli, and tests are underway against C. difficile. Tackling such bugs on coatable surfaces in a healthcare setting could not only help reduce human suffering, but also offer substantial savings in resources, according to Dr Colreavy.

"If in the environment 20 per cent of the infection challenge is coming from walls and doors and floors, and if we can deal with just 10 per cent of that challenge, thereby removing just 2 per cent of where the microbes are coming from, we can save the system €1.7 million per hospital over five years."

Presenter:
Dr. John Colreavy

CREST DIT

Technology
Radical

BIG IDEAS

Suura

Presenter:
Mark Dennehy

TCD

Research collaborator
Dr. Hitesh Tewari, TCD

Technology
Suura

Getting online when you are out and about should be easy – the proliferation of WiFi hotspots can offer users instant Internet access through enabled devices like laptops and smart phones.

But for customers, the process of signing up and paying for individual hotpot usage is still fraught, explains Mark Dennehy, a research assistant at Trinity College Dublin and manager of the Suura project, which aims to make WiFi access easier for customer and supplier.

"If you walk into a coffee shop and they have a WiFi hotspot and you want to use it you have to get a user name and password from them, and the same applies to airports," he explains. "So most people just won't bother doing it."

Some companies offer solutions that sell blocks of time to users from signed up hotspots, but a user ends up paying the same whether no matter how much they actually use in that time, adds Dennehy.

Instead, the Suura platform is based on micropayments software developed by Dr Hitesh Tewari at TCD and allows users to access Wifi automatically through software on their device. They then pay for the amount of data downloaded rather than time.

"So we can provide WiFi authentication and metering technology to mobile operators, hotspot operators and other wireless service providers," says Dennehy.

Trials involving students and staff at around 1100 WiFi hotspots across Trinity's campus and related buildings have already tested the system's mettle, including its security requirements and the type of business negotiation needed, and a company is soon to be spun out to market the technology as an intermediary between the WiFi supplier and user, he adds.

Extreme UV lithography

Smaller microchips mean faster electronics – and as the pressure grows to cram more capability onto silicon wafers, scientists at the school of physics in University College Dublin have come up with an innovative solution to a tricky problem.

Manufacturers who want to use next-generation light sources of plasma – or extremely hot ionised gases – face a shattering experience when using conventional mirrors to concentrate the wavelengths they need to etch fancy features onto a wafer.

"The high energy and debris coming from the plasma will destroy an optic you put in front of it," explains researcher Dr Fergal O'Reilly.

Instead, their big idea is a new 'liquid' mirror designed to withstand the intensity:

"The liquid metal mirror is put in front of a plasma that is made of the same liquid metal, so debris and particles and heat produced by the plasma just get absorbed into the liquid mirror."

The mirror also has to be correctly shaped and positioned to concentrate extreme ultraviolet (EUV) wavelengths of 13.5 nanometres for etching fine detail, he adds.

"We have come up with a solution that involves coating the inside of a complex optical shape - something like the reflector on a car headlight - with a liquid metal and rotating it to keep it coated as it collects the light from the plasma and reflects it forward."

The team has just started an Enterprise Ireland-funded project to further develop the prototype, and they are eyeing up the market for EUV collectors in metrology, which has a value of up to €12 million per year.

In the longer term they are looking to high-power EUV lithography, where the annual market could run to hundreds of millions of Euro for the mirror component alone, explains Dr O'Reilly.

Presenter:
Dr. Kenneth Fahy

UCD

Research collaborators
Dr. Fergal O'Reilly, UCD & Dr. Paul Sheridan, UCD.
Technology
Extreme UV Lithography

Subsea Operations Technologies

Presenter:
Francis Flannery

UL

Technology
Subsea Operations Technologies

The ocean remains one of the vastly untapped environments on earth, and exploring it requires considerable expertise.

Since 2003, the Mobile and Marine Robotics Research Centre (MMRRC) at the University of Limerick has been developing novel underwater technologies to aid seabed imaging, and working on simulators to support the advancement of marine sensing platforms and to improve underwater vehicle positioning and navigation control.

