First in Europe - First in Ireland - First in Innovation

Engineering an Undergraduate Innovation Eco-System

Pictorial Compendium of International & National Innovation Awards

Vincent Forde pictured with Sons Sacha, Blaise and Jude

Enterprise Ireland Student Entrepreneur Awards

Overall Winner and Student Entrepreneur of the Year 2016

Vincent Forde, Gasgon Medical, Cork Institute of Technology

CIT Multidisciplinary Teams Win All Five Major Awards at National Finals

(1) Enterprise Ireland Overall Winner and Student Entrepreneur of the Year 2016
(2) Cruickshank Intellectual Property Attorneys National Award 2016
(3) Grant Thornton National Award 2016
(4)Intel ICT National Award 2016
(5)Enterprise Ireland Academic Innovation National Award 2016

National Prize-Winners
in Engineering Innovation, Design & Entrepreneurship
Innovative Product Development Laboratories

Recent National student successes include:

Three Enterprise Ireland / Invest Northern Ireland Young Entrepreneur of the Year First Place National Awards (2016, 2013, 2007)
Three Enterprise Ireland / Invest Northern Ireland Academic Innovation National Awards (2016, 2012, 2009)
One Accenture Leaders of Tomorrow First Place National Award Accenture HQ Grand Canal Square Dublin (2016)
Five Enterprise Ireland Cruickshank Most Technologically Innovative Project First Place National Awards(2016, 2013, 2009, 2008, 2007)
Nine MEETA Asset Management and Maintenance National Awards (2016(x2), 2015(x2), 2014, 2013(x2), 2011, 2006)
One James Dyson Design National Award Ireland (2016)
One Enterprise Ireland Intel ICT First Place National Awards (2016)
One Enterprise Ireland Grant Thornton First Place National Awards (2016)
One National Disability Authority Centre for Excellence in Universal Design Grand Challenge Enterprise Ireland Commercialisation National Award (2016)
One National Disability Authority Centre for Excellence in Universal Design Grand Challenge Judges' Choice Award Technology Trophy National Award (2016)
One Early Career Awards Special Recognition National Award (2016)
Two Engineers Ireland Excellence Awards - " Best in Class " Engineering Education Award (2015, 2011))
Eight Enterprise Ireland / Invest Northern Ireland National Awards of Merit (2015, 2013, 2012, 2010, 2009, 2008, 2007)
Eleven Engineers Ireland Innovative Student Engineer of the Year Awards sponsored by Siemens (2014 L8, 2013 L8, 2012 L8, 2011 L7, 2009 L7, 2008 L8, 2007 L7, 2006 L8, 2005 L8, 2004 L8, 2003 L8)
One Chartered Institution of Water and Environmental Management - AECOM Student Environmental Award Winner-Sligo (2015)
Five Enterprise Ireland I.Mech.E Speak Out for Engineering Awards (2014, 2013, 2007, 2006, 2004)
One CADFEM Ireland and Ansys Users Conference EI HQ Dublin Best Presentation Paper (2014)
One GradIreland Graduate Employee of the Year First Place Award Mansion House Dublin (2012)
One NCBI Inclusive Technology Showcase Grand Prize Wood Quay Dublin (2012)
Three Abbott Ireland Intern of the Year Awards (2012, 2011, 2009)
One Engineers Ireland Excellence Awards - ESB Award for Outstanding Contribution to Engineering (2011)
One Engineers Ireland Excellence Awards - Chartered Engineer of the Year (2011)
One Inaugural Enterprise Ireland / Invest Northern Ireland Young Entrepreneur Solving Problems for Industry €7,500 Award (2009)
Two HP Invent Awards for Best Science/Engineering/IT project in Ireland
Three William Eccles Institution of Production Engineers National Awards

International Prize-Winners
in Engineering Innovation, Design & Entrepreneurship
Innovative Product Development Laboratories

Recent Major International achievements include:

Nine First Places and Seven Runner Up Finalists in the Institution of Mechanical Engineers Best Medical Engineering and Design and Development of a Biomedical Device Competitions, London (2015, 2014, 2011, 2010, 2008, 2007, 2006, 2005)
Two European Laureate of Innovation First Place Award - European Student Innovator of the Year 2014 and 2012 - European Student Innovation Finals - Innovact Reims France (2014, 2012)
One University Startup World Cup Finals Sole Irish Finalist Category Finalist Award Winner Copenhagen Denmark (2015)
European Science Engineering and Technology Best European Mechanical Engineering Student One First Place and One Runner Up Babcock Award - SET Finals London UK (2013, 2011)
Two Enterprise Ireland / Invest Northern Ireland Think Outside the Box Academic Innovation Awards (2012, 2009)
One European Laureate of Innovation Third Place Award – European Student Innovation Finals - Innovact Reims (2010)
Two Gold Medals Undergraduate Awards of Ireland and Northern Ireland Engineering/Mechanical Sciences (2011, 2010)
Seven First Places and Six Runner Up Finalists in the Institution of Mechanical Engineers Best Medical Engineering and Design and Development of a Biomedical Device Competitions, London (2011, 2010, 2008, 2007, 2006, 2005)
One Global Student Entrepreneur Finalist Award sponsored by the Entrepreneurs' Organisation in conjunction with Mercedes-Benz Financial at the GSEA Finals in Kansas City, Missouri, USA (2009)
One SOFE Paris Second Place Award - Institution of Mechanical Engineers (2009)
One First and One Second Place in the ISEA International Sports Engineering Competition, London
Two Queen's Silver Jubilee awards for Best Mechanical Engineering Degree Project in Ireland and Britain
One Genius 2000 Award for Best New Invention at the Nuremburg Inventors' Fair
Two Society of Manufacturing Engineering Outstanding Young Engineer Worldwide Awards
Three First Places for Best Published and Presented Paper at the International Manufacturing Conference.
Two Engineers Ireland Excellence Awards - " Best in Class " Engineering Education Excellence Awards (2015, 2011)

Enterprise Ireland Student Entrepreneur Awards

Limerick 8th - 9th June 2016

CIT Innovative Product Development Multidisciplinary Teams

Win All Five Major Awards at National Finals

Enterprise Ireland Student Entrepreneur Awards 2016

(1) Enterprise Ireland Overall Winner and Student Entrepreneur of the Year 2016
(2) Cruickshank Intellectual Property Attorneys National Award 2016
(3) Grant Thornton National Award 2016
(4)Intel ICT National Award 2016
(5)Enterprise Ireland Academic Innovation National Award 2016

The achievement by CIT Engineering students and staff of all five major awards at the Enterprise Ireland Student Entrepreneur Awards Finals 2016 - the Enterprise Ireland Overall Winner and Student Entrepreneur of the Year 2016, the Cruickshank Intellectual Property Attorneys National Award 2016, the Grant Thornton National Award 2016, the Intel ICT National Award 2016 and the Enterprise Ireland Academic Innovation National Award 2016 - is unprecedented.

With over 500 entries nationally to this prestigious entrepreneurship and innovation multi-discipline competition, the achievement of all five major national awards by onecollege is quite remarkable.

See http://studententrepreneurawards.com/ ***and*** http://studententrepreneurawards.com/category/previous-winners/2016/

CIT Innovative Product Development Multidisciplinary Teams
Win All Five Major Awards at National Finals
Enterprise Ireland Student Entrepreneur Awards 2016

"Engineering an Innovation Eco-System at Cork Institute of Technology "

Pictured at the Enterprise Ireland Student Entrepreneur Awards Finals 2016 are Cork Institute of Technology Mechanical Engineering Student Vincent Forde, Enterprise Ireland Student Entrepreneur of the Year 2016 and Winner of the top €10,000 National Award with Ms. Gillian Slattery, Enterprise Ireland, Organiser of the Student Entrepreneur of the Year Competition. The engineering of a unique innovation eco-system in CIT has resulted in the unprecedented achievement by CIT Engineering students and staff of the five major top awards at the Enterprise Ireland Student Entrepreneur Awards National Finals 2016.

Enterprise Ireland Student Entrepreneur Awards

Limerick 8th - 9th June 2016

Enterprise Ireland Overall Winner and Student Entrepreneur of the Year 2016 - €10,000

Vincent Forde, Gasgon Medical, Cork Institute of Technology

Presented by Richard Murphy, Enterprise Ireland and Myles Murray, CEO, PMD Solutions

***GASGON MEDICAL** aims to deliver unique and innovative medical devices to improve patient safety and support medical professionals during common procedures. The company was founded when doctors from Cork University Hospital highlighted the valuable staff time that was being wasted while setting up and monitoring IV procedures. Medical staff have reacted positively to the proposed solution, with initial investigations into the business potential uncovering a wider global opportunity. The project has already seen significant success having won both Accenture's 'Leaders of Tomorrow' and CIT's 'Prize for Innovation' this year.*

ENTERPRISE IRELAND
where innovation means business

STUDENT ENTREPRENEUR AWARDS
turning ideas into business
an Enterprise Ireland initiative

ENTERPRISE IRELAND
where innovation means business

Enterprise Ireland Student Entrepreneur Awards

Limerick 8th - 9th June 2016

Overall Winner and Student Entrepreneur of the Year 2016 - €10,000

Vincent Forde pictured with Sons Sacha, Blaise and Jude

Vincent Forde, Gasgon Medical, Cork Institute of Technology

intel

CRUICKSHANK
Intellectual Property Attorneys

Grant Thornton
An instinct for growth

Enterprise Ireland Student Entrepreneur Awards

Limerick 8th - 9th June 2016

Cruickshank Intellectual Property Attorneys

Exceptional Business Idea National Award - €5,000

HydroFLOcean (H-FLO) Multidisciplinary Team

Cork Institute of Technology

Arran Coughlan, Kelly Lane, George O'Rourke, Shane O'Driscoll, Jason Shorten, John Harrington, Kacey Mealy & Gerard O'Connell

Presented by Mr. Donal O'Connor, Cruickshanks

Enterprise Ireland Student Entrepreneur Awards

Limerick 8th - 9th June 2016

Cruickshank Intellectual Property Attorneys

Exceptional Business Idea National Award - €5,000

HydroFLOcean (H-FLO) Multidisciplinary Team

Cork Institute of Technology

H-Flo is a new innovative water safety device that disengages a lanyard from a harness when submerged in water. The functional prototype was designed in response to the tragic death of two men on Thomond Bridge, Limerick in 2015 when they were harnessed onto a platform that fell into the River Shannon.
H-Flo aims to prevent future tragedies like this one occurring.

Enterprise Ireland Student Entrepreneur Awards

Limerick 8th - 9th June 2016

Grant Thornton

Exceptional Business Idea National Award - €5,000

Recovery Solutions Leader (RSL) Multidisciplinary Team

Cork Institute of Technology

Tim Walley, Conor O'Brien, Jerry Crowley, Daniella Barrett, Aidan Lawless, David Cullinane, Tahamina Akter & Vincent Lotti

Presented by Mr. Kevin Foley, Grant Thornton

Enterprise Ireland Student Entrepreneur Awards

Limerick 8th - 9th June 2016

Grant Thornton

Exceptional Business Idea National Award - €5,000

Recovery Solutions Leader (RSL) Multidisciplinary Team

Cork Institute of Technology

Tim Walley, Conor O'Brien, Jerry Crowley, Daniella Barrett, Aidan Lawless, David Cullinane, Tahamina Akter & Vincent Lotti

RSL's innovative Cooling Compression Recovery Aid (CCRA) product treats sports injuries. It utilises existing recovery methods but in an easy-to-use, ergonomic and user friendly pack. Encompassing cooling and compression, the CCRA provides the user with an efficient recovery period with reduced time in pain and discomfort.

ENTERPRISE IRELAND
where innovation means business

STUDENT ENTREPRENEUR AWARDS
turning ideas into business
an Enterprise Ireland initiative

ENTERPRISE IRELAND
where innovation means business

Enterprise Ireland Student Entrepreneur Awards

Limerick 8th - 9th June 2016

Intel ICT National Award - €5,000

Steady Life Multidisciplinary Team

Cork Institute of Technology

John Morrissey, Eoin Kelly, Katie Galvin, Neil Walsh, Piotr Kasztelan, Ryan Sebastian & Michelle Kehoe

Presented by Mr. Paul Phelan, Intel

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CRUICKSHANK
Intellectual Property Attorneys

Grant Thornton
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STUDENT ENTREPRENEUR AWARDS
turning ideas into business
an Enterprise Ireland initiative

ENTERPRISE IRELAND
where innovation means business

Enterprise Ireland Student Entrepreneur Awards

Limerick 8th - 9th June 2016

Intel ICT National Award - €5,000

Steady Life Multidisciplinary Team

Cork Institute of Technology

Steady Life is a comfortably fitted sleeve that is worn around the forearm. The sleeve incorporates sensor systems and electrotherapy to help a patient dampen and reduce the frequency and relieve the pain of tremors.

intel

RUICKSHANK
Intellectual Property Attorneys

Grant Thornton
An instinct for growth

Enterprise Ireland Student Entrepreneur Awards
Limerick 8th - 9th June 2016

Enterprise Ireland Academic Innovation National Award 2016

Enterprise Ireland Academic Innovation National Award 2016 presented to

Senior Lecturer Sean F. O'Leary
Cork Institute of Technology

by
Mr. Richard Murphy, Enterprise Ireland

See http://studententrepreneurawards.com/ and http://studententrepreneurawards.com/category/previous-winners/2016/

Universal Design Grand Challenge 2016

Centre for Excellence in Universal Design NDA

Universal Design Grand Challenge Awards

National Science Gallery Dublin 26th May 2016

Damien Dennehy Dual Award Winner with Mr. David Flood, Enterprise Ireland and
Dr. Gerald Craddock, Centre for Excellence in Universal Design, National Disability Authority

Enterprise Ireland "Universal Design Commercialisation Award"

Winner: Damien Dennehy of Cork Institute of Technology

"Advanced Hydro Systems - the Automated Flood Defence Barrier"

Universal Design Grand Challenge 2016

Centre for Excellence in Universal Design NDA

Universal Design Grand Challenge Awards

National Science Gallery Dublin 26th May 2016

Damien Dennehy Dual Award Winner with Technology Award Judges Declan Brady, President, Irish Computer Society, Joan Mulvihill, CEO, Irish Internet Society and Professor Jane Grimson

Universal Design Grand Challenge Award

Centre for Excellence in Universal Design

National Disability Authority

Judges' Choice Award Technology Trophy

Winner: Damien Dennehy of Cork Institute of Technology

"Advanced Hydro Systems - the Automated Flood Defence Barrier"

Universal Design Grand Challenge 2016

Centre for Excellence in Universal Design NDA

Universal Design Grand Challenge Awards

National Science Gallery Dublin 26th May 2016

Finalists Universal Design Challenge Finals 2016

Many Congratulations to Damien Dennehy (CIT's first ever finalist in the Universal Design Grand Challenge Award Competition), who has won not one but two major design awards - the Enterprise Ireland Universal Design Commercialisation Award and the Universal Design Technology Award!

This is a great honour for Damien and CIT.

The Universal Design Grand Challenge Awards Competition Finals, run by the Centre for Excellence in Universal Design (CEUD) at the National Disability Authority (NDA) and supported by Enterprise Ireland, is a very high profile event.

The Universal Design Grand Challenge (UDGC) promotes and awards excellence in student projects that feature solutions that work for everyone and is open to third level students in their final two years of study, post grads and recent graduates to enter their best student project to compete for the National Universal Design Student Awards.

http://universaldesign.ie/Awards/

Universal Design Grand Challenge 2016

Centre for Excellence in Universal Design NDA

Universal Design Grand Challenge Awards

National Science Gallery Dublin 26th May 2016

Following first-hand personal experience of recent urban major flooding events, Damien undertook the development of a novel pre-installed self-deploying flood defence barrier to automatically detect and prevent flood water ingress through standard doorway aperture. Current doorway flood defence barriers require manual application, necessitating the presence of and prompt action from competent individual / individuals during flood events. Manual application requires continuous monitoring of flood warnings with major consequences arising from monitoring system failure, personnel non-availability or barrier equipment misplacement. Current devices are difficult to lift/install, particularly for the elderly or disabled.

Damien undertook comprehensive literature research of current solutions, technologies and methodologies and an in-depth review of riverine development of the severely affected urban commercial region and market research into customer functional requirements. A range of novel design solutions were conceived and assessed by Damien. A design approach, based on rigorous safety and sustainability criteria, was adopted to devise and advance a novel optimal solution. Damien utilised advanced finite element analysis, material optimisation methodologies and control hardware/software development to achieve a total solution.

Damien's developed Advanced Hydro Systems doorway flood barrier system incorporates novel water detection sensor technology. Safety features incorporated by Damien into the Advanced Hydro Systems include manual over-ride for ease of egress in emergencies and application of infra-red sensors to detect people and obstructions and prevent and abort deployment in unsafe circumstances. Damien manufactured, assembled and commissioned his Mark 1 prototype automated flood defence barrier and undertook extensive testing on the Advanced Hydro Systems doorway water barrier in terms of operation and safety. Damien's developed doorway flood barrier system incorporates novel water detection sensor technology, self-deploys automatically during flood events and provides text alert notification to householder/business owner with potential to obviate major loss/damage.

Damien has commenced commercialisation investigation of the novel automated barrier system.