Several commercial projects have arisen from this work, including ROVLATIS, a new survey class Remotely Operated Vehicle that can closely monitor undersea features and capture video imagery. A particular advantage of ROVLATIS is its relatively small size, making it suitable for a wide range of carrier vessels and exploratory environments, including shallower coastal waters, estuaries, confined ports and waterways.

The Enterprise Ireland supported Centre has also developed MPPT-RING, new hardware/software platforms to enable more seamless integration of equipment, simulate and execute missions and analyse data.

The multi-purpose platform provides innovative technologies for the offshore oil and gas industry, remotely operated vehicle manufacturers, marine survey companies and researchers.

Meanwhile to help address specific problems faced by unmanned robots deployed in water to survey and image the seabed, the UL researchers have developed PULSE-RT, a suite of high-fidelity virtual reality simulation tools that allows testing and refinement of equipment before it is sent out to the deep to do its work.

AMODS

Energy efficiency is a buzzword these days, but in very real terms it can save money, and a new design of microLED is making the most of energy to create smaller, lighter and cheaper-to-run devices.

"We have produced a new LED that is up to 1,000 times smaller than a standard LED, and we are using that to focus on applications where power efficiency is of utmost importance," explains Dr Bill Henry from Tyndall National Institute where the patented technology was developed.

The key to its efficiency is an integrated parabolic reflector, which means that little of the energy through the LED is wasted, so it can operate on a fraction of the power required for standard LEDs.

The ultimate commercial goal is to spin out a company and target the medical and diagnostic devices and consumer electronics industries, explains Dr Henry, who cites a wide range of other potential applications.

"You can see our light in a room with as little as a few nanoamps of current – we are using that to go into markets in security and authenticity," he says, adding that the nature of the technology platform makes it attractive for data transmission too.

"Because our light is so small it's easy to switch it on and off very quickly, so we can send a lot more data down an optical fibre."

The Tyndall researchers are working closely with PIFAS (Photonic Integration From Atoms to Systems), they have collaborations with Dublin City University and they are receiving financial and business support from Enterprise Ireland.

Presenter:
Dr. Bill Henry

Tyndall, UCC

Technology
AMODs, ultra efficiency light solutions

Beemune

Presenter:
Dr. Kevin Kavanagh

NUI, Maynooth

Technology
Beemune - Honey Bees Technology

There's a lot more to bees than honey. An estimated 40 per cent of the world's food crops rely on the insects as pollinators, so the recent devastation of bee populations around the world has agriculture on tenterhooks about the possible impact on food production.

A key problem is that bee populations are currently under stress from one or more aspects of their environment, explains Dr Kevin Kavanagh, a senior lecturer in biology at NUI Maynooth.

He is developing a product to help support bees through these challenging times.

"More stress has the effect of reducing the immune response, and it leaves the bees susceptible to a range of diseases they would normally be able to tolerate," he says.

"So we have developed a therapy that builds up the immune system of the bee."

The therapeutic agents involved have the regulatory advantage of already being proven safe for use in bees and humans, and they are currently undergoing trials in bee populations in Greece and Ireland and have been sent to the US for testing, says Kavanagh.

A patent has been taken out on the application, and so far, the trials are promising. A company is now being spun out to commercialise a range of products, first targeting the top "migratory" bee keepers in the US, a relatively small number of experts who manage around 1.5 million hives, explains Dr Kavanagh.

BIG IDEAS

eBioTECH

When a patient with a chronic condition like asthma doesn't seem to be doing well on a course of treatment, is it because the medication doesn't suit them? Or might they just not be taking it properly?

It's difficult for patients and doctors alike to figure out the problem in the absence of hard data, and that's where the developers of a new technology hope to make a difference.

The eBioTECH project is developing ways of monitoring patients on particular treatments, such as inhalers for asthma, explains mechanical and bio-engineer Isabelle Killane, who worked in the pharmaceutical industry before moving to Trinity College Dublin.

The idea is to insert a device into the patient's inhaler that automatically records when the patient takes the medication. The patient and doctor can then access and track the data and spot any potential issues.

"It is monitoring for the effectiveness of the medication and also for compliance, which is very important," explains Killane.

The project also addresses remote monitoring of other chronic conditions, including schizophrenia, multiple sclerosis and vocal palsy, she adds. "This kind of technology can be put in any device and even be done over the telephone."

But in the immediate term, the group's main commercial focus is on pharmaceutical and clinical trials companies for asthma, which affects an estimated 300 million people worldwide, says Killane. "We are going into a clinical trial and trying to get CE marking, and we are looking for investment of funding and marketing partners."

Presenter:
Isabelle Killane

TCD

Research collaborators
Dr. Richard Costello, RCSI & Prof. Richard Reilly, TCD.

Technology
eBioTECH

BIG IDEAS

Astryne

Presenter:
Dr. Wolfgang Laub

DCU

Research collaborator
Prof. Jens Ducree, DCU

Technology
Astryne – lab-on-a-chip foundry and design

As a technology, microfluidics offers enormous potential. The "lab on a chip" approach can open up new avenues in medical devices, diagnostics and testing. But how do you link research and development in the field with manufacturers and end users?

A new platform is being set up in Dublin City University to join those dots, explains Dr Wolfgang Laub, who recently arrived in Ireland to work with microfluidics expert Prof Jens Ducree.

"The idea is very simple – we want to set up a company which offers the complete food chain from research and development to mass production of microfluidic components," says Dr Laub, a physicist with three decades of business development experience.

He is now seeking to harness the research expertise in centres like the Biomedical Diagnostics Institute, and develop processes to move that knowledge towards manufactured products. The group has already identified a manufacturing partner in north Dublin.

But the company is more than a middleman, he adds. "We are not only connecting but we are also producing something. Between research and development and mass production there is a gap with several processes that are not already set up, and we are setting them up."

Dr Laub sees no lack of demand for the service, and is setting up the company, Astryne, with support and funding from Enterprise Ireland.

"We have an advantage because it is very difficult to find investors for new products. People don't like risk any more," he says. 'But in general the processes here have been tested and the most critical one, the mass production side, has been tested for several years now. And we have a lot of potential customers."

BIG IDEAS

Dermascan

The pursuit of beauty is big business: in the US alone, the market for non-surgical aesthetic procedures has grown by over 750 per cent since 1997.

But while there's huge demand for the treatments – an estimated 11 million cosmetic procedures were carried out in the US in 2008 - it can be a challenge to track how well they are working. Researchers at Trinity College Dublin have developed a handy light-based device to monitor the progress by building up visual images and useful data about the skin's surface.

"It measures the shape of a surface and then you can visualise the surface with imaging of 3d characteristics such as the roughness or smoothness," explains physicist Dr Guido Mariotto, who is spinning out the technology with Dr Roman Kantor and experienced entrepreneur Prof Igor Schvets.

The device shines light on the skin and processes information from the reflected light using sophisticated software, explains Dr Mariotto. "It means you can measure things like the length and depth of wrinkles on a person's face, or abrasions or pore sizes," he says.

Dermascan, an Enterprise Ireland technology development project, can also measure melanin at the skin's surface to quantify sun damage, as well as haeomoglobin that causes pigmentation in birthmarks.

The approach also has applications in dermatology and is currently being beta-tested in hospital settings. The aim is to help doctors choose a suitable treatment for individual patients and then monitor progress. And what sets Dermascan apart from other devices on the market are its portability and its three-dimensional visualisation of data, says Dr Mariotto.

Presenter:
Dr. Guido Mariotto

TCD

Research collaborators
Prof. Igor Schvets, TCD & Dr. Roman Kantor, TCD.

Technology
Dermascan – 3D Surface Metrology for Cosmetics

BIG IDEAS

MapUme

Presenter:
Dr. Alan McGibney

Cork Institute of Technology

Research collaborators:
Dr. Martin Klepal, CIT & Dr. Susan Rea, CIT.

Technology
MapUme

Finding your way around a new environment is easy with GPS, which works well when you are outside. But what happens when you go indoors and GPS no longer works?