Further details of Damien's project and the Universal Design Grand Challenge Award Competition Finals can be found at:
https://universaldesign.awardsplatform.com/gallery/oYBYwZrx/JjKZMPdE
and http://universaldesign.ie/Awards/

A Video to illustrate the development / testing of Damien's dual award winning project "Advanced Hydro Systems - the Automated Flood Defence Barrier" can be viewed at the link:
https://www.youtube.com/watch?v=dBF5LT63RAo

ADVANCED HYDRO SYSTEMS

MEETA - Asset Managers Association

First Place National Student Overall Award Winner 2016

at National Finals in Engineers Ireland, HQ, Ballsbridge, Dublin

Ms. Karen McDonnell, Biomedical Engineering, CIT presented with MEETA Student Overall National Award Winner 2016 by Mr. Dermot Byrne, President of Engineers Ireland pictured with Mr. Ray O'Neill, General Manager ESS and Mr. John Coleman, Chairman of MEETA Asset Managers Association

Karen McDonnell Biomedical Engineering CIT

"Optimisation of the Packaging System at Wright Medical"

On Thursday November 17th, at a glittering Awards ceremony in Dublin, CIT Biomedical Engineering Student Karen McDonnell was adjudged as first place national winner and presented by Mr. Dermot Byrne, President Engineers Ireland with the prestigious MEETA Asset Management and Maintenance National Student Overall Award Winner 2016.

A double success ensued for CIT as CIT Sustainable Energy Engineering student Lisa Mooney was adjudged winner of and was presented with the the MEETA National Certificate Award of Excellence by Mr. Dermot Byrne, President Engineers Ireland.

These successes represent a significant groundbreaking achievement for two women (and both proud Kerrywomen at that) to choose and pursue capstone projects and indeed excel at the highest level in the traditionally highly male dominated Asset Management and Maintenance sector, competing against the cream of Undergraduate and Masters Degree students nationwide for the highly prestigious MEETA National Student First Place Award Winner 2016.

MEETA - Asset Managers Association

First Place National Student Overall Award Winner 2016

Karen McDonnell, Biomedical Engineering, CIT, MEETA Student Overall National Award Winner 2016 with her proud Parents Mrs. And Mr. Mary and Christy McDonnell

Karen McDonnell Biomedical Engineering CIT

"Optimisation of the Packaging System at Wright Medical"

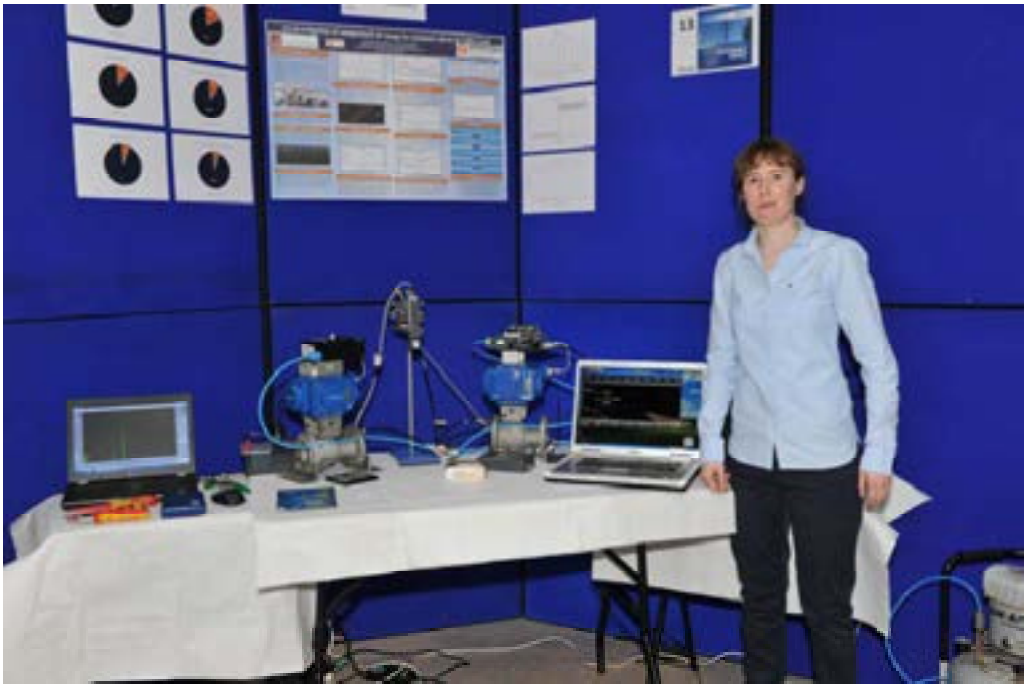
A bottleneck has been identified and highlighted by the author in the Phase 2 area of manufacturing within Wright Medical. This project, thus, concerned the investigation of the current state of the system and the determination of a method to increase the capacity of the system - thereby increasing throughput, allowing a better flow of manufacturing and the ability to match future demand increases arising from the merger of Wright Medical and Tornier. A variety of diverse methods of alleviating the critical bottleneck identified at the sachet packaging station were investigated. It was determined that the most suitable approach was to design, develop and introduce a new sachet sealing machine system. A pay-back period for the new system of less than two year was determined.

With the introduction of the nozzle based system, significant design and implementation challenges arose and had to be overcome by the development and local manufacture of new packaging system components including a specific height adjustable table to cover all product ranges. A validation plan was created and implemented by the author as part of the control phase of the adopted DMAIC approach. The validation process included installation, operational and performance qualification testing – all applied to rigorously test the equipment to ensure correct installation, functionality and maintenance of required performance over time. This validation testing proved successful and all sachets tested displayed results well within the acceptance criteria.

Following the successful approval of the validation protocol testing, the developed sachet sealing machine has now been commissioned and placed in routine production at Wright Medical.

MEETA - Asset Managers Association

National Student Certificate Award of Excellence 2016



Lisa Mooney, Sustainable Energy Engineering, CIT, MEETA National Certificate Award of Excellence Winner 2016 pictured at the MEETA National Asset Management and Maintenance Finals with her proud parents Susanne and Paul

Lisa Mooney Sustainable Energy Engineering CIT

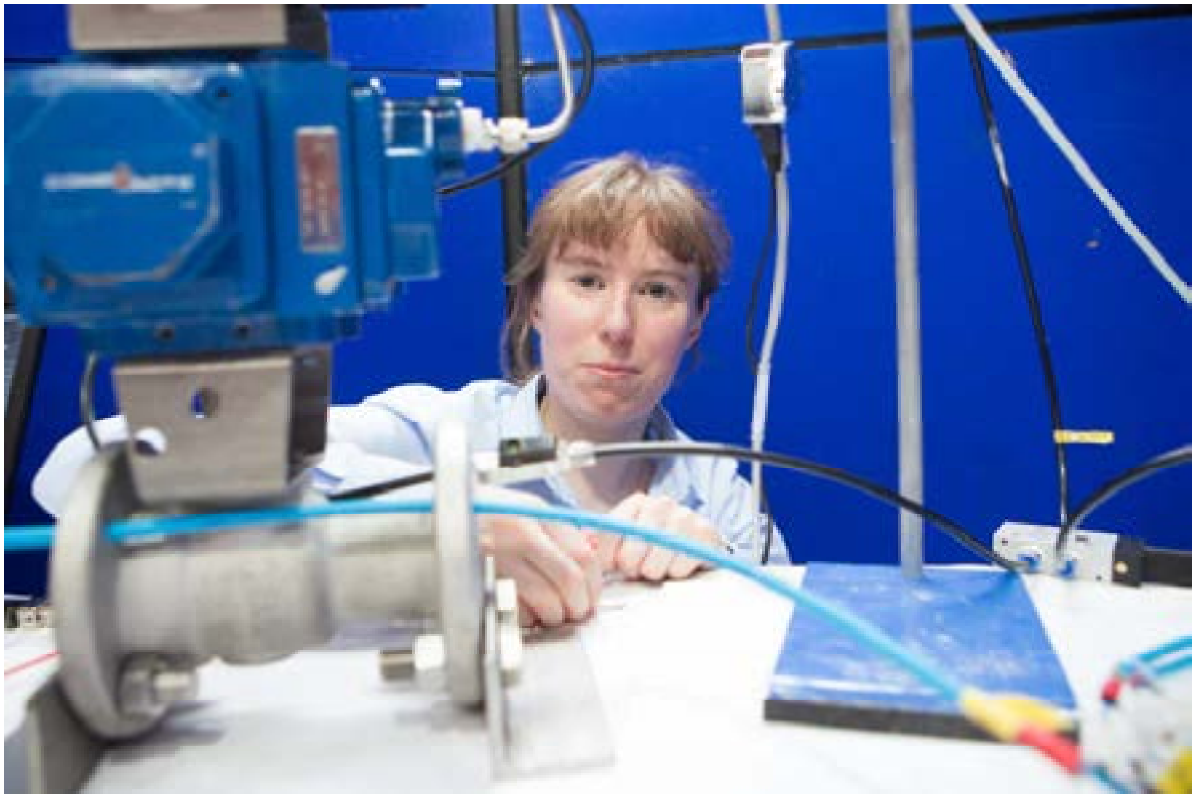
"An Investigation of Compressed Air Usage by Actuated valves in GSK Cork"

Pictured Left:

Mr. Dermot Byrne
President of Engineers Ireland,
Mr. Ray O'Neill
General Manager ESS,
Ms. Lisa Mooney, Sustainable Energy Engineering, CIT,
MEETA National Student Certificate Award of Excellence Winner 2016
Mr. John Coleman
Chairman of MEETA Asset Managers Association

MEETA - Asset Managers Association

National Student Certificate Award of Excellence 2016



Lisa Mooney Sustainable Energy Engineering CIT

"An Investigation of Compressed Air Usage by Actuated valves in GSK Cork"

GlaxoSmithKline (GSK) is one of the world's leading pharmaceutical companies. GSK Cork is a Primary API (Active Pharmaceutical Ingredient) site and has been operating since 1975. 15 different products on the site's product portfolio are used to treat Cancer, HIV, Depression and Parkinson Disease. GSK has set a goal to be carbon neutral by 2050. Electricity consumption of compressed air accounts for 6.6% of GSK Corks total electricity usage annually. The aim of this project was to investigate and reduce the consumption of compressed air at GSK Cork. The fundamental operating principles of air actuated control valves were investigated extensively. There are two types of control valves used on site, one is an On/Off valve which uses very little air during operation and the other is a modulating valve which uses a positioner to control the valve position. There are two types of positioners used on control valves; one is classified as high bleed and the other as low bleed. GSK Engineering personnel were aware that high bleed positioners were using a lot of air; however, there was no data available to quantify total air used.

An experimental test rig was designed, built and commissioned to simulate operation of high and low bleed positioners. Test rig commissioning challenges included testing of flowmeter ranges and trouble shooting of flowmeter software. The operation of the PLC used on the rig required extensive liaison with the Engineering Team. Test rig data was recorded and analysed and this data is now being used as an input to a feasibility study for replacement of high bleed positioners.

Project findings include:

- A survey of positioners should always be completed before replacing an air compressor
- Low bleed positioners should be specified for new plant
- Calibration of low bleed positioners is a lot easier for maintenance technicians
- Zero bleed positioners should be investigated

Annual Student Awards 2016

meeta
THE ASSET MANAGERS

MEETA, the Irish Maintenance and Asset Management Society, in association with ESS Ltd., would like to invite final year students to submit their maintenance projects for the MEETA Student Project Award 2016

WHO CAN ENTER

The MEETA Annual Student Project Award 2016 will be awarded to applicants who have completed a project as part of their final year course. There are two categories for entrants:

- Students on an Honours Degree/Masters Degree programme
- Students on an Ordinary Degree or Technical Programmes and students on Apprenticeship Programme

The programme must be in a maintenance, reliability or asset management related area. The assessment criteria will reflect this.

SUBMISSION DETAILS

Each applicant will be expected to submit 2 copies of a 2-page summary of their project including their results/conclusions by Friday 7th October 2016, and be available to present their project to a panel in October 2016. The entrants will be short listed and contacted by Engineers Ireland.

AWARD

The winning applicant of each category will receive a prize and may be offered the opportunity to present their project at the National Maintenance and Asset Management conference on Friday 18th November 2016.

SUBMISSION DATE

Submissions to be marked for the attention of CPD Training and to arrive at Engineers Ireland no later than Friday 7th October 2016.

ABOUT THE SPONSOR

ess
Providing asset optimisation & compliance through people

ESS Ltd is once again proud to sponsor the MEETA Student Project Award. ESS is a national award winning services company specialising in Industrial Maintenance.

Established in 1991, ESS Ltd headquarters is in Limerick with additional offices in Cork and Dublin. We currently employ technical personnel throughout Ireland and the UK providing a range of services including Maintenance Outsourcing, Consultancy, Maintenance Evaluations, Systems & Maintenance Training courses.

In 2013, we acquired Eirdata, Specialists in cleanroom validation, commissioning & compliance to complement our existing services.

ESS Ltd. - Providing Asset Optimisation & Compliance through people.

For further information please contact:
CPD Training, Engineers Ireland, 22 Clyde Road, Ballsbridge, Dublin 4. Telephone: 01 6651305 or email: cpdtraining@engineersireland.ie

MEETA - Asset Managers Association

Health and Safety Category Industry Award Winner 2016

at National Finals in Engineers Ireland, HQ, Ballsbridge, Dublin

The Biomarin International Award Winning Team

John O Brien
Biomarin Maintenance Manager and
CIT Mechanical Engineering Graduate

Christopher O Halloran
Biomarin Maintenance and Reliability Engineer and
CIT Mechanical Engineering Graduate

Barry Pigott
Biomarin Maintenance and Clean Utilities Engineer and
CIT Mechanical Engineering Graduate

Michael O Brien - Biomarin Utilities

James Dyson Design Award Ireland 2016

First Place National Award

HydroFLOcean (H-FLO) Multidisciplinary Team

Arran Coughlan, Kelly Lane, George O'Rourke, Shane O'Driscoll, Jason Shorten, John Harrington, Kacey Mealy & Gerard O'Connell

H-Flo is a new innovative water safety device that disengages a lanyard from a harness when submerged in water. The functional prototype was designed in response to the tragic death of two men on Thomond Bridge, Limerick in 2015 when they were harnessed onto a platform that fell into the River Shannon. H-Flo aims to prevent future tragedies like this one occurring.

H-FLO's Dyson award winning entry may be viewed directly at: http://www.jamesdysonaward.org/projects/hydro-flocean/

James Dyson Design Award Ireland 2016

First Place National Award Winner: HFLO™ Multidisciplinary Team

The James Dyson Award is a national and international design award that celebrates, encourages and inspires the next generation of design engineers. The Award is open to current and recent design engineering students. It is run by the James Dyson Foundation, James Dyson's charitable trust, as part of its mission to get young people excited about design engineering.

- **NATIONAL WINNERS (Announced 8th September - CIT's H-FLO wins Irish National Award)**
- **Top 20 Global Finalists (Announced 29th September - CIT's H-FLO in Top 20 International Short-list)**

H-FLO's Dyson award winning entry may be viewed directly at:
http://www.jamesdysonaward.org/projects/hydro-flocean/

accenture
High performance. Delivered.

Leaders of Tomorrow

NDRC

THE IRISH TIMES

Accenture Leaders of Tomorrow Awards

Grand Canal Square Dublin Wednesday 2nd March 2016

Winner: Vincent Forde

Mechanical Engineering Cork Institute of Technology

Accenture Leaders of Tomorrow Winner 2016 with Alastair Blair Managing Director Accenture

Industrial Partner:
CUH
Ospidéal Ollscoile Chorcaí
Cork University Hospital

GASGON™
MEDICAL DEVICES

Educational Institution:
CIT
CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

https://www.accenture.com/ie-en/Careers/leaders-of-tomorrow-award.aspx

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Leaders of Tomorrow

NDRC

THE IRISH TIMES

Accenture Leaders of Tomorrow Awards

Grand Canal Square Dublin Wednesday 2nd March 2016

Winner: Vincent Forde

Mechanical Engineering Cork Institute of Technology

Finalists Accenture Leaders of Tomorrow Winner 2016

with Alastair Blair Managing Director Accenture

Industrial Partner:
CUH
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Cork University Hospital

GASGON™
MEDICAL DEVICES

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https://www.accenture.com/ie-en/Careers/leaders-of-tomorrow-award.aspx

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Leaders of Tomorrow

NDRC

THE IRISH TIMES

Accenture Leaders of Tomorrow Awards

Grand Canal Square Dublin Wednesday 2nd March 2016

Winner: Vincent Forde

Mechanical Engineering Cork Institute of Technology

Accenture Leaders of Tomorrow Winner 2016 with Accenture Programme Manager, Peter Cleary and Accenture Business Sponsor Eithne Harley

Industrial Partner:
CUH
Ospidéal Ollscoile Chorcaí
Cork University Hospital

GASGON™
MEDICAL DEVICES

Educational Institution:
CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

https://www.accenture.com/ie-en/Careers/leaders-of-tomorrow-award.aspx

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Leaders of Tomorrow

NDRC

THE IRISH TIMES

Accenture Leaders of Tomorrow Awards

Grand Canal Square Dublin Wednesday 2nd March 2016

News from Dublin

CIT's Vincent Forde Wins Accenture Leaders of Tomorrow 2016 Competition

Following a very long day indeed of project presentation and demonstration in Accenture HQ, Grand Canal Square, Dublin, CIT's Vincent Forde was announced as the Winner of the Accenture Leaders of Tomorrow 2016 Competition Finals.

Vincent, a Third Year Mechanical Engineering Student and participant in CIT's Student Inc Summer 2015, was shortlisted as one of just 6 finalists, having previously been short-listed to 18 semi-finalists from 143 national and international entries in the Accenture Leaders of Tomorrow 2016 Competition.

Vincent presented his project on improving patient safety in the clinical environment in this highly prestigious competition, which is open to undergraduate and postgraduate student and recent graduates.

Congratulations to Vincent - a really superb achievement for any student and particularly so for a third year undergraduate student competing against a very large entry of hugely competitive teams of post-graduate students and graduates.

Industrial Partner:
CUH
Ospidéal Ollscoile Chorcaí
Cork University Hospital

GASGON™
MEDICAL DEVICES

Educational Institution:
CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

https://www.accenture.com/ie-en/Careers/leaders-of-tomorrow-award.aspx

Irish Early Career Awards

National Gallery Dublin Wednesday 9th November 2016

Winner: Vincent Forde

Mechanical Engineering Cork Institute of Technology

Vincent Forde Special Recognition Award Winner 2016 with Dublin Footballer Paul Flynn

Industrial Partner:
CUH
Ospidéal Ollscoile Chorcaí
Cork University Hospital

GASGON™
MEDICAL DEVICES

Educational Institution:
CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

http://earlycareerawards.ie/awards/

Irish Early Career Awards

National Gallery Dublin Wednesday 9th November 2016

Vincent Forde Founder Gasgon Medical

In 2010 Vincent discovered his entrepreneurial flair as the founder of Kuebo Design, a successful design company which has been established over 7 years and continuing to grow.

During this time Vincent has attended Cork Institute of Technology studying Mechanical Engineering, while also establishing his second business Gasgon Medical, a start-up company that supports front-line medical staff through innovative products and procedures to ensure better patient outcomes.

Vincent is also a graduate of the Student Inc programme at the CIT Rubicon Centre.

Vincent has also been accredited with a number of prestigious awards including Accenture Leaders of Tomorrow Award 2016, CIT Prize for Innovation 2016 and Enterprise Ireland Student Entrepreneur of the Year 2016.

The Irish Early Career Awards

Celebrating the Young Professional Stars of Ireland

The Irish Early Career Awards, in association with Lincoln Recruitment Specialists and Bank of Ireland celebrate excellence and recognises the achievements of young professionals in Ireland, and ultimately, rewards innovation, best practice and outstanding achievement across a broad range of sectors.

Industrial Partner
CUH
Ospidéal Ollscoile Chorcaí
Cork University Hospital

GASGON™
MEDICAL DEVICES

Educational Institution:
CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

http://earlycareerawards.ie/awards/

CIT Prize for Innovation 2016

Student Entrepreneur of the Year 2016

First Place €4,000 Award

Winner: Vincent Forde

Mechanical Engineering Cork Institute of Technology

Cork Institute of Technology's Innovation Week 2016 came to a close with the awarding of the Local Enterprise Offices (Cork) CIT Prize for Innovation. The winner of this year's first prize of €4,000, and title of CIT Entrepreneur of the Year, went to Vincent Forde, a third year mechanical engineering student from Carrigaline, Co Cork for his project GASGON, which is a degassing solution for flowing fluids.GASGON was chosen from 52 entries for the Local Enterprise Offices (Cork) sponsored prize, which awards €10,000 in cash prizes to those whose inventions, and business ideas, are judged most creative, novel, innovative, and likely to succeed in the workplace. Vincent completed the Student Inc., programme in CIT's Rubicon Centre last Summer and was most recently the winner of the Accenture "Leaders of Tomorrow" 2016 Competition Final.

CIT Prize for Innovation 2016

Most Innovative Award 2016

€2,000 First Place Award

Winner: HFLO™ Multidisciplinary Team

Platform Safety System Design

Innovative Product Development Laboratories

Multidisciplinary Biomedical, Mechanical and Business Team

Arran Coughlan , Gerard O'Connell , John Harrington, Jason Shorten, Georgs O'Rourke, Kelly Lane, Shane O'Driscoll, Janek Kräuter, Kacey Mealy

CIT Prize for Innovation 2016

Best Business Plan 2016

€1,500 First Place Award

Winner: Darren Kingston

Final Year Mechanical Engineering

Safety Release Hook™

Construction Sector Novel Safety Device

Mechanism Design and Development

CIT Prize for Innovation 2016

Best Business Plan 2016 €1,500 First Place Award

Winner: Darren Kingston Final Year Mechanical Engineering

Safety Release Hook™

Construction Sector Novel Safety Device Mechanism Design and Development

CIT Prize for Innovation 2016

Nimbus Centre €5,000 Technological Development Award

Winner: Steady Life™ Multidisciplinary Team

Parkinson's Disease Medical Enablement Device Design

Innovative Product Development Laboratories

Multidisciplinary Biomedical, Mechanical and Business Team

Katie Galvin, Ryan Sebastian, Eoin Kelly, Neil Walsh, John Morrissey, Piotr Kasztelan, Michelle Kehoe

Rubicon

Nimbus / Embedded Systems Research

Oifig Fiontair Áitiúil
Local Enterprise Office

Rubicon

CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Oifig Fiontair Áitiúil
Local Enterprise Office

CIT Prize for Innovation 2016

Best Exhibited Project Stand Award 2016

€1,000 First Place Award

Winner: Shelve Tech™ Multidisciplinary Team

Diarmuid Cody, Daniel McCarthy, Cillian Farrell, Sean O'Callaghan, Niall O'Leary, Elaine Ferro, Timothy Casey, Brian Laffan, Mark O'Flynn

Safe and Efficient Storage Device Design

IDEA hub

Innovative Product Development Laboratories
Multidisciplinary Biomedical, Mechanical and Business Team

IDEA hub

Rubicon

CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Oifig Fiontair Áitiúil
Local Enterprise Office

CIT Prize for Innovation 2016

Innovative Product Development Laboratories

Multidisciplinary Biomedical, Mechanical and Business Team Finalists

CardiEq™ Bafety™ EaseGate™

IDEA hub

IDEA hub

Rubicon

CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Oifig Fiontair Áitiúil
Local Enterprise Office

CIT Prize for Innovation 2016

Innovative Product Development Laboratories

Multidisciplinary Biomedical, Mechanical and Business Team Finalists

BullStop™ RSL™ Brace Yourself™

IDEA hub

IDEA hub

Enactus CIT

Social Innovation Award 2016

€1,000 First Place Award

Winner: Biomedical Engineering Year 3 Team
Alex Sheehan, Eoin McCarthy and Myat Min Khaung

Hand-held Water Purification Device

combating the lack of clean drinking water locally and in third world countries

Enactus CIT

Social Innovation Award 2016

€1,000 First Place Award

Winner: Biomedical Engineering Year 3 Team

Alex Sheehan, Eoin McCarthy and Myat Min Khaung

Hand-held Water Purification Device

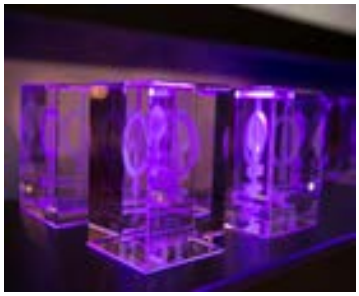
combating the lack of clean drinking water locally and in third world countries

2015 Awards

Engineers Ireland Excellence Awards

"Best in Class" Engineering Education Excellence Award 2015

Cork Institute of Technology
30 Years A Growing
Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition
Ireland and Europe's Largest Educational Engineering Event



Engineers Ireland "Best in Class"

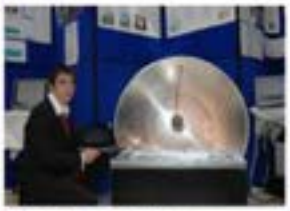
Education Excellence Award Winner 2015

Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition

Ireland and Europe's Largest Educational Engineering Event















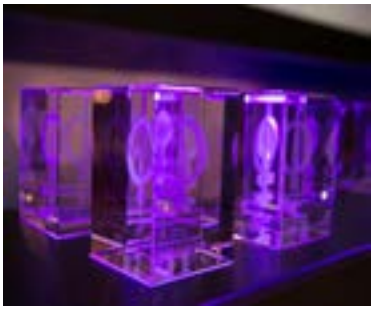







Engineers Ireland Excellence Awards

"Best in Class" Engineering Education Excellence Award 2015



Cork Institute of Technology
30 Years A Growing
Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition
Ireland and Europe's Largest Educational Engineering Event

Simielle De Morais CIT Final Year Biomedical Engineering Student demonstrates her capstone project on Design, Development and Testing of Cardiac Output Simulator carried out in conjunction with Cork University Hospital to Dr. Aoife Burke and Lecturer Sally Bryan at the Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition

Engineers Ireland Excellence Awards

"Best in Class" Engineering Education Excellence Award 2015

Cork Institute of Technology

30 Years A Growing

Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition

Ireland and Europe's Largest Educational Engineering Event

Now, in its 30th year, the Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition with over 200 stands is Ireland and Europe's Largest Educational Engineering Event.

Combining entrepreneurship, multidisciplinary innovative product development and industrial participation, the student centric event features many major themed exhibits, including Formula 1 cars and reproductions of Leonardo da Vinci's studio/inventions. The Cork exhibition is a seminal fixture in promoting engineering on a national /international level and engineering a highly successful campus educational innovation eco-system.

Engineers Ireland Excellence Awards

"Best in Class" Engineering Education Excellence Award 2015

Cork Institute of Technology
30 Years A Growing
Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition
Ireland and Europe's Largest Educational Engineering Event

Westminster London 2015

International Medical Engineering Finals
Wednesday 25th February 2015

First Place - Vicon Prize for
Best Undergraduate Medical Engineering Project 2015

James Fogarty - Cork Institute of Technology

"Design and Development of an Assistive Technology Music System for People with Cerebral Palsy

Institution of MECHANICAL ENGINEERS

Engineering in Medicine and Health Division

I MECH E

Institution of MECHANICAL ENGINEERS

Engineering in Medicine and Health Division

I MECH E

Westminster London 2015

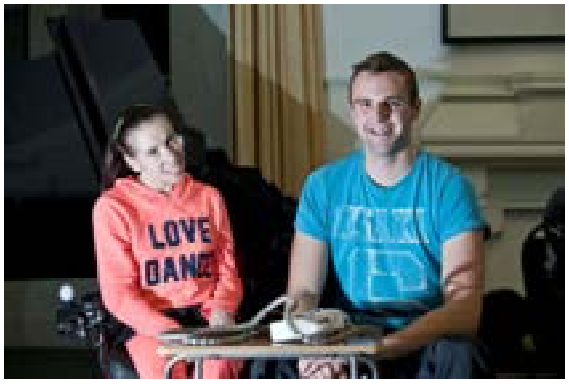
The Healthcare Technologies Student and Early Career Awards 2015

International Medical Engineering Finals 25th February 2015

First Place - Vicon Prize for
Best Undergraduate Medical Engineering Project 2015

First Place: James Fogarty - Cork Institute of Technology

"Design and Development of an Assistive Technology Music System for People with Cerebral Palsy"



Institution of MECHANICAL ENGINEERS

Engineering in Medicine and Health Division

I MECH E

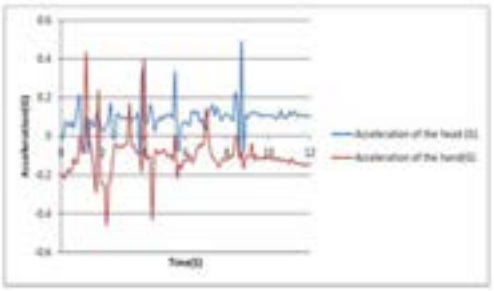
Design and Development of an Assistive Technology Music System for People with Cerebral Palsy

James Fogarty Final Year Bachelor of Engineering in Biomedical Engineering Undergraduate Capstone Project in conjunction with Enablement Organisation SoundOUT

Music is something which is engraved into our culture. Music gives us a sense of community, culture and family and is such an integral part of our lives that it can often be taken for granted. For people with disabilities, music participation has been demonstrated to have significant benefits in terms of development of cognitive, physical, communication, social and emotional skills.(1) Music is an effective means of stimulating and focusing attention and may be especially significant for some people who do not respond to other interventions. Music is an important tool in learning. Music also can provide significant assistance in memorization. Scientific evidence exists that rhythm stimulates and organizes muscle response with a significant assist to people with neuromuscular disorders.(2) Music therapy has the distinction of being effective at stimulating and motivating speech, as well as providing an avenue for nonverbal communication.(3)

However, not everybody has the ability to create music. This project thus strives to bridge the gap for people with severe disabilities to express themselves musically. The research, design and development of a viable method for creating music utilising the available movements of a particular subject with hemiplegic cerebral palsy is undertaken - leading to the development of a generic method of music creation to suit a wide range of disabilities.

A systematic design approach is adopted to conceive, design and optimise the novel music system - Music-ability™. Iterative prototype design, development and extensive testing is successfully undertaken. The developed hardware and software system efficiently converts head and arm movements into corresponding notes and sound effects. Through extensive liaison, feedback and approval from the subject and music teacher, the created assistive technology music system is optimised and tailored for the unique wants and needs of the subject.



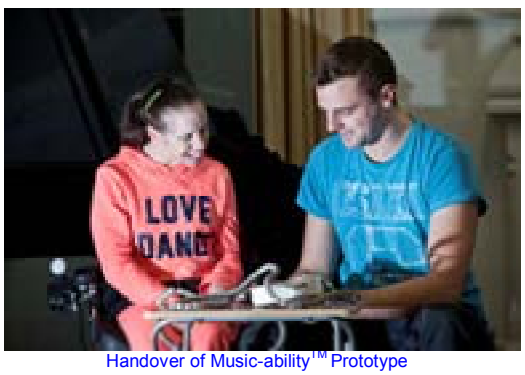
Secondary Head and Hand Testing of Music-ability™ Prototype

The developing Music-ability™ system enables the subject to explore different rhythms and to play a range of notes and keys similar to any other instrument. This instrument is electronic and implemented by simple movements. The developing design utilizes a dual three-axis accelerometer and data acquisition module system processed to create more sophisticated music than is possible with current systems. From this original concept, software is designed to achieve the eight basic notes in a scale using simple movements of the arm. Further technical and software development is progressed to utilise both the head and hand movements to create corresponding percussion sound effects. Improvement and optimisation is undertaken to aid the creation of music with additional features such as different sound effects, calibration and note display. The Music-ability™ music creation system can be connected to a public address system to play with other musicians live and to record music - this connectivity achieved via auxiliary cable and auxiliary cable jack configuration. The system is tested with the subject and alterations to the software completed to enhance the music creation capability of the subject and ensure consistent performance.

This project concentrates on the study of the range and strength of movement of one particular student - resulting however in the creation of a generic instrument, which enables patients of similar mobility to play, record and enjoy sophisticated music. The developed generic assistive music technology system Music-ability™ is readily adapted to a wide range of disabilities.

Planned future work includes investigation of incorporation of one axis accelerometers to reduce product cost, wireless accelerometers to enhance aesthetics and flexibility, optimisation of seamless transfer to collaborative software and music creation from digital audio workspace. The final product will be similar in discrete form and size to a wristband and easily fitted on the subject.

The developing system has been tested and calibrated and formal handover (including full supporting documentation) of the Music-ability™ Prototype to the subject, her parents and the SoundOUT enablement organisation took place on Monday 12th May 2014.



Handover of Music-ability™ Prototype

(1) Pacchetti, Claudio MD; Mancini, Francesca MD; Aglieri, Roberto; Fundarò, Cira MD; Martignoni, Emilia MD; Nappi, Giuseppe MD,Psychosomatic Medicine:May/June 2000 - Volume 62 - Issue 3 - pp 386-393, Active Music Therapy in Parkinson's Disease: An Integrative Method for Motor and Emotional Rehabilitation
(2) L. L. Morton, J. R. Kershner and L. S. Siegel, (1990), Journal of Music Therapy Volume 27, Issue 4Pp. 195-208, The Potential for Therapeutic Applications of Music on Problems Related to Memory and Attention
(3) Mary M. Rainey Perry,(1990) Journal of Music Therapy Volume 40, Issue 3Pp. 227-246. Relating Improvisational Music Therapy with Severely and Multiply Disabled Children to Communication Development

Design and Development of an Assistive Technology Music System for People with Cerebral Palsy

music generation
MAKING MUSIC EDUCATION HAPPEN
Ireland's National Music Education Programme
A Music Network initiative, funded by U2 & The Ireland Funds

James Fogarty Final Year Bachelor of Engineering in Biomedical Engineering Undergraduate Capstone Project in conjunction with Enablement Organisation SoundOUT

Darragh Kane

James Fogarty
CIT Final Year Biomedical Engineering Student
demonstrates his capstone project on
Design and Development of an Assistive Technology Music System for People with Cerebral Palsy
carried out in conjunction with SoundOUT
to Rebecca Casey at the

Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition

First Place - Vicon Prize for
Best Undergraduate Medical Engineering Project 2015
The Healthcare Technologies Student and Early Career Awards 2015
London Medical Engineering Finals
25th February 2015

European Enterprise Promotion Awards 2015

November 18-20 2015 Luxembourg

See video of Luxembourg Awards Ceremony at:
https://www.youtube.com/watch?v=M0-iehXI5tE

Cork Institute of Technology 'Engineering an Innovation Eco-System'

Irish National Award Winner

European Commission for the European Enterprise Promotion Awards 2015 under

"Promoting the Entrepreneurial Spirit"

The European Commission quoted the reasons for Cork Institute of Technology's selection as the National Winner as
"Delivering innovative product development, multi-disciplinary engineering and ground-breaking education"

The Objectives of the Awards are to:

- *Identify and recognise successful activities and initiatives undertaken to promote enterprise and entrepreneurship;*
- *Showcase and share examples of best entrepreneurship policies and practices;*
- *Create a greater awareness of the role entrepreneurs play in society;*
- *Encourage and inspire potential entrepreneurs.*

The Award Categories are:

- ***Promoting the entrepreneurial spirit - promote an entrepreneurial mindset, especially among young people and women;***
- ***Investing in entrepreneurial skills – improve entrepreneurial and managerial skills;***
- ***Improving the business environment - support enterprise start-up and growth, simplify legislative and administrative procedures for businesses;***
- ***Supporting the internationalisation of business - encourage enterprises and particularly small and medium-sized businesses to benefit more from the opportunities offered by markets, both inside and outside the EU;***
- ***Supporting the development of green markets and resource efficiency - support SME access to green markets and help to improve their resource efficiency through, for example, green skills development and matchmaking, as well as funding;***
- ***Responsible and inclusive entrepreneurship - promote corporate social responsibility among small and medium-sized enterprises and entrepreneurship among disadvantaged groups such as the unemployed, legal migrants, disabled, or people from ethnic minorities.***

European Commission

European

Enterprise Promotion

Awards

National Winner
Promoting the Entrepreneurial Spirit

Cork Institute of Technology
Ireland

for

'Engineering an Undergraduate Innovation Eco-System'
Delivering innovative product development, multi-disciplinary engineering & ground-breaking education

Luxembourg, November 2015

Joanna Drake
Chair of the European Enterprise Promotion Awards Jury

In co-operation with

Presidency of the Council of the European Union · GRAND DUCHY OF luxembourg

The European Enterprise Promotion Awards 2015 recognise excellence of initiatives supporting SMEs and entrepreneurship among public administrations and public-private partnerships within the European Union and associate countries in the Competitiveness and Innovation Programme (CIP). It is sponsored by the European Commission.