A new software platform developed at Cork Institute of Technology is opening new doors on providing localisation services seamlessly in heterogeneous environments, including inside buildings.

"MapUme is like GPS for indoors," explains Dr Alan McGibney, a post-doc with the Centre for Adaptive Wireless Systems research group in CIT.

"If you have a smart phone and you go into a building with WiFi or mobile phone network coverage, the software sniffs out the information and then gives you an estimated location in the building."

Unlike existing indoor systems, the MapUme platform doesn't require a dedicated infrastructure or any new hardware to be installed, and the mobile phone itself works as the tracking tag.

"We can provide an affordable and scalable and very accurate solution to the indoor environment," says Dr McGibney, noting that the enabling technology fits in well with social media, and its room-level specificity allows users to find out where friends, colleagues or clients are within a building.

"The common question is 'where are you?'" he says. "Application developers are looking for the next killer applications for mobile phones, and these applications can work really well if you have location too. So if they come up with the killer application, we can provide the platform that gives you location. MapUme can enhance applications by moving localisation indoors."

Precysion

Every day, around 4,000 people worldwide die of sepsis, a condition where an infection post-surgery sends the patient's immune system into overdrive, inflaming and damaging vital organs. Patients who survive can sometimes take up to a year to recover, if they get back to full health at all.

Current approaches to managing sepsis focus on testing for the condition as it develops, but the damage can happen quickly once inflammation runs amok, explains life sciences consultant Paul McMahon.

Instead he wants to identify high-risk patients before the condition takes hold, so those patients can be quickly channeled into appropriate treatment.

That's the thinking behind Precysion, a diagnostic technology that monitors a suite of specific "biomarkers" in the patient, says McMahon, who recognised the potential of the approach on an Enterprise Ireland Business Development programme.

Proof-of-concept research at Trinity College Dublin and St James's Hospital is identifying clear signals in patients who are more prone to the condition, and the next steps are to streamline the detection process and develop an automated prototype for monitoring the key molecules.

"We see that it would be part of a platform of tests and we would be trying to ally with people who have tests in other areas," says McMahon, who notes the proactive approach could ultimately have wider applications in other immune-related conditions. "There are lessons to be learned here that could be applied elsewhere for the benefit of the patients."

Presenter:
Paul McMahon

Research collaborator
Dr. Thomas Ryan, TCD.

Technology
Precysion

Safeguard Cutting Angioplasty

Presenter:
Tim McSweeney

NUIG

Inventor
Dr. Bruce Murphy while at NUI, Galway, now based at TCD.

Technology
Safeguard Cutting Angioplasty

In medical procedures, safety is uppermost in everyone's mind. That's why Dr Bruce Murphy has come up with a 'flexi-cutting sheath' device, a new design to make blades on artery-ublocking angioplasty balloons safer.

Engineer Dr Murphy came up with the idea while at NUI Galway, when he spotted a gap in the market for safe and effective blades to cut away hard plaques inside bloodvessels, explains business partner Tim McSweeney.

"The device that we have has tiny microblades embedded in the device and when you inflate the device the design enables those microblades to protrude and then they will cut into the offending plaque," says McSweeney.

Using an angioplasty balloons kitted out with blades is in itself not new, explains McSweeney, but the novel design is what sets this product apart from competitors, which glue the blades to the outside of the balloon. That approach can pose a hazard as the device is being taken out of the patient, explains entrepreneur McSweeney.

"What the market is experiencing is that sometimes when they are withdrawing the product the blade becomes dislodged from the balloon and that can cause a serious problem, so taking out the products can be very difficult."

However the flexi-cutting sheath design overcomes the issue because the blades are only exposed when the balloon is inflated. Once deflated the blades no longer stick out so the device can be safely removed from the bloodvessel.

The design, for which Dr Murphy won a "one to watch" award from Enterprise Ireland this year, is to target a niche market of peripheral bloodvessel angioplasty estimated to be annually worth €100 million.