Engineers Ireland Innovative Student Engineer of the Year 2015

SIEMENS *sponsored by Siemens* ENGINEERS IRELAND

Ms. Emma O'Leary, Ms. Nicolle Dunphy and Ms. Kelly Lane
Final Year Level 7 Biomedical Engineering Degree Students
demonstrate their capstone project on
"Piglet Mortality Reduction
Automatic Pig Milking Device Design and Development"
which received a Finalist Award at the
Engineers Ireland Innovative Student Engineer of the Year 2015
National Competition

SIEMENS

CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

ENGINEERS IRELAND

UNIVERSITY STARTUP
World Cup

Equaliser

Equaliser – Extreme Weather Condition Novel Tie Down System for Ship to Shore Cranes

CIT Equaliser Team

Shortlisted for

University Startup World Cup

Finals September 14-18 2015 Copenhagen, Denmark

(See http://universityworldcup.com/)

48 Finalists from 24 Countries

Italy, United Kingdom, Denmark, Nicaragua, China, Japan, Netherlands, South Africa, India, Canada, Brazil, Turkey, Iran, United States of America, Croatia, Australia, Korea, Egypt, Serbia, Sweden, Nigeria, Finland, Kenya, Ireland

Cork Institute of Technology's Equaliser Team is the sole Irish team and Adjudged in Top Three Worldwide in Product and Technology Category

World Cup

Equaliser

World Cup

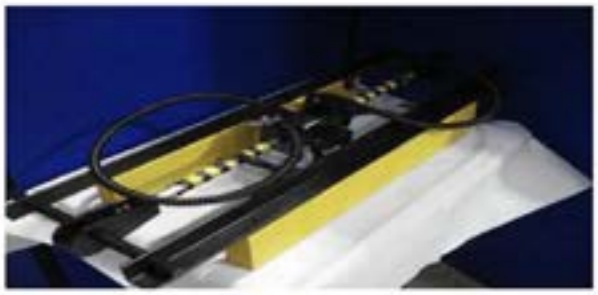
CIT Equaliser Team Shortlisted for University Startup World Cup

Finals September 14-18 2015 Copenhagen, Denmark

(See http://universityworldcup.com/)

The Equaliser™ Product

Equaliser™ is an extreme weather conditions novel tie-down system for ship to shore cranes, incorporating an equalising beam and torque adjustable features, which has been designed, prototyped, optimised and tested. The tie-down system is a critical device to prevent a container crane from being overturned or pushed along the quay during extreme weather events. The development of Equaliser™ has substantially advanced the safety and design functionality of this important crane component, which is highly influenced by strong damaging wind forces. The innovative design ensures equal distribution of these forces on installed tie-down mechanisms and eliminates irregularities in height difference during operation which is critical.



The Equaliser™ Team

The Equaliser™ development team, comprising of brothers Brian and Ronan Hand, prides itself on inculcating an ethos of sustained dedication and innovation in progressing the novel extreme weather crane tie-down system. Their combined technical and management skills are harnessed to create a highly driven focus to excellence and entrepreneurship in our start-up company. Brian from a mechanical engineering background has primarily taken the role of product development through conducting extensive iterative design, product analysis testing and experimentation. Ronan from an energy engineering background has taken on the role of overseeing the business and marketing elements of the business with developing many of the promotion outlets for their business.

Equaliser™ Team Brian and Ronan Hand

Extreme Weather Conditions Novel Tie-down System for Ship to Shore Cranes - Equaliser™

https://www.youtube.com/watch?v=FYEZ1tMtVnI and https://www.youtube.com/watch?v=a3AHciPZrAE and http://www.cit.ie/newsarchive?id=833 and http://www.cit.ie/equaliser

Red Letter Day for CIT Graduating Class of 2015

In conjunction with

EMC, Abbott and BioMarin at

MEETA Asset Management and Maintenance Awards National Finals
Engineers Ireland HQ Ballsbridge Dublin

3 MEETA Certificate Awards of Excellence for CIT Graduating Class of 2015 at MEETA Asset Management and Maintenance Awards National Finals 2015

Thursday 19th November 2015 proved to be a Red Letter Day for the CIT Graduating Class of 2015 at the MEETA Asset Management and Maintenance Awards Finals Presentations at Engineers Ireland HQ, Clyde Road, Ballsbridge, Dublin 4.

In the MEETA Student Awards, CIT Mechanical and Biomedical Engineering graduates 2015, Michael Harrington and Kevin Condon undertaking projects in conjunction with EMC and Abbott were selected from a very large student entry to be presented with two of just three MEETA Certificate Student Awards of Excellence awarded nationally.

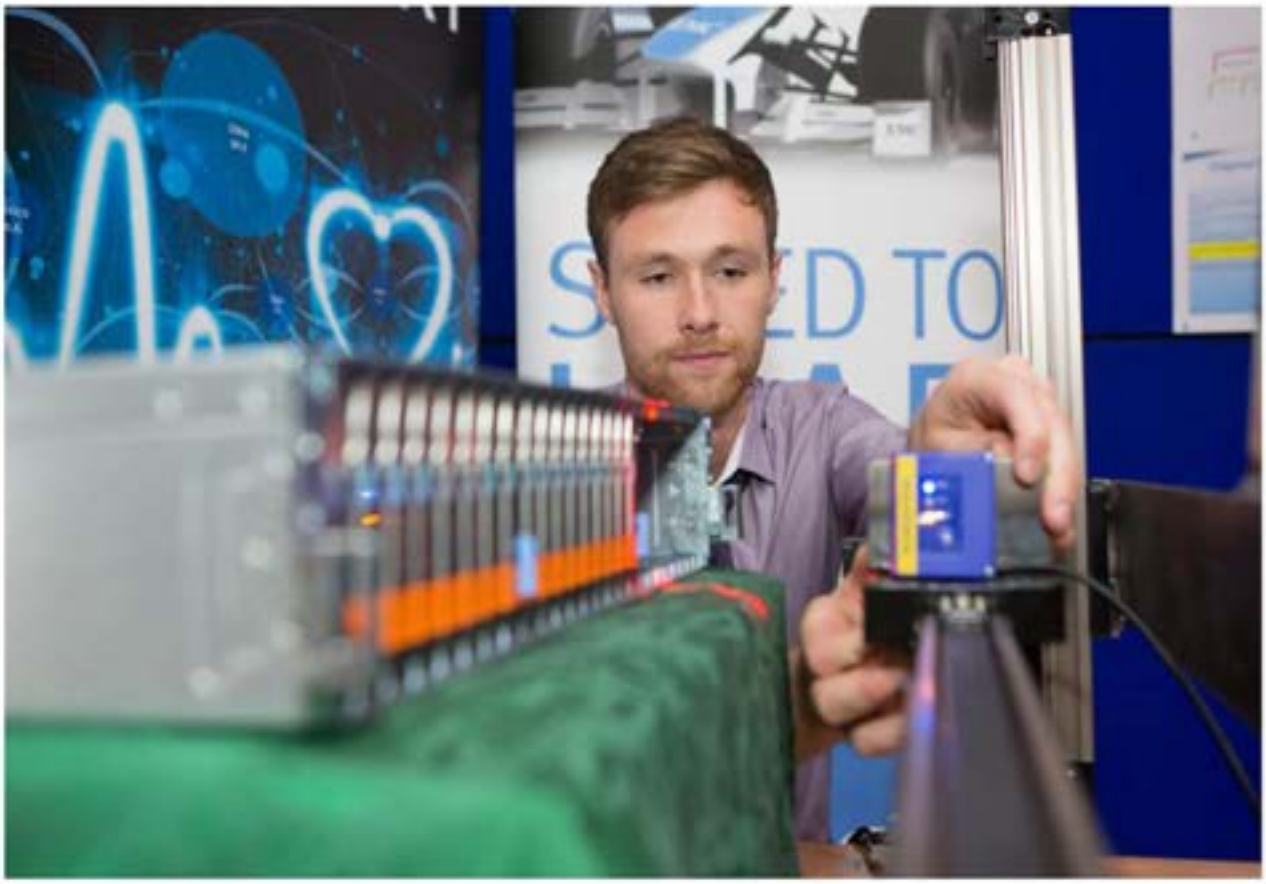
In the MEETA Industrial Awards, Michael and Kevin's classmate of 2015, Christopher O'Halloran of BioMarin along with colleagues John O'Brien (also a CIT graduate) and Kevin Kilbride of BioMarin were selected from a very large industrial entry to be presented on behalf of BioMarin with one of just two MEETA Certificate Awards of Maintenance Excellence awarded nationally.

A Red Letter Day indeed for the CIT Graduating Class of 2015, EMC, Abbott and BioMarin.

MEETA - Asset Managers Association

National Finals Engineers Ireland HQ Ballsbridge Dublin

Student Certificate Award of Excellence 2015



Michael Harrington Mechanical Engineering CIT

"Design and Development of a Fast Scan System in conjunction with EMC"

Fast Scan System

A Happy and Proud Harrington Family

Fast Scan System

MEETA - Asset Managers Association

National Finals Engineers Ireland HQ Ballsbridge Dublin

Student Certificate Award of Excellence 2015

Michael Harrington Mechanical Engineering CIT

Pictured with John Coleman, Chairman MEETA and Ray O'Neill of ESS

"Design and Development of a Fast Scan System in conjunction with EMC"

Mechanical Engineering Student Michael Harrington's Final Year Capstone Project "Design and Development of a Fast Scan System" was carried out in conjunction with EMC under the supervision of Lecturer Michael O'Mahony. EMC is a global leader in the design and manufacture of large storage systems for IT departments worldwide. These storage systems contain series of hard-drives, hundreds of thousands of which are used by EMC every quarter. Hard-drive identification is via a unique bar code system. The scanning of hard-drive barcodes and nesting to purchase orders, an essential part of the manufacturing/distribution process, is completely manual and a monotonous/time consuming task. Based on student project identification/proposal while on work placement, EMC agreed to support an investigation of scanning process automation. Following a hugely challenging hardware/software project and personal development process, a fully functional automated fast scan prototype was designed, manufactured, commissioned and tested. Optimum speed, scanner angle, scanner distance and scanner operating modes were determined and implemented to achieve major efficiency and speed benefits. Direct benefits include a scanning process 400% faster, increased productivity and the elimination of human error/monotonous process.

Fast Scan System

where information lives

CORK INSTITUTE OF TECHNOLOGY

where information lives

Fast Scan System

MEETA - Asset Managers Association

National Finals Engineers Ireland HQ Ballsbridge Dublin

Student Certificate Award of Excellence 2015

Kevin Condon Biomedical Engineering CIT

Pictured with John Coleman, Chairman MEETA and Ray O'Neill of ESS

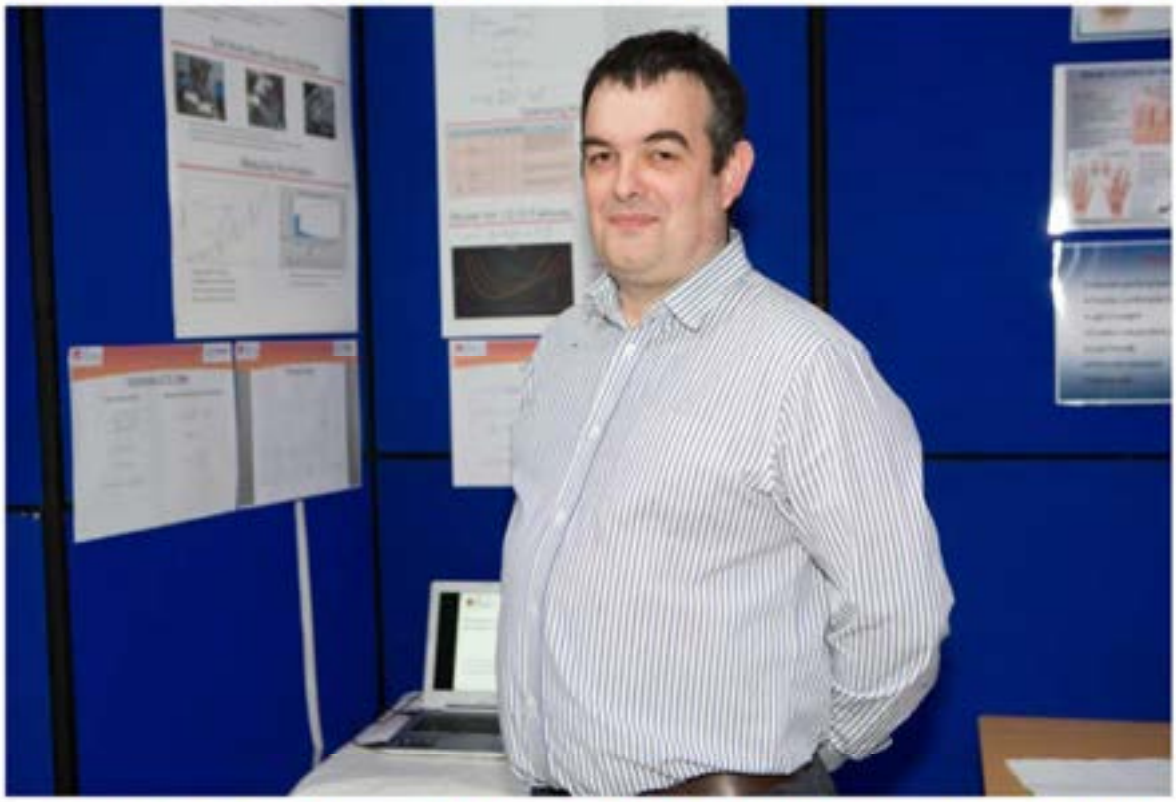
"Preventive Maintenance Optimization of a Split Mold Stent Security Machine in conjunction with Abbott Ireland"

Kevin Condon with Kevin Walsh of Abbott

MEETA - Asset Managers Association

National Finals Engineers Ireland HQ Ballsbridge Dublin

Student Certificate Award of Excellence 2015



Kevin Condon Biomedical Engineering CIT

"Preventive Maintenance Optimization of a Split Mold Stent Security Machine in conjunction with Abbott Ireland"

Biomedical Engineering Student Kevin Condon's Final Year Capstone Project "Preventive Maintenance Optimization of a Split Mold Stent Security Machine" was carried out under the supervision of Lecturer Sally Bryan. This project was undertaken to increase maintenance efficiency at a bottleneck manufacturing station. Through the use of Six Sigma methodology, DMAIC, FMEA and statistical modelling of failure data, the project has established and validated a method of optimizing PM that is transferrable to other equipment families in the organization. The project was not without its challenges. As the equipment family consisted of 35 assets, minimum cost of maintenance models proved inadequate, requiring the development, implementation and validation of more appropriate maintenance mathematical models. The harnessing of stakeholder commitment throughout all project phases was also both challenging and critical. The project has directly resulted in significant efficiency improvements in both planned and unplanned maintenance and a capacity increase of 3000 parts. The devised project solution and methodology, applying scientific process for a vital capacity improvement, is consequently currently being implemented in multiple sites throughout the organization both in Ireland and globally.

MEETA - Asset Managers Association

National Finals Engineers Ireland HQ Ballsbridge Dublin

Certificate Award of Maintenance Excellence 2015

BioMarin - Kevin Kilbride, Christopher O'Halloran and John O'Brien

Management of Maintenance Assets Project

In the MEETA Industrial Awards, CIT Mechanical Engineering Graduate 2015, Christopher O'Halloran (centre) of BioMarin along with colleagues John O'Brien (also a CIT graduate) and Kevin Kilbride of BioMarin were selected from a very large industrial entry to be presented on behalf of BioMarin with one of just two MEETA Certificate Awards of Maintenance Excellence awarded nationally.

Pictured with John Coleman, Chairman MEETA and Terence McCarthy and Paul Harte of AESSEAL.

The BioMarin Shanbally asset maintenance management program was developed in a threefold structure of elements: BioMarin identified personnel as key to the development of a dynamic and efficient maintenance organisation. An agile team structure was developed with key positions instilled to create an empowered team dynamic with the required skillset and mind set. Critical to the development of the asset maintenance program was the equipment maintenance criticality ranking (ECA). Equipment Maintenance Criticality is a value assigned to each asset indicating its criticality in the event of failure or shutdown within the plant. Equipment criticality ranking was based on Base Criticality Factors - EHS /Business /Quality Impact and Maintenance Factors - Utilization/Time to Repair/Equipment Costs/Mean time Between Failure/ Detection/Visibility Factor. The Maintenance and Reliability programme develops a continuous improvement attitude toward our maintenance systems allowing the systems to develop. An assessment was performed on our People and Organisation, Processes, Systems, Technology & Optimisation and Culture to identify gaps between current and best practice.

The CHARTERED INSTITUTION OF WATER AND ENVIRONMENTAL MANAGEMENT

AECOM Student Environmental National Award Winners 2015

Following a very long day indeed of project preparation and presentation in Sligo, the 2015 AECOM National Student Environmental Awards have been announced.

The three recipients of the 2015 AECOM National Student Environmental Awards are:

Brendan Heery ***Dublin City University*** ***PhD Student***
Programme of Study - Chemistry
" Sensing platform design for faecal indicator bacterial detection in marine waters "

Aidan Ware ***Cork Institute of Technology*** ***PhD Student***
Programme of Study - Environmental Engineering
" Potential of renewable gas production from slaughterhouse waste streams "

Damien Dennehy ***Cork Institute of Technology*** ***Undergraduate Student***
Programme of Study - Mechanical Engineering
"Design and Development of an Automatic Flood Defence Barrier - Advanced Hydro Systems"

ADVANCED HYDRO SYSTEMS

Design and Development of an Automatic Flood Defence Barrier

AECOM Student Environmental National Award Winner 2015

Damien Dennehy Cork Institute of Technology

"Design and Development of an Automatic Flood Defence Barrier - Advanced Hydro Systems"

Damien Dennehy
CIT Final Year Mechanical Engineering Student
demonstrates his award winning capstone project on "Advanced Hydro Systems - Design and Development of an Automatic Flood Barrier" at the

2015 Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition

AECOM Student Environmental National Award Winner 2015

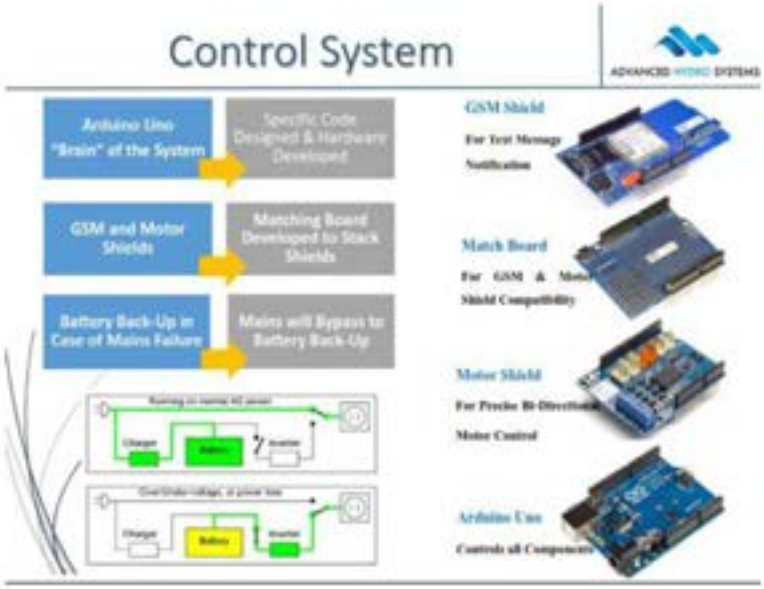
Damien Dennehy Cork Institute of Technology

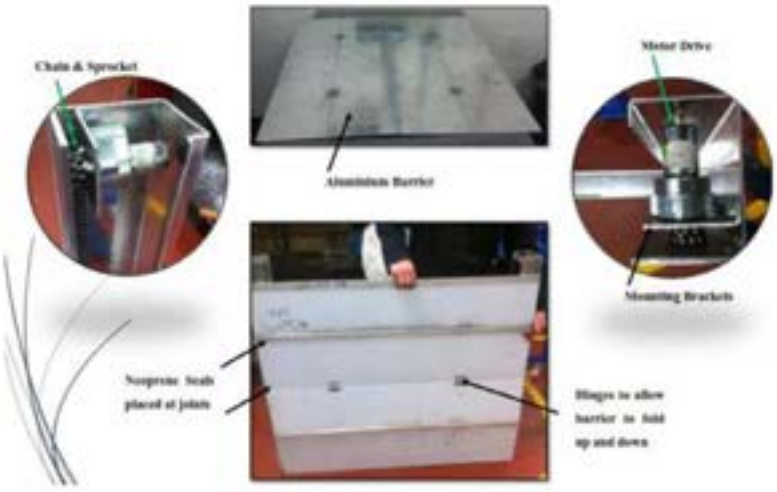
"Design and Development of an Automatic Flood Defence Barrier - Advanced Hydro Systems"

ADVANCED HYDRO SYSTEMS

Design and Development of an Automatic Flood Defence Barrier

A Prototype Automated Pre-installed Flood Defence Barrier is Conceived, Designed, Manufactured and Tested

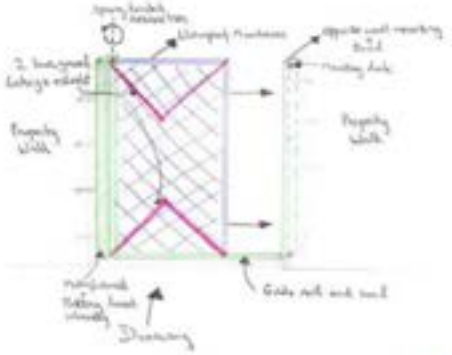




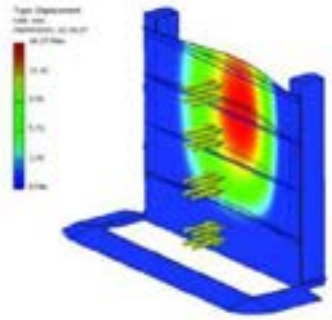
AECOM Student Environmental National Award Winner 2015

Damien Dennehy Cork Institute of Technology

"Design and Development of an Automatic Flood Defence Barrier - Advanced Hydro Systems"



A systematic design approach, based on rigorous safety / sustainability criteria, is adopted to devise/advance a novel optimal solution.



A range of novel design solutions were conceived and assessed.

Advanced finite element analysis, material optimisation methodologies and control hardware/software development are employed.

ADVANCED HYDRO SYSTEMS

Advanced Control System

The developed doorway flood barrier system incorporates novel water detection sensor technology, self-deploys automatically during flood events and provides text alert notification to householder/business owner with potential to obviate major loss/damage.

http://www.pmd-solutions.com/

€4.2 Million Funding

11 further jobs announced at PMD Solutions

November 2015

PMD Solutions Mission

To revolutionise non-invasive respiratory monitoring, and empowering medical staff to support the early prevention model of healthcare while improving patient care and solving the critical need for a comprehensive and continuous method of respiratory monitoring.

CEO and Founder – 2011 CIT Mechanical Engineering Graduate Myles Murray

It has just been announced that CIT Mechanical Engineering Graduate Myles Murray's PMD Solutions Respiratory Monitor Device (arising from his Final Year Capstone Mechanical Engineering Degree Project 2011 and developed over the past 4 years in the Rubicon Centre) is to receive Horizon 20/20 €4.2 Million Funding and to create 11 further jobs in Cork (10 already employed).

Myles first rose to national prominence in 2010 when his third year multi-disciplinary project team project on the Design and Development of a Portable Intravenous Infusion System Mobilis carried out with student colleagues Gavin O'Sullivan and Mark Keane won an Enterprise Ireland / Invest Northern Ireland Islandwide Enterprise Award at the Young Entrepreneur of the Year Competition 2010 in Dublin.

Between third year and fourth year, Myles undertook his work placement at the CIT MEDIC Centre, where he received expert guidance and excellent experience including introduction to Professor Stephen Cusack of CUH, now Clinical Director of PMD Solutions.

Myles returned to college in September 2010 and commenced his self-conceived individual capstone Mechanical Engineering project on the Design and Development of a Patient Friendly Respiratory Rate Monitor, which progressed to great effect over the 2010/ 2011 academic year.

Myles' project won first place in the CIT Prize for Innovation and the coveted title of CIT Student Entrepreneur of the Year 2011 in March 2011.

Following completion of his mechanical engineering studies in June 2011, Myles took the hugely brave step of not following the traditional professional engineering degree path of employment with a blue chip company – but decided to set up his company PMD Solutions and to develop his early stage biomedical device under the expert guidance and assistance from CIT's Rubicon Centre.

Many congratulations also to all at the CAPPA Centre for their super contribution in helping prepare PMD Solution's successful proposal.

The company development over the past four years, based on this expert guidance from the Rubicon and Myles' and the PMD Solutions team drive and dedication, has been meteoric – this announcement a fantastic success for all involved in the CIT Innovation Eco-System.

PMD Solutions Mission

To revolutionise non-invasive respiratory monitoring, and empowering medical staff to support the early prevention model of healthcare while improving patient care and solving the critical need for a comprehensive and continuous method of respiratory monitoring.

CEO - Myles Murray

MEDTEC Ireland Winner - Academy of Excellence

MedTechWorld START-UP ACADEMY
Future Innovation & Technology

This year MEDTEC **launched a brand new** Start-Up Academy – **a place where start-up businesses showcase their latest innovations to potential partners from the medical device industry.**

PMD Solutions was awarded with the title Start-Up Academy of Excellence Winner.

MEDTEC launched the competition with the aim of uncovering the very best in start up innovations from across Europe.

MEDTEC Ireland enables Europe's leading medical device manufacturers to present their propositions to a wider audience across a 2 day event.

RespiraSense receives CE Mark

PMD's premier product, RespiraSense - Breathing Rate Monitoring, has received regulatory approvals for the sale and marketing of the device across the European Union. This milestone now enables PMD to establish a wider presence by leveraging European approvals in countries on other continents.

"RespiraSense was specifically designed to be easily adopted by healthcare providers in order to serve the widest population of patients in the shortest possible time. Delivering respiratory rate to the European market through RespiraSense will enable PMD to work with leading university hospitals and national health authorities to establish a new industry best practice for continuous breathing rate monitoring." says Myles Murray, CEO of PMD Solutions.

PMD SOLUTIONS

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Student Inc.
SUPPORTING STUDENT ENTREPRENEURS

Start-up Intern Project Summer 2015

Rubicon Centre Supported Campus Student Company
€5,000 Grant - Serviced Office and Lab Space - Mentoring
Start-up Intern Project Summer 2015

Mechanical Engineers

Mr. Vincent Forde and Mr. Timothy Norton

"Development of In-Line De-Gassing Solution for Intravenous Medical Applications "

Demonstrate at 2015 Exhibition

Student Inc.

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Student Inc.
SUPPORTING STUDENT ENTREPRENEURS

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Start-up Intern Project Summer 2015

Rubicon Centre Supported Campus Student Company
€5,000 Grant - Serviced Office and Lab Space - Mentoring
Start-up Intern Project Summer 2015

Biomedical Engineers

Ms. Emma O'Leary, Ms. Nicolle Dunphy and Ms. Kelly Lane

"Automatic Pig Milking Device Design and Development"

Demonstrate at 2015 Exhibition

Student Inc.

2014 Awards

European Student Innovation Awards
Innovact 2014 Reims France
European Campus Student Innovator of the Year 2014
First Place and Outright Winner

http://www.innovact.com

First Place European Campus Student Laureate of Innovation 2014
John Roberts PyraAid™ "Wheelchair Enablement Device"
Cork Institute of Technology Ireland

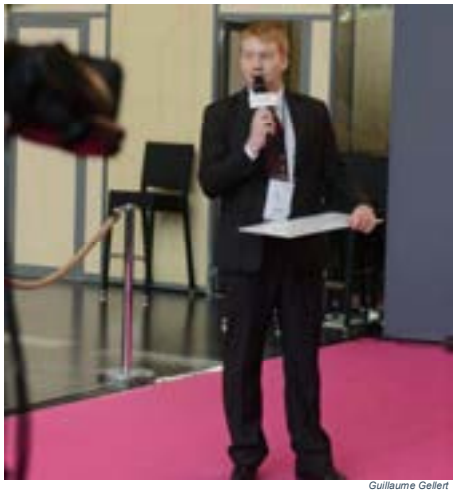
It has been announced on Wednesday 2nd April 2014 before a packed auditorium at the European Innovation Finals Innovact 2014 Reims, France, that First Place and Outright Winner of European Campus Student Innovator of the Year 2014, from hundreds of international entries and 20 shortlisted international finalists is John Roberts of Cork Institute of Technology.

John would like to pay particular tribute to his third year Multidisciplinary Engineering and Business student colleagues: Siobhan Hickey, Alan O'Reilly, Laura Hannon, Sandra Hayes, Thomas Thornton and Stephen O'Brien, who were central and crucial to the early inspiration and development of the enablement project and whose support and encouragement persuaded John to continue on the project as a most challenging and rewarding final year capstone mechanical engineering project.

European Student Innovation Awards
Innovact 2014 Reims France

European Campus Student Innovator of the Year 2014
First Place and Outright Winner

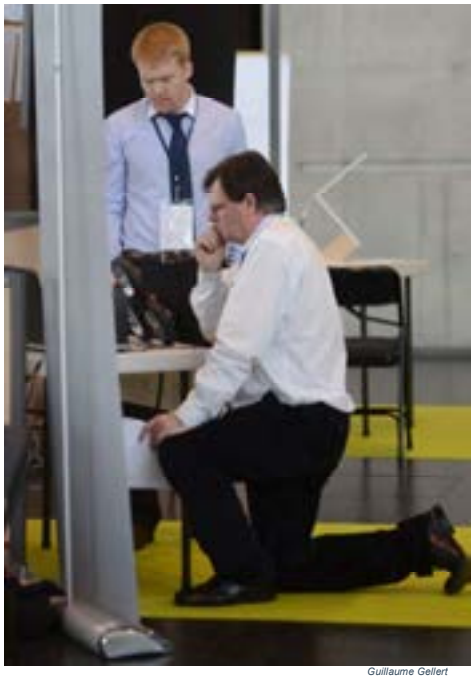
http://www.innovact.com



Guillaume Gellert

Guillaume Gellert

First Place European Campus Student Laureate of Innovation 2014
John Roberts PyraAid™ "Wheelchair Enablement Device"
Cork Institute of Technology Ireland



Guillaume Gellert

David Keane

European Student Innovation Awards
Innovact 2014 Reims France

Engineers Ireland Innovative Student Engineer of the Year 2014

SIEMENS *sponsored by Siemens* ENGINEERS IRELAND

Naoise Culhane

First Place €1,500 National Award

Winner: James King

Mechanical Engineering Cork Institute of Technology

"Drone Compatible Medical Transportation Pod Design, Development and Testing"

CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Engineers Ireland Innovative Student Engineer of the Year 2014

SIEMENS

sponsored by Siemens

ENGINEERS IRELAND

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Engineering in Medicine and Health Division

Westminster London 2014

International Medical Engineering Finals
Thursday 27th February 2014

First Place - JRI Prize for Best Undergraduate Medical Engineering Project Exhibition and Poster Presentation

First Place: Shane Fogarty - Cork Institute of Technology
"Medication Capsule Thermoforming Process Improvement and Electrostatic Analysis"

Runner Up Finalist:
David Williams
Cardiff University
"Exploring Knee Loading Using Magnetic Resonance Imaging"

Runner Up Finalist:
Alaa Abdulali Alsaffar
University of Huddersfield
"Development of Methods To Pressure Map The Patient Device Interface In Support Surface"

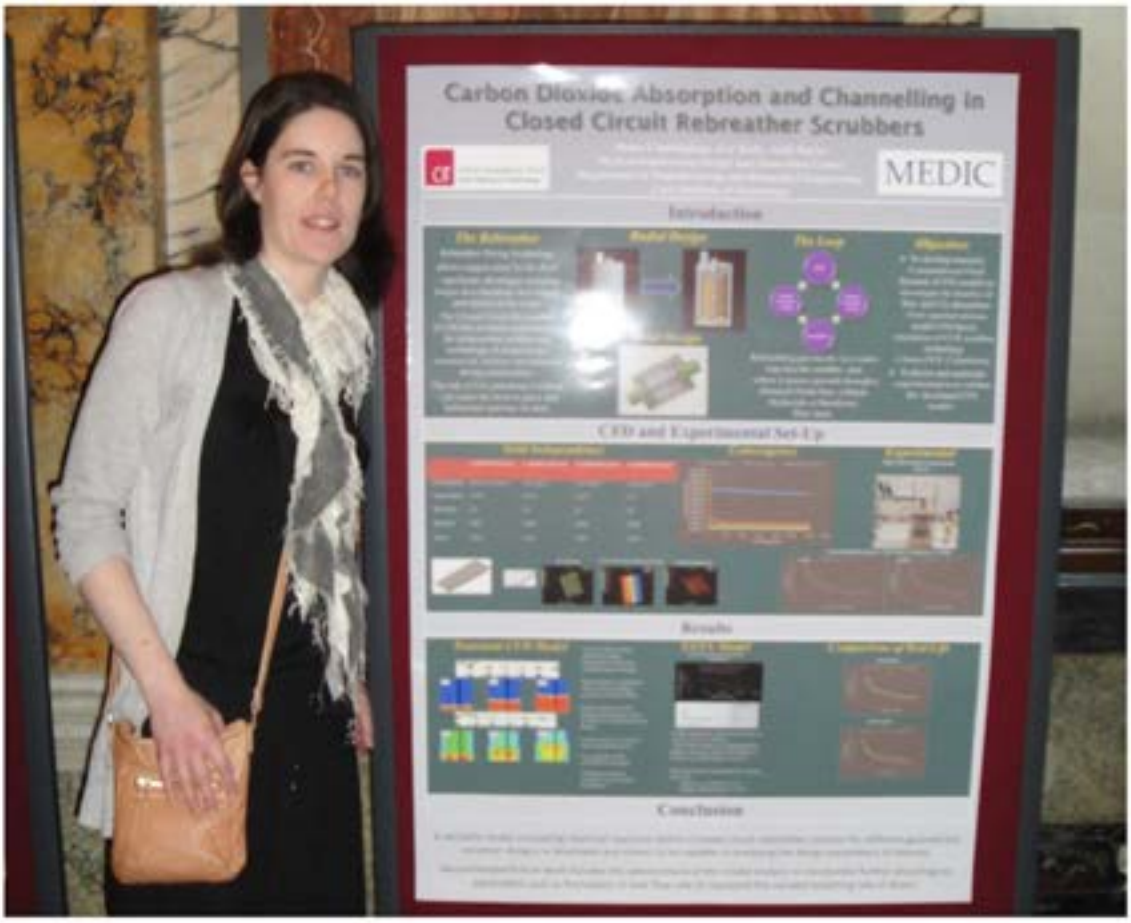
First Class Honours Mechanical Engineering Graduate Shane returns to a most highly sought after graduate placement in the prestigious professional development programme at Biomedical company Abbott Vascular in Clonmel, Co. Tipperary.