ImmuPatch

You could develop the best vaccine in the world, but if it can't get to the people who need it, it's hardly worth having.

That's why a group of scientists in Cork is developing ImmuPatch - an easy-to-use patch that sticks on to your skin and delivers a vaccine immediately.

Such "transdermal" methods can offer many benefits, explains vaccine immunologist Dr Anne Moore from University College Cork.

The patch – which is smaller than a sticking plaster – is easier to ship, store and use than the conventional needle, syringe and vial, and this is particularly important in regions with limited access to clinical facilities, such as remote areas or parts of the developing world.

"Transdermals is a growing area and organisations like WHO and PATH have set needle-free delivery as a key priority by 2015," says Dr Moore.

The Immupatch is made by etching tiny needles on one surface of the patch, then the micro-needles are loaded with vaccine. To administer, the patch is simply placed directly on the skin, then peeled off and discarded.

Preclinical trials show the Immupatch can be more effective at generating an immune response to a commercial vaccine when compared with a needle and syringe delivery, and unlike the major competitor product, the patch being developed in Cork requires no vaccine adjuvant and can be administered in a single step.

The fabrication system is also highly flexible, adds Dr Moore.

"You can change the parameters, so the needles go deeper or not as deep, they can be wider or you can change the number on a patch," she says. "That's where the IP is, in getting that design right."

Presenter:
Dr. Anne Moore

UCC/Tyndall

Research collaborators
Dr. Abina Crean, UCC & Dr. Conor O'Mahony, Tyndall National Institute, UCC.

Technology
ImmuPatch

BIG IDEAS

BIG IDEAS

Drug delivery technologies

Presenter:
Michael Nairn

Collaborating with;
RCSI

Technology
Drug Delivery Technologies

With dwindling drug pipelines putting the pharmaceutical industry under pressure, the smart money is on innovating to retain competitive advantage.

That's the thinking behind a suite of drug-delivery technologies from the Royal College of Surgeons in Ireland, explains UK-based business development expert Michael Nairn. He is working with the college to spin out a company to commercialise the platforms.

One is technology ensures tablets dissolve quickly in the mouth with no need for added water, he explains. But compared to other fast-melt formulations, the RCSI approach saves money, explains Nairn.

"It's a very cheap one-step manufacturing process, a lot cheaper to produce than the competition," he says. "And the tablet that you end up with as a result of this process is much more robust than anything else that is out there. That makes the packaging much cheaper."

Another technology coats drugs cheaply, allowing for more control over when and where the medication is released in the body, according to Nairn.

"We can coat microparticles, whether they be in liquid, solid or gas," he says. "Coating technologies exist already but this is a cheap way, and you end up with a coating that is very stable, which is important, and whatever you are coating also remains more stable."

And for topical application they have developed Topgel, a wound-healing gel can be incorporated into dressings and effectively heals without causing skin irritation, says Nairn.

The technologies, which have received funding from Enterprise Ireland, are now to be spun-out through a single company.

BIG IDEAS

Flexrad

If you have ever experienced a lost wireless connection while on the phone or streaming a video, you know how frustrating it is. Costly too for the network operators, who have to field calls from disgruntled customers and often have to go out and physically fix the problem.

That's why a group at Trinity College Dublin has developed Flexrad, a software platform that can intelligently monitor and even repair problems.

"We use clever techniques in software to address problems consumers often face," explains Dr Keith Nolan from the Centre for Telecommunications and Value Research at Trinity College Dublin.

Those problems may result from interference, seasonal foliage, mobility and location, but the Flexrad software can detect and overcome to the impending issue, he says.

"Through the software we observe the process, decide quickly what to do and react. We can dynamically change the characteristics like side-stepping the frequency to keep the link up."

The flexibility of the software could make network rollouts easier and allows hardware to accommodate new platforms easily, adds Dr Nolan. "For the equipment vendor it means they can develop a new system very quickly, and for the operator they can get to market very quickly as well and do service trials, there's not this huge investment in hardware."