Engineering in Medicine and Health Division

Engineering in Medicine and Health Division

Westminster London 2014

International Medical Engineering Finals
Thursday 27th February 2014
Medimaton Prize for Best PhD Medical Engineering Project
Exhibition and Poster Presentation



First Place: Dr. Chi Leng Leong
Imperial College London
"Bioengineered Microfluidic Devices for the Real-Time Clinical Measurement of Neurochemicals"

Runner Up Finalist: Dr. Shona Cunningham
Cork Institute of Technology
"Carbon Dioxide Absorption and Channelling in Closed Circuit Rebreather Scrubbers"

Dr. Shona Cunningham of Cork Institute of Technology takes up a most highly sought post-doctorate research position in the area of Computational Fluid Dynamics at the world renowned National Physics Laboratory (NPL) in London

Engineering in Medicine and Health Division

CADFEM Ireland and Ansys Users Conference 2014

Best Paper Presentation Award

"An Analysis into Wind Induced loading Effects on a Ship-to-Shore (STS) Crane and Investigation into Design Optimisation"

12th September 2014 Dublin

Cork Institute of Technology's Brian Hand Final Year Undergraduate Engineering Project "An Analysis into Wind Induced loading Effects on a Ship-to-Shore (STS) Crane and Investigation into Design Optimisation" Wins Best Paper Presentation Award at CADFEM Ireland and Ansys Users Conference 2014 in Engineers Ireland HQ Dublin

Brian's self-devised final year undergraduate capstone project on "An Analysis into Wind Induced Loading Effects on a Ship-to-Shore (STS) Crane and Investigation into Design Optimisation" arose from his work placement at Liebherr Container Cranes of Killarney, Co. Kerry.

Brian had already been extended the exceptional honour for an undergraduate student of being invited to publish and present his findings at this major conference. Competing against primarily PhD students at the conference, Brian's achievement, as the sole undergraduate presenter, in winning the CADFEM Ireland award is a remarkable testament to the rigour and innovativeness of the work undertaken.

Details of Brian's award winning work, including illustrated summary, full capstone project report and two developed videos, can be found at: http://www.cit.ie/equaliser

Brian is to graduate on 20th October 2014 at Cork Institute of Technology with a Bachelor of Engineering in Mechanical Engineering Level 8 First Class Honours Degree

Brian has also been awarded a CIT Risam PhD Scholarship

Speak Out for Engineering 2014

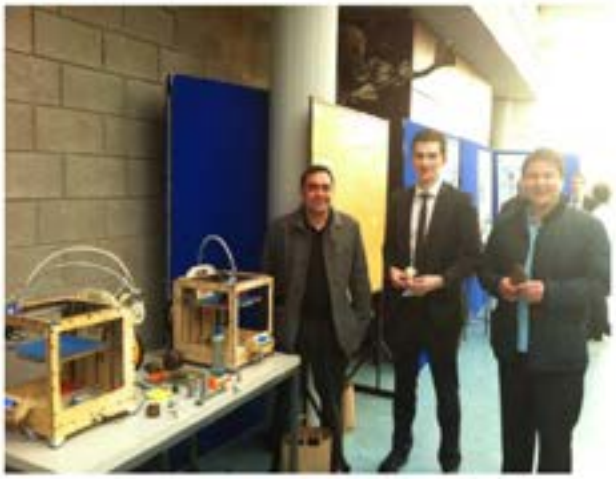
First Place National Award

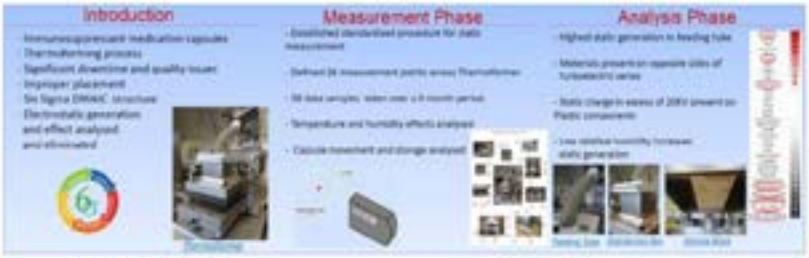
Institution of Mechanical Engineers Republic of Ireland Young Members

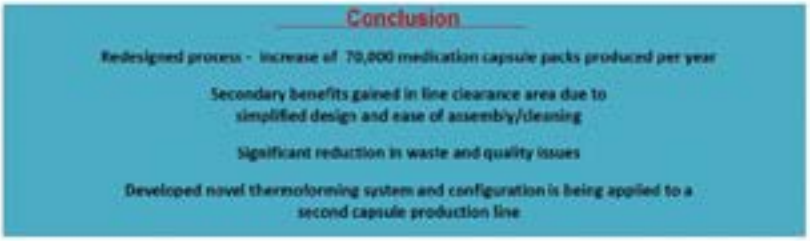
Engineers Ireland young engineers

Winner: Shane Fogarty Mechanical Engineering Cork Institute of Technology

"Medication Capsule Thermoforming Process Improvement and Electrostatic Analysis"







Institution of Mechanical Engineers Republic of Ireland Young Members

Engineers Ireland young engineers

MEETA - Asset Managers Association

National Student Award 2014

Damien McAuliffe Mechanical Engineering CIT

"GlaxoSmithKline Incinerator Scrubber System Analysis and Optimisation"

When specifying equipment for industrial use, that equipment is regularly oversized to ensure suitability and potential for expansion. The prevalent view is that, if oversized, equipment can adequately achieve specified function, but that undersizing may result in both non-functionality and restriction on expansion. Research is undertaken on the GlaxoSmithKline Incinerator Scrubber System to design, develop and implement modifications to reduce running costs while providing capacity for future expansion.

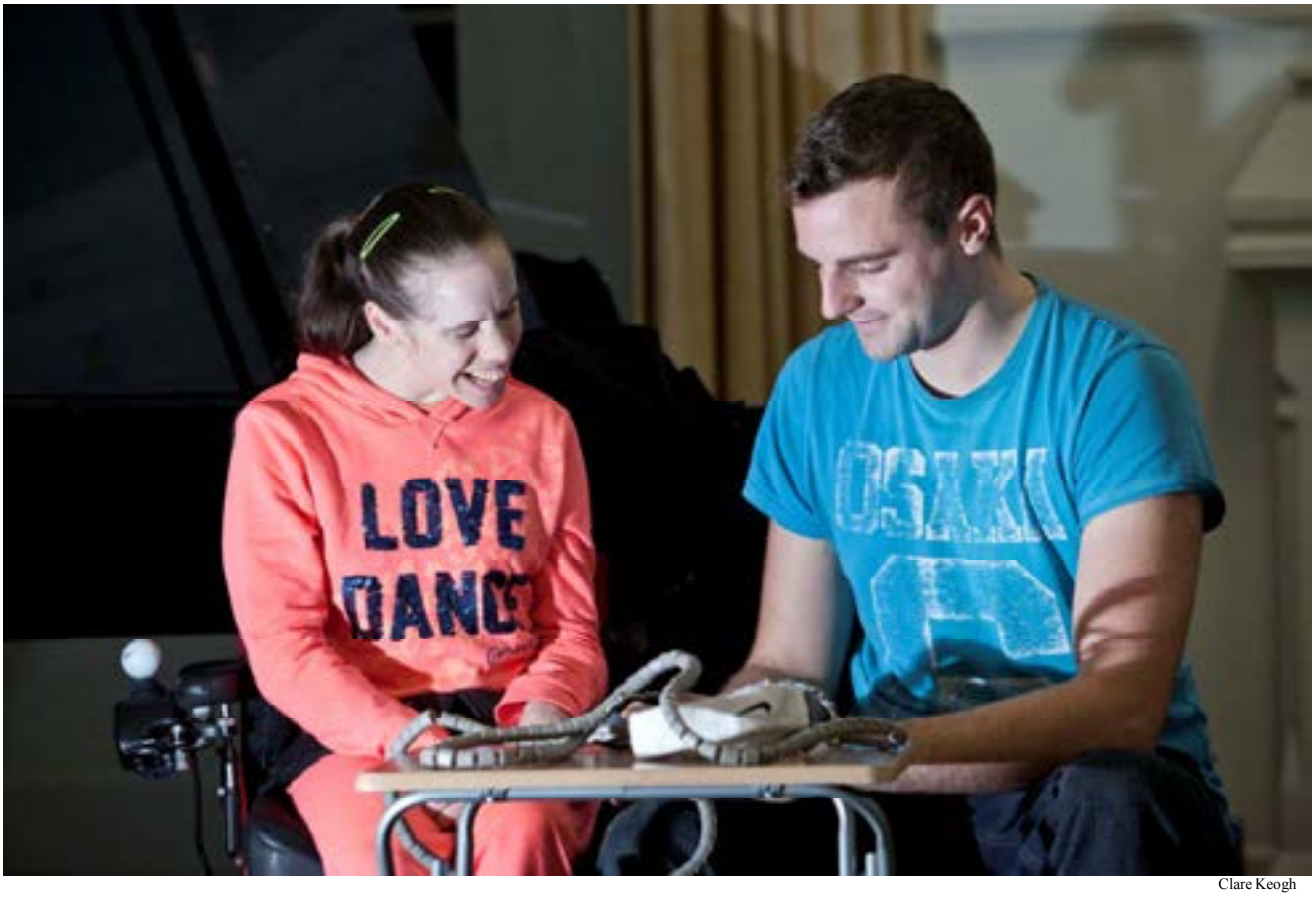
Scrubber operation investigation was carried out to determine critical parameters affecting operation, resulting in determination of an ideal water droplet size to ensure efficient water use and pump motor requirements to supply this water. Testing was successfully undertaken utilising advanced high speed camera technology thereby allowing comparison of droplet size and spray pattern from original and optimised nozzle configuration systems. The recommended and specified new nozzle size configuration enables a 60% reduction in water volume with a payback period of 0.8 years.

2014 Undergraduate Awards

Engineering and Mechanical Sciences

James Fogarty Cork Institute of Technology

"Design and Development of an Assistive Technology Music System - Musicability"



Clare Keogh

CIT Biomedical Engineering Student James Fogarty with Jenny Garde from the SoundOUT Programme

James developed an assistive music technology system "Musicability" to help facilitate music making for the SoundOUT programme in Cork City.

Highly Commended
The Undergraduate Awards 2014
Top 10% of
4,792 Global Submissions

Darragh Kane

James demonstrates his project to Rebecca Casey

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music generation
MAKING MUSIC EDUCATION HAPPEN
Ireland's National Music Education Programme
A Music Network initiative, funded by U2 & The Ireland Fund

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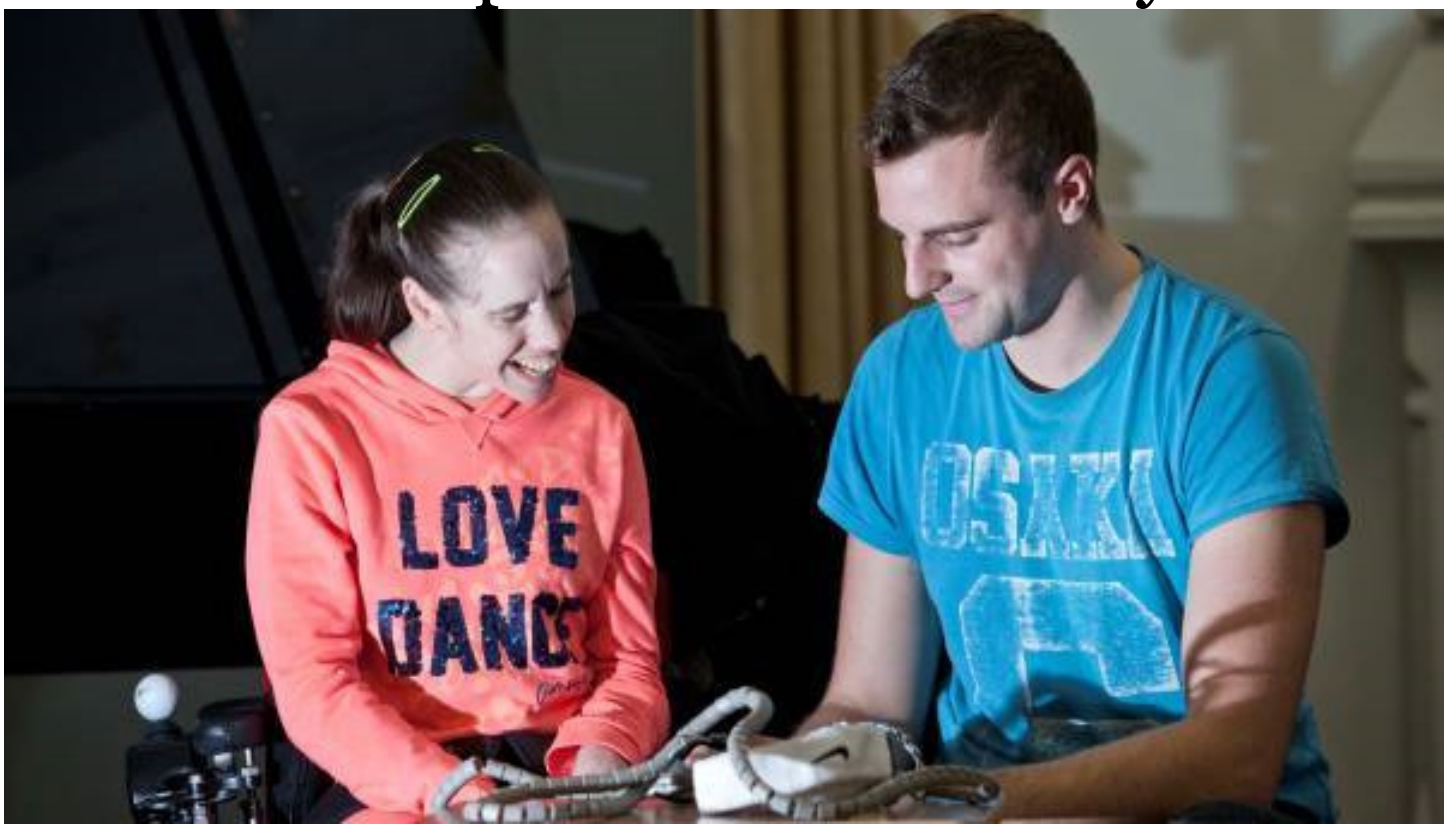
Irish Examiner **News Page 2** Thursday, November 20, 2014

James' help is music to Jenny's ears



CIT Graduate James Fogarty who developed a piece of assistive music technology to help facilitate music making for the SoundOUT programme in Cork City. With him and the instrument is Jenny Garde from the SoundOUT programme. Picture: Clare Keogh

- *By Eoin English Irish Examiner Reporter*

It has hi-tech accelerometers, complex hardware and specially written coding to beat the band — but it's all music to their ears. Cork Institute of Technology (CIT) engineering graduate James Fogarty has developed a tailor-made "assistive system" to help Jenny Garde, who has cerebral palsy, realise her dream of making music.

James, 23, a biomedical engineer from Co Waterford, who graduated from CIT last month, spent the last year of his course working with Jenny as part of Music Generation Cork City's SoundOUT programme — the inclusive music education programme run in several schools across the city. "It was something I was very passionate about," James said. "I come from a musical background and was until recently, in a band with my two brothers. "Jenny loves music too. She was very musical but couldn't express it because of her condition."

He spent months working closely with her, assessing her physical abilities to devise a system that could adapt to and use her movement to create music. He has developed a wrist strap and a head band with in-built accelerometers which have been adapted to pick up on her movements.

Those movements are then converted through automation software in to electronic signals which are passed to a module which plays a sound through a laptop. Jenny can select a guitar or piano sound and can even change the key of the tune so that she can play along with other instruments. "It was a lot of work, with a lot of testing and validating over the months but it was just great to help someone who couldn't create music create it," James said. While he is due to start work in Abbott Vascular in Clonmel in a few weeks, he plans to continue developing the system, which can be adapted for other uses.

His project was highly commended in the engineering and mechanical sciences category of the Undergraduate Awards 2014, and was ranked in the top 10% of submissions to the 2014 programme, which received 4,792 submissions from undergraduate students around the world.

Cork Institute of Technology
is a major supporter and one of six local funders of
Music Generation Cork City, which is part of
Music Generation, Ireland's national music education programme

Recently two of CIT's engineering students who graduated this Autumn, designed and developed new assistive music technologies to help facilitate music making for the SoundOUT programme

Students James Fogarty and Nicola O' Mahony worked closely with the SoundOUT team and the young musicians involved, in order to develop specific types of technology which would best suit the musicians' needs

Darragh Kane

CIT Student Nicola O'Mahony demonstrates her capstone Biomedical Engineering project on the Adaptation of "The Magic Flute" for People with Restricted Movement carried out in conjunction with the SoundOUT organization.

Engineers Ireland Excellence Awards 2014

Four Seasons Hotel Dublin

Friday November 7th 2014

CIT graduates Robert Hobbs and James King
Winners of Engineers Ireland Excellence Awards 2014

CIT Graduates Receive 2 Major Awards

Presented at the glittering and prestigious Engineers Ireland Excellence Awards Ceremony at the Four Seasons Hotel, Ballsbridge, Dublin 4:

DePuy Synthes Cork "The Journey from Follower to Global Leader" submitted by a team led by 2007 CIT Mechanical Engineering Graduate Robert Hobbs, has won the Engineers Ireland Excellence Award for Continuing Professional Development CPD Employer of the Year 2014 Award. See following link for EI Summary Paper authored by Robert on the DePuy Synthes Team Submission:
http://www.engineersjournal.ie/de-puy-engineering-cpd-strategy/

Engineers Ireland Excellence Award for First Place and Engineers Ireland Innovative Student Engineer of the Year 2014 (Level 8) - James King - Mechanical Engineering - Cork Institute of Technology "MediPod - Drone Compatible Medical Transportation Pod Design, Development and Testing".
See http://www.cit.ie/medipod

ENGINEERS IRELAND

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ENGINEERS IRELAND

CONTINUING PROFESSIONAL DEVELOPMENT CPD EMPLOYER OF THE YEAR 2014 AWARD

Winner - DePuy Synthes Cork "The Journey from Follower to Global Leader"
DePuy Synthes Cork "The Journey from Follower to Global Leader" submitted by a team led by 2007 CIT Mechanical Engineering Graduate **Robert Hobbs** has won the Engineers Ireland Excellence Award for Continuing Professional Development CPD Employer of the Year 2014 Award.

Runner Up Short-listed Companies- Continuing Professional Development CPD Employer of the Year 2014

► 30 Million by 2017 - A Business Transformation Roadmap - GE Healthcare

► Delivering Value Through Knowledge Management and External Learning Linkages - Roughan & O'Donovan Consulting Engineers

► RPS GMIT BIM Revolution - RPS Group Ltd

► Continuous Improvement and Adaptability Brings Growth for Zimmer Shannon - Zimmer Orthopedics Manufacturing Ltd

ENGINEERS IRELAND EXCELLENCE AWARDS STUDENT ENGINEER OF THE YEAR 2014 AWARDS

First Place and Engineers Ireland Innovative Student Engineer of the Year 2014 (Level 8)
James King - Mechanical Engineering - Cork Institute of Technology
"MediPod - Drone Compatible Medical Transportation Pod Design, Development and Testing".

Runner Up Finalists

► **Brian Hand** - Cork Institute of Technology:
"An Analysis into Wind Induced loading Effects on a Ship to Shore (STS) Crane and Investigation into Design Optimisation"

► Oisín Moore - National University of Ireland Galway
"Improving Breast Cancer Screening - Design of a Microwave Breast Imaging Prototype"

► Niall Ó Murchú - Dublin Institute of Technology
"Design and Build of an Electromechanical Test Rig"

.....

Congratulations also to two other CIT graduates who were also nominated for excellence awards -
Hewson Consulting's **Bridget Mullane**, CIT 2008 Structural Engineering Graduate, Department of Civil, Structural and Environmental Engineering, was short-listed for Chartered Engineer of the Year 2014 .
The Naval Service's Cdr **Michael Malone,** 1985 Marine and Plant Engineering Graduate, Cork RTC, paper on " P60 Naval Offshore Patrol Vessel " was short-listed for the Best Paper/Presentation of the Year 2014.

ENGINEERS IRELAND

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ENGINEERS IRELAND

Naoise Culhane

Engineers Ireland Innovative Student Engineer of the Year 2014 Level 7 Finalists

CIT Students Shane O'Gorman, Mark O'Flynn and Patrick Walsh present their project on Design Development and Testing of a Motorcycle Transport Device to Shirley McDonald EI and Aiden Cawley Siemens

2013 Awards

2013 Think Outside the Box Finals Galway
Three Major Awards Winners for Cork Institute of Technology

From over 400 Entries and following three gruelling days of Finals in Galway, Three Major Awards Winners were announced for Cork Institute of Technology by Minister John Perry:

First Place and Student Entrepreneur of the Year 2013 - €10,000
Most Technologically Innovative Product 2013 - €5,000
Think Outside the Box Award of Merit 2013 - €1,500

2014 Think Outside the Box Finals to come to CIT

ENTERPRISE IRELAND

STUDENTS THINK OUTSIDE THE BOX AWARDS

Invest Northern Ireland

2013 Think Outside the Box Finals Galway

First Place and
Student Entrepreneur of the Year 2013 - €10,000

Company AH Technology *Product Mastech*
Cork Institute of Technology
Animal Healthcare Device Design and Development

CIT Multi-Discipline Start-Up Innovation Team
Nicola O'Mahony, Donal Carey, Kenneth Barry, Damien McAuliffe, Ciaran Malone
Owen Mc Donagh, James Cahill

CIT CORK INSTITUTE OF TECHNOLOGY

2013 Think Outside the Box Finals Galway

First Place and

Student Entrepreneur of the Year 2013 - €10,000

MasTech™ - an in-line automatic detection system for mastitis in cows.

Mastitis has a significant adverse economic effect on dairy farmers throughout the world. Currently, most detection methods available are for the bulk milk tank. These methods do not facilitate rapid isolation of the infected cow. The developing MasTech™ product is designed to enable early identification of the infected cow during the milking process.

The MasTech™ product, developed by multi-disciplinary student team, AH Technology™, is unique in that it is an automated device which can be retrofit to any existing milking parlour and will test the milk sample during the milking process causing minimal disruption to the farmer. Currently the farmer has to test the cows manually by obtaining milk samples from each cow and then test them. This can be time consuming and is rarely done - so early detection of infected cows is rare.

The early identification and isolation of the infected cow by MasTech™ has major animal welfare and husbandry benefits for the cow and herd, and also has significant and on-going financial benefits for the farmer, creamery, and milk processor.

The product is currently in the prototype stage. Initial proof of concept testing has been undertaken and has proven very promising. Further product consistency testing on the developing prototype is planned to ensure the product works in all conditions that may arise in the milking parlour environment.

CIT Multi-Discipline Start-Up Innovation Team

Nicola O'Mahony, Donal Carey, Kenneth Barry, Damien McAuliffe, Ciaran Malone, Owen Mc Donagh, James Cahill

CIT CORK INSTITUTE OF TECHNOLOGY

ENTERPRISE IRELAND

STUDENTS THINK OUTSIDE THE BOX AWARDS

Invest Northern Ireland

2013 Think Outside the Box Finals Galway

Cruickshank Intellectual Property Attorneys
Most Technologically Innovative Product 2013 - €5,000

Company ***Sweet Sounding Electrics*** ***Product*** ***Hush Hush Hairdryers***
Cork Institute of Technology
Electronic Device Development

CIT Multi-Discipline Start-Up Innovation Team
John Kelleher, Mariah Reidy, Marco Quatrana , Kieran Minehane,
Colm Kearney, Shane O'Driscoll , Niamh Ryan

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ENTERPRISE IRELAND

STUDENTS THINK OUTSIDE THE BOX AWARDS

Invest Northern Ireland

2013 Think Outside the Box Finals Galway

Cruickshank Intellectual Property Attorneys Most Technologically Innovative Product 2013 - €5,000

In the home, excessively noisy hairdryers can wake sleeping children, make it difficult to converse and cause annoyance when watching TV. In the hair salon multiple dryer environment - with noise levels for individual hairdryers measured by the Sweet Sounding Electrics ™ team as exceeding 90dB - there are serious concerns for hearing impairment of hair dressers.

Exposure to constant and excessive noise can also cause other health problems including: stress, tinnitus, potential permanent hearing loss, headache, elevated blood pressure, fatigue, Irritability, digestive disorders and increased susceptibility to colds and infections.

Under Irish Law, ear protection must not only be provided - but must be worn in the event of workplace noise levels exceeding 90dB daily. Ear protection however is impractical for both hair salon and home environments.

The Hush Hush Hairdryers™ device, product of multidisciplinary student team Sweet Sounding Electrics ™, provides a novel, effective and unobtrusive method of hair dryer noise reduction within both the home and salon environment.

Company *Sweet Sounding Electrics* *Product* *Hush Hush Hairdryers* *Cork Institute of Technology*

CIT Multi-Discipline Start-Up Innovation Team

John Kelleher, Mariah Reidy, Marco Quatrana , Kieran Minehane, Colm Kearney, Shane O'Driscoll , Niamh Ryan

CIT CORK INSTITUTE OF TECHNOLOGY

ENTERPRISE IRELAND

STUDENTS THINK OUTSIDE THE BOX AWARDS

Invest Northern Ireland

2013 Think Outside the Box Finals Galway

National Award of Merit 2013 - €1,500

Company 123 Fitness Product Robobox

Cork Institute of Technology

Sports Training Device Development

CIT Multi-Discipline Start-Up Innovation Team

Donagh Good, Eoghan McEnery, Brian Hand, Aidan O Sullivan, David Linehan, James Fogarty, David Waterman

CIT CORK INSTITUTE OF TECHNOLOGY

ENTERPRISE IRELAND

STUDENTS THINK OUTSIDE THE BOX AWARDS

Invest Northern Ireland

2013 Think Outside the Box Finals Galway

National Award of Merit 2013 - €1,500

Boxing is in the public eye at the moment due to Ireland's recent success in the Olympic Games. Katie Taylor and John Joe Nevin took home gold and silver medals from the London Olympics 2012.

These wins coupled with the bronze medal wins of Paddy Byrnes and Michael Conlon help solidify the idea of "the fighting Irish".

123 Fitness™ is an Irish based company - the brainchild of a multidisciplinary student team -developing the Robobox™ product - a novel boxing pad trainer.

Not limited to just boxing, Robobox™ also provides a great cardio workout. Robobox™, in fact, provides a mixture between cardio and strength training, which gives the product great flexibility.

The product can also be combined with toning or Boxercise classes, making Robobox™ an all-encompassing product - suitable for men and women of different sports, backgrounds and fitness levels.

Company 123 Fitness *Product Robobox* *Cork Institute of Technology*

CIT Multi-Discipline Start-Up Innovation Team
Donagh Good, Eoghan McEnery, Brian Hand, Aidan O Sullivan, David Linehan, James Fogarty, David Waterman

CIT CORK INSTITUTE OF TECHNOLOGY

Engineers Ireland Innovative Student Engineer of the Year 2013

SIEMENS *sponsored by Siemens*

ENGINEERS IRELAND

First Place €1,500 National Award

Winner: Patrick Byrnes

Mechanical Engineering *Cork Institute of Technology*

"Automation of Ultrasonic Cleaning and Blast Processes at Zimmer Orthopaedics"

CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

zimmer

Siemens Engineers Ireland Innovative Student Engineer of the Year 2013
First Place €1,500 National Award

Student: Patrick Byrnes, Bachelor of Engineering (Honours Level 8) in Mechanical Engineering
College : Cork Institute Of Technology

Automation of Ultrasonic Cleaning and Blast Processes at Zimmer Orthopaedics

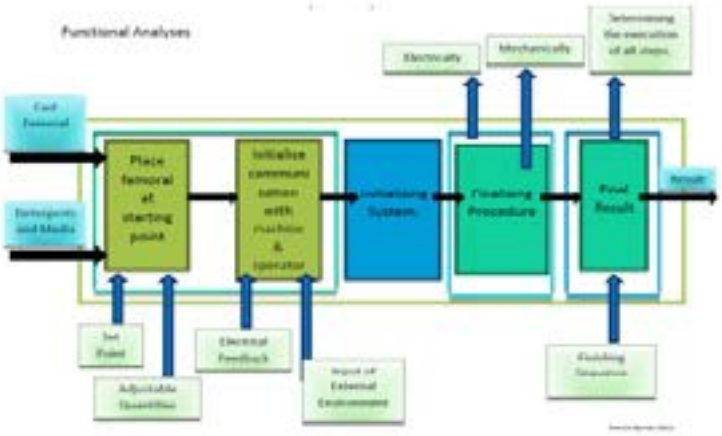
Implementation of automation technology into any modern manufacturing process poses many serious challenges and opportunities. Key factors such as timing and scheduling, financial planning, technical support acquisition and provision, quality control and cost saving all illuminate themselves as a threat to project success. These factors are never more critical to success than in the medical device industry – additional challenges include strict medical body regulation and the highest quality standards.

Femoral Orthopaedic Implant

Current Process Manufacturing Route

Medical device companies, who do take the plunge into the automation world, often face enormous corporate investments and suffer large lead times of implementation, all in the interest of stream lining production and lowering product cost.

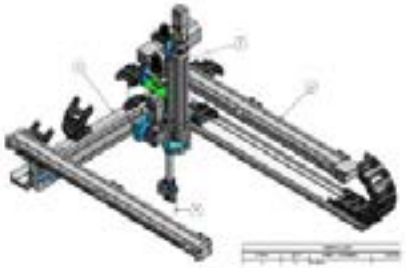
The achievement of a yellow belt in Six-Sigma and the valuable experience gained on work placement at Zimmer Orthopaedics, Ireland, enabled the author, through independent scrutinisation and analysis of existing manufacturing practices and the development of streamlined ergonomic techniques, to identify, formulate and progress this real world manufacturing project.



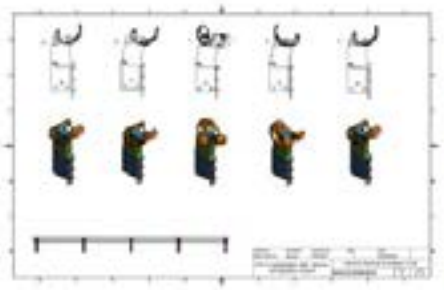
Extensive Systematic Design

Initial analyses identified existing ultrasonic cleaning and blast processing lead times as severe and sustained 'bottle neck' locations. Rigorous time studies, capability studies and gauge repeatability and reproducibility studies are carried out in order to fully characterise and simulate the current process. Various modes of systematic and experimental process design are undertaken by the author to raise the project classification / approval to that of 'budget venture'.

Breaking the manual mould, while simultaneously incorporating technology at minimal cost, is key to project feasibility and recognition. Design concept development, assessment, progression and optimisation are undertaken. Prototype manufacture, commissioning, testing and optimisation is achieved.



CAD Concepts Generation



Part Orientation Plotting

Prototype Development

The critical integration of FDA and ISO quality standards into final design is central to the project ethic and success. The student developed solution dramatically reduces the sub-process cycle time, providing efficiency savings of over €120,000 annually with a payback period of less than 4 months and frees up four personnel from repetitive tasks. The developed process solution is to be integrated into Zimmer's current manufacturing process.

Ireland hosts over 250 medical device technology companies - many of which contribute to the orthopaedic implant manufacturing industry. The innovation incorporated into this developing budget product has already attracted significant third party interest. The application to smaller outsource manufacturing companies is under progression. The devised process solution significantly demonstrates further applications in the manufacture of other medical device products.

The expertise gained led to the author forming and registering his own start-up company BYNCO Labs, specialising in providing innovative solutions in budget automation projects for the medical device manufacturing environment - first purchase order received in June 2013.

zimmer

Automation of Ultrasonic Cleaning and Blast Processes at Zimmer Orthopaedics

CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Student: Patrick Byrnes, Bachelor of Engineering (Honours Level 8) in Mechanical Engineering
College : Cork Institute Of Technology

Siemens Engineers Ireland Innovative Student Engineer of the Year 2013
First Place €1,500 National Award

Speak Out for Engineering 2013

First Place National Award

Developed Pyra-Aid™ Wheelchair Enablement Device by J. Roberts

Winner: John Roberts Mechanical Engineering Cork Institute of Technology

"Design and Development of a Wheelchair Enablement Device"

With 3 million users in the US and 5 million users in Europe, a staggering 1% of the total population of the Western World are estimated to gain mobility and freedom though the daily use of wheelchairs. Unfortunately, this mobility can be severely restricted by every day barriers such as mounting single steps or kerbs.

The design , development and testing of Pyra-Aid™, a retro fitted, user friendly, momentum powered mechanical device to aid in mounting of single steps or kerbs, is undertaken by the author. A systematic design approach, informed by wheelchair user and support group liaison, is adopted in the iterative development of the enablement device. Critical design criteria of the innovative 3 wheeled pyramid configuration include operation, efficiency, stability, safety, ease of attachment /detachment, versatility, wheelchair brand universality, manufacturability, aesthetics and cost.

A Mark 1 Pyra-Aid™ device has been manufactured and tested both in field and laboratory. Initial step / kerb mount tests have proven to be very promising. Design optimisation of the developing device, utilising state of the art manufacturing and material selection methodologies, is undertaken. Advanced analytical, computer aided design and experimental techniques, including finite element analysis and photo-elastic testing, are employed in the development of a Mark 2 prototype.

Pyra-Aid™ - a safe, easy to use, low cost aid promoting user comfort, mobility and independence through daily life for wheelchair users.

Speak Out for Engineering 2013

First Place National Award

"Design and Development of a Wheelchair Enablement Device"

The Speak Out for Engineering Finals Ireland 2013, adjudicated on by a distinguished panel drawn from both academia and industry, have just been announced at the Engineers Ireland HQ, Dublin. This prestigious engineering competition is open to all undergraduate and postgraduate engineering students in Ireland.

First Place and Outright Winner of the Speak Out for Engineering Award 2013

John Roberts - Final Year Mechanical Engineering - Cork Institute of Technology
"Design and Development of a Wheelchair Enablement Device"

Second Place Fiona Borkin - Letterkenny Institute of Technology - "Multi-Sensory Device for Children with Autism"

Third Place James Foody - University College Cork - "Design and Development of Low Cost Robotic Hand"

Highly Commended Finalists

Austyn Matheson - Trinity College - Dublin"Nerve Conduit Guide Optimization"

Luke Scales - Dublin City University - "Smart Homes - Current and Future Technology"

Aibhne Doherty - Dublin Institute of Technology - "Design, Analysis, Manufacture, and Verification of a Single Seat Racing Car Chassis for Formula Student Application"

EngineersWeek 25 February - 3 March 2013

EngineersWeek 25 February - 3 March 2013

MEETA - Asset Managers Association

National Student Awards 2013

MEETA Overall Student Award First Place 2013

Winner: Shane Fogarty Mechanical Engineering CIT

"Process Improvement and Electrostatic Analysis of Thermoforming Machine"

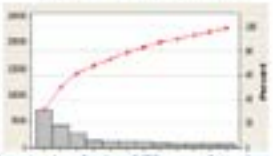
Medication Capsule Thermoforming Process Improvement and Electrostatic Analysis

Shane Fogarty Mechanical Engineering CIT - MEETA National Award Winning Final Year Capstone Project

The manufactured pharmaceutical product medication capsule reduces patient immune system activity and is applied to prevent the rejection of transplanted organs – most prominently in kidney, liver and heart transplants.

Capsule Flow Disruption

Significant product waste and downtime during an industrial thermoforming process - designed to place the medication capsules into a continuous web of blister sheets - are observed and analysed by the author. Static electricity generation is believed to be the root source of the downtime and waste issues. Static analysis determines that the thermoformer is running at an all time low of 89.5% efficiency. Static related downtime is initially estimated at circa 2.2% or 4,700 minutes - equating to an estimated loss of 40,000 medication capsule packs per year.



Pareto Analysis of Thermoforming Process Downtime

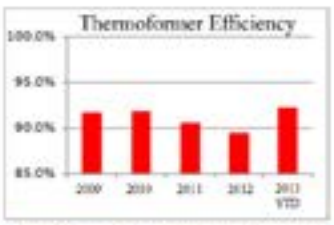
Original Capsule Thermoforming Process Technology and Configuration

Electrostatic analysis of capsule flow through the thermoforming process in a pharmaceutical environment is undertaken and the theoretical basis of electrostatic generation in an industrial setting formulated by the author. Validation is achieved through the development and implementation of standardised electrostatic measurement procedures, leading to identification and quantification of major areas of electrostatic generation in the thermoforming process. Medication capsule movement is mapped out using a devised process map - static measurement points taken in each area. Temperature and humidity readings are taken and recorded to determine effect on static generated. 56 sets of static data are gathered over a three month period covering different batch sizes, different capsule sizes and product combinations. Varying environmental and storage conditions of the capsules are also taken into consideration.

A systematic design approach is devised and applied to develop a novel medication capsule feeding system. Critical design criteria identified and implemented include static generation reduction, uniform capsule dispersal, good conductive properties, ease of assembly, manufacture and cleaning, low maintenance and FDA approval. A series of designs are developed and Pugh's decision matrix approach utilised to determine optimal design configuration. Optimised 3D model design generation is achieved and novel prototype capsule feeder system fabricated and commissioned. Product quality assurance and regulatory compliance are central to the devised and undertaken validation testing. Prior to entry into commercial use, extensive validation processes and documentation including process failure mode effect analysis, microbiology testing, functionality report, material certificates, manufacturing certificates, working drawings, cleaning standard operating procedures and line clearance standard operating procedures are undertaken and prepared by the author.

Developed Novel Capsule Thermoforming Process Technology and Configuration

The root cause of electrostatic generation is identified and eliminated - resulting in a highly significant increase in medication capsule thermoforming manufacturing efficiency (including secondary savings above initial estimates) of 3%. The redesigned process results in the thermoforming process operating at a four year high of 92.5% efficiency – representing an increase of 70,000 medication capsule packs produced per year, reduced line clearance time due to simplified assembly and a significant reduction in waste and quality issues. The developed novel thermoforming system and configuration is currently being applied to a second medication product line, leading to further predicted significant efficiency, waste reduction and maintenance gains and a projected additional 110,000 organ transplant medication capsule packs produced per year.



Thermoformer Efficiency Four Year High

MEETA - Asset Managers Association

National Student Award 2013

Patrick Byrnes Mechanical Engineering CIT

"Automation of Femoral Implant Ultrasonic Cleaning and Blast Processes"

2012 Awards

European Student Innovation Awards
Innovact 2012 Reims France
European Student Innovator of the Year 2012
First Place and Outright Winner

Kieran O'Callaghan of VisionRE™

Etaion Ni hAilpin Kieran O'Callaghan Norma Downing

VisionRE™ Team Cork Institute of Technology - "Terrain / Obstacle Detect

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Graduate Employee of the Year GradIreland 2012

CIT Mechanical Engineering Graduate 2010

Connor Barry (Abbott) wins

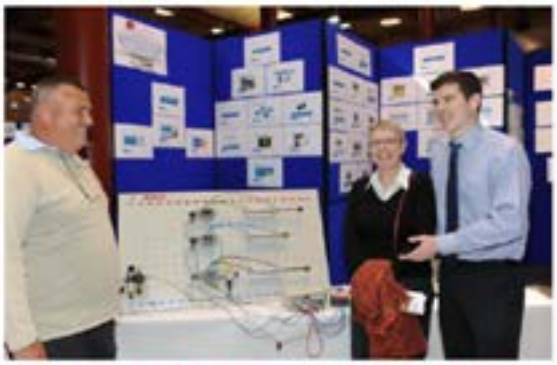
Graduate Employee of the Year 2012 at GradIreland Awards, Mansion House, Dublin

The winners of the GradIreland Graduate Recruitment Awards were announced on Wednesday 25 April 2012 at a gala dinner in The Mansion House in Dublin. Voted for by students and judged by an independent panel of industry experts, these awards recognise Ireland's most popular recruiters across a range of employment sectors.

Connor graduated with a First Class Honours Bachelor of Engineering Degree in Mechanical Engineering at Cork Institute of Technology in 2010, thereafter securing a place on the highly selective Abbott Ireland Professional Development Programme.

Connor has completed three of his four rotations on this programme and is currently working on assignment as a global buyer in the Abbott Nutrition Supply Chain in Columbus, Ohio, the first Irish Professional Development Programme recruit to be offered such a global assignment. Connor's previous rotations were as a process development engineer and quality engineer in Abbott Vascular's Irish operations.

Pics: Nikki Browne



Connor at 2010 CIT Engineering Exhibition

The gala dinner and awards ceremony were attended by 500 of Ireland's most respected employers, third level careers services and professional bodies, making it the biggest gathering of the graduate recruitment community in Ireland.

Graduate Employee of the Year GradIreland 2012

Winner: Connor Barry (Abbott)
CIT Mechanical Engineering Graduate

Graduate Employee of the Year Shortlist:

- *Aidan Sandys, Abbott*
- *Aine Sheehan (Deloitte)*
- *Niall Goulding (Deloitte)*
- *Ciara McNestry (First Derivatives)*
- *Ken O'Shea (InterTradeIreland – Eirgen Pharma)*
- *Niall McSkeane (InterTradeIreland – JFC Manufacturing*
- *Rachel Murray (Learnosity)*
- *Damian Cunningham (Medtronic Vascular)*
- *Lisa Archer (Sigmar Recruitment)*
- *Elizabeth Conlon (Vision Consulting)*

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Engineers Ireland Innovative Student Engineer of the Year 2012

sponsored by Siemens

First Place €2,000 National Award

Winner: Martin Evans Mechanical Engineering Cork Institute of Technology

"Design and Development of an Advanced Scrum Machine in conjunction with Munster Rugby"

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

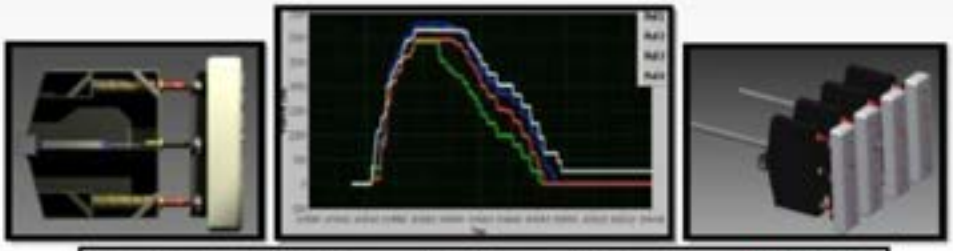
Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

"Design and Development of an Advanced Scrum Machine in conjunction with Munster Rugby"

Crouch Touch Pause Engage Measure

Crouch, Touch, Pause, Engage is a well known instruction delivered by rugby referees before scrum engagement. The modern game places an ever increasing pressure on rugby teams to improve scrum performance – hence the need to determine a reference to allow pack and individual team member performance comparison and incremental improvement. The author was given carte blanche to increase - through redesign / remanufacture and virtual instrument development - the functionality of an existing intermediate level scrum machine to the level of an advanced machine with data acquisition and scrum performance measurement capabilities. Hence Crouch, Touch, Pause, Engage and Measure.

Viewing of Advanced Scrum Machine Developed System by Munster Rugby / International Player



Crouch Touch Pause Engage Measure

Design and Development of an Advanced Scrum Machine in conjunction with Munster Rugby

Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

European Student Innovation Awards
Innovact 2012 Reims France
European Student Innovator of the Year 2012
First Place and Outright Winner

http://www.innovact.com

Ph: Guillaume Gallois

First Place European Laureate of Innovation 2012
Kieran O'Callaghan VisionRE™
"Real Time Interactive Obstacle Detection and Navigation Aid for the Visually Impaired"
Cork Institute of Technology Ireland

Second Place Thibaud Arnault et al WebShell
" A New Computing Language to allow Developers to make Web and Mobile Applications in 10 minutes instead of 10 days "
University of Epita France

Third Place Modeo Salvatore et al MRS - Material Recovery
" Electromechanical System to Select and Salvage the Waste of the Empty Room (Thermal Evaporation) to maintain Evaporation ".
University of Salento Italy

It has been announced on Wednesday 28th March 2012 before a packed auditorium at the European Innovation Finals Innovact 2012 Reims, France, that First Place and Outright Winner of European Student Innovator of the Year 2012, from hundreds of international entries and 42 shortlisted international finalists from 28 European countries, is Kieran O'Callaghan of Cork Institute of Technology.

This is the first time that the accolade of
First Place Laureate in European Innovation has been won outright by an Irish student.

Enterprise Ireland / Invest Northern Ireland
Academic Innovation Award Winner
Think Outside the Box Finals Dublin 2012

Enterprise Ireland / Invest Northern Ireland Academic Innovation Award Winner 2012
Senior Lecturer Sean F. O'Leary of Cork Institute of Technology
with Ms. Gillian Slattery of Enterprise Ireland and Mr. Frankie McCourt, Invest Northern Ireland
Think Outside The Box Finals Dublin

ENTERPRISE IRELAND

Invest Northern Ireland

THINK OUTSIDE THE BOX AWARDS

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

THINK OUTSIDE THE BOX AWARDS

Enterprise Ireland / Invest Northern Ireland
Student Finalist Award Winners
Think Outside the Box Finals Dublin 2012

Enterprise Ireland / Invest Northern Ireland
Student Finalist Award Winners 2012
CIT Multidisciplinary Group
Muscle Stress Indicator MSI
represented by
Rebecca Lyall , Colm Keane, Declan Cotter, Richard O Sullivan, Sean Leahy, Daniel Corkery, Richard Childs
with Mr. Tom Hayes,
Head of Micro Enterprises and Small Business, Enterprise Ireland,
at the Think Outside The Box Finals
Dublin 2012

Enterprise Ireland / Invest Northern Ireland
Student Finalist Award Winners 2012
CIT Multidisciplinary Group
Wheelchair Enablement Device PyraAid™
represented by John Roberts, Alan O'Reilly, Laura Hannon, Sandra Hayes, Siobhan Hickey, Thomas Thornton, Stephen O'Brien
at the Think Outside The Box Finals
Dublin 2012

Invest Northern Ireland

CIT Institiúid Teicneolaíochta Chorcaí Cork Institute of Technology

ENTERPRISE IRELAND

Abbott Ireland Intern of the Year 2012
Eoin Lyons CIT Biomedical Engineering

CIT Biomedical Engineeering student Eoin Lyons has been selected as and presented with the highly coveted Abbott Ireland Intern of the Year 2012 Award.

Eoin, chosen from a group of over 30 students from third level institutions across Ireland who had undertaken internships with Abbott Ireland, was presented with the Abbott Intern of the Year Crystal Trophy and €1,000 bursary by Ms. Kelly Henry, Talent Acquisition Specialist, Abbott Ireland at a glittering ceremony at the Abbott stand at the 2012 CIT Career Fair on Tuesday 2nd October 2012.

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

ENGINEERS IRELAND EXCELLENCE AWARDS

Excellent Night for CIT Graduates at Engineers Ireland Excellence Awards 2012 Four Seasons Hotel Dublin

Engineers Ireland Excellence Award Winners and Finalists 2012 CIT Mechanical Engineering Graduates Danny Johnston, Engineering Manager OpenHydro Technology, Alan Bateman, Automation and Control Engineering Manager, Janssen Pharmaceuticals, Eoin O'Donovan, Technical Operations and Maintenance Manager for Renewables, Bord Gáis Energy pictured with CIT Head of School of Mechanical, Electrical &Process Engineering Matthew Cotterell and Senior Lecturer Sean F. O'Leary

The Engineers Ireland Excellence Awards 2012 were presented at a glittering ceremony, hosted by RTE's Mary Kennedy, at the Four Seasons Hotel, Ballsbridge, Dublin. CIT graduates were very much to the forefront of the accolades presented at the Excellence Awards 2012.

CIT Mechanical Engineering Graduate Alan Bateman, Automation and Control Engineering Manager at Janssen Pharmaceuticals, was presented on behalf of Janssen Supply Chain (Ireland) with the Engineers Ireland Continuing Professional Development (CPD) Company of the Year Award. Cork-based multinational Janssen's overhaul of its business model ensured more than 500 hi-tech jobs were sustained across its two locations, Little Island and Ringaskiddy, in Cork. The Engineers Ireland CPD Company of the Year Award aims to recognise and reward the successful and sustainable achievement of an engineering employer's strategic vision through the use of best practice CPD initiatives.

CIT Mechanical Engineering Graduate Danny Johnston, Engineering Manager, OpenHydro Technology, was part of a four man team from OpenHydro presented with the Engineers Ireland Technology of the Year Award. OpenHydro designs and manufactures marine turbines to generate renewable energy from tidal streams. This award highlights Irish innovation in technology that clearly demonstrates a real impact on society, coupled with an actual or future contribution to society.

CIT Mechanical Engineering Graduate Eoin O'Donovan, Technical Operations and Maintenance Manager for Renewables at Bord Gáis Energy, was short-listed to just six very impressive finalists for Engineers Ireland Chartered Engineer of the Year 2012 from over 450 nominated engineers nationwide and internationally. Eoin O'Donovan joined Bord Gáis Energy in 2010 from SWS Energy, where he was responsible for developing the wind operations team. Prior to SWS, Eoin worked for Pharmaceutical Multinational, GlaxoSmithKline, as a plant reliability engineer. Eoin's project concerned the Delivery of a Sustainable Operations and Maintenance Management Model in the Wind Industry.

CIT Institiúid Teicneolaíochta Chorcaí Cork Institute of Technology

NCBI CFIT Technology Showcase
AquaEye™

First Place and Grand Prize 2012

http://www.cit.ie/currentnews?id=350

CIT's Kieran O'Callaghan Enablement Product AquaEye™ (Swimming Aid for People with Vision Impairment) wins the National Council for the Blind of Ireland Grand Prize Wood Quay Dublin

Nine designers of inclusive technologies battled against each other in an exhibition-style showcase.

The Mission - to promote digital inclusion in Ireland, with a specific focus on vision and vision loss. Design entries comprised technologies which were designed in an inclusive way and those which specifically address the needs of users who are blind or have a vision impairment.

The other finalists included:

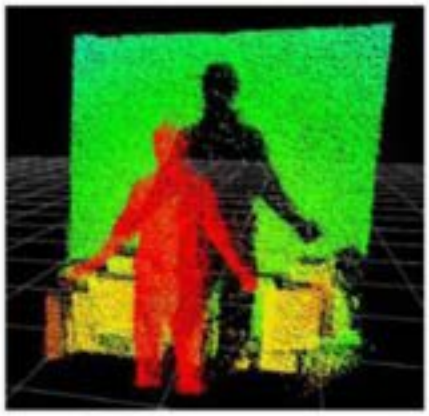
- ***AutonoMi: A personal security alarm for older people living independently.***
- ***An accessible version of the RTE Player.***
- ***RowMate Access: A Smartphone App which allows vision impaired rowers to train independently using an indoor rowing machine.***
- ***VisionRE: A navigation aid for detecting obstacles while walking.***
- ***