The fleixible technology, which was developed with support from Enterprise Ireland, is now being tested to harness spare spectrum in TV bands. Meanwhile a company, Reconfigr, is to be spun out to commercialise several products that enhance reliability, says Dr Nolan.

"The aim is to allow the ability to communicate to be taken for granted no matter where you are and what you are doing."

Presenter:
Dr. Keith Nolan

TCD

Research collaborator
Prof. Linda Doyle, TCD.

Technology
Flexrad

BIG IDEAS

Bioplastech

Presenter:
Dr. Kevin O'Connor

UCD

Technology
Bioplastech

Plastic-eating microbes might sound like something out of a sci-fi film, but for one innovator they are proving to be the germ of a potentially ground-breaking technology.

Microbiologist Dr Kevin O'Connor from University College Dublin has figured out how to trick bacteria into eating resistant waste plastic and converting it into something more valuable and ecologically friendly.

The key lies in heating the plastic in the absence of air to predigest it, then allowing carefully selected bacteria eat the treated waste. Under certain conditions, the bacteria will convert the plastic into "fat", which can then be pulled from the microbes to make a new, useful plastic which is ultimately biodegradable.

The patented process involves no genetic modification of the bacteria, and the researchers have built up a library of bugs that are suited to digesting different source plastics, explains Dr O'Connor, who is working with Enterprise Ireland to commercialise the Bioplastech approach.

The technology can not only convert waste into new and saleable plastic for use in food packaging, medical applications and agriculture, but it also stands to change the roles of recycling companies from handlers to innovators, opening the way for more employment, notes O'Connor.

"We are currently at lab scale and we are moving to much larger volumes, and we are hoping to get the right finance and investors in so we can do a pilot in Ireland," he says.

RECAP

Around the world, sourcing and procurement professionals buy several trillion dollars worth of goods and services every year, and the annual global volume purchased using electronic auctions is in the order of hundreds of millions of dollars.

But most electronic procurement today is based on single unit auctions in which individual items go to the lowest bidder. These auctions are inefficient and can represent a lose-lose situation - suppliers often bid too much to safeguard their desired combinations, while suppliers can't exploit their internal business efficiencies, explains computer scientist Dr Barry O'Sullivan, associate director of the Cork Constraint Computation Centre at University College Cork, and principal investigator of the RECAP project.

Researchers there have developed the first risk-managed software solution to reduce procurement costs through combinatorial auctions: bidders can put rich constraints on their desired combinations of items, while the buyer minimises the risk of winning bidders withdrawing from the transaction.

Under Enterprise Ireland Proof of Concept and Technology Development programmes, the UCC team developed a software platform that has demonstrated the potential for savings in a large public procurement auction run in conjunction with Cork City Council. Start-up company Keelvar Systems, headed by Dr. Alan Holland, is hoping to build on that experience.

The technology, which won a commercialisation award from the Irish Software Association, is particularly well timed for the recession, according to Dr O'Sullivan.

"We believe that this technology is of value in very large-scale public procurement processes such as those undertaken by the Health Services Executive, which is worth in excess of €10 billion per annum," he says. "The technology can also be used in advertising sales scenarios, supply chain management contexts, transportation system design, telecommunications systems management and radio spectrum allocation."

Presenter:
Dr Barry O'Sullivan

UCC

Research collaborator
Dr. Alan Holland, UCC.

Technology
Robust and Expressive Combinatorial Auctions for Procurement

Active Holographics

Presenter:
Brendan Ring

DIT

Technology
Active Holographics

How long does it take to make a counterfeit hologram – a month? A few weeks? Try 39 hours. That's the scale of the security challenge facing the use of "surface" or embossed holograms in products like credit cards, currency notes or pharmaceutical labels.

But research at Dublin Institute of Technology has come up with a more robust approach – a "volume" hologram made from a unique light-sensitive material. By manufacturing the hologram using reflected lasers, the process becomes encrypted and so can thwart the would-be copycats.

"The laser beam passes through the photopolymer material and reflects off an object and comes back into the photopolymer again," explains Brendan Ring, commercialisation director of DIT's Hothouse. "Then it's the interaction of those two beams, that creates the refractive index and changes the properties in the photosensitive polymer."

The light-reactive material they use is also sensitive to humidity, so a hologram can be easily validated on the spot, adds Ring, who notes the product is the fruit of research at the Centre for Industrial and Engineering Optics.

A spin-out company, Active Holographics, is now working with experienced entrepreneur Alan Phelan to develop the commercial potential of the patented holographic technology. It has already excited interest in the pharmaceutical industry, which is looking for improved security measures. "They reckon around 10 per cent of the world's drugs are counterfeits," says Ring.

The secure volume holograms could also be used to "track and trace" products, and are compatible with 2d-barcoding, he adds.

"For our route to market we could go through the labelling companies, and the plan is to manufacture the holograms in Ireland."

pSensor

Recent tragedies of sudden deaths among high-level GAA and soccer players have prompted guidelines for tighter monitoring of players. But existing heart monitors offer little sophisticated data about an individual player's progress.

So a team at Dublin City University is coming up with a more holistic system called pSensor – software that applies expert knowledge to data from multiple sources about a player to safeguard their health and performance.

"You can buy a system now and it will just check heart rate and it won't let you ask any questions," says computer scientist Dr Mark Roantree, who is collaborating with sports physiologist Prof Niall Moyna on the Enterprise Ireland-funded project.

To build up a more useful picture, pSensor software can pull in data from several sources and allows the data to be interrogated so it yields practical information, explains Dr Roantree.

"Players fill in a diary to quantify the amount of activity they are putting in, and we use cheap wireless heart rate sensors to get the data," he says. "Then we can look at things like if you have been injured twice last year and you are training four times a week for the last six months and you are exhibiting the readings on the heart monitor, that's much more complex."

The DCU team is currently partnering with the GAA to test out the system, says Dr Roantree, who explains that the mix of sophisticated software with sports expertise can make the most of "dumb" data from sensors.

"We have developed the software so it will take the data from any source. We are not looking to create new devices, we are looking to use everything out there."

Presenter:
Dr. Mark Roantree

DCU

Research collaborator
Prof. Niall Moyna, DCU.

Technology
pSensor - Data Management and Query Optimisation in pHealth Sensor Networks

Presenter:
Prof. Barry Smyth

UCD

Research collaborators
Dr. Maurice Coyle, UCD & Dr. Peter Briggs, UCD.

Technology
Heystaks

With so much information online, it's easy to be overwhelmed, or to miss out on important data when carrying out searches. Then when you do find something important or interesting, in order to alert friends or colleagues to it you have to email them links.

But an innovative tool called HeyStaks is offering web users a more intelligent way to seek and share information on the web.

The technology, which is delivered as a plug-in for Google, Bing, Yahoo (and other mainstream search services), revolves around creating search folders or 'staks' as a way to store and share your search experiences", explains Prof Barry Smyth, Digital Chair of Computer Science at University College Dublin.

"It's a unique combination of social networking and web search," says Prof Smyth, whose research group developed the approach. "It helps people to search more productively by harnessing the searchers of others."

For example, a group of friends planning a holiday abroad might create and share a "Holiday 2009" search stak. As each friend searches online for travel, accommodation and entertainment options, their selections will be shared with other stak members as they search so that the group benefits from the search experiences of each other.

Prof Smyth co-founded ChangingWorlds in 1999, a successful company that develops software for personalising content, and HeyStaks is the first spin-out of CLARITY, a €16m Science Foundation Ireland research centre combining researchers from UCD, Dublin City University, and Tyndall National Institute.

HeyStaks won an Eircom Web Innovation award in 2008 and UCD's SUSSED competition in 2009.

BIG IDEAS

BIG IDEAS

Contact

bigideas@enterprise-ireland.com
Research and Innovation Business Unit

Enterprise Ireland
The Plaza
East Point Business Park
Dublin 3

www.enterprise-ireland.com

www.enterprise-ireland.com/bigideas

Dowling & Dowling Design Consultants Ltd

Funded by the Irish Government under the
National Development Plan, 2007-2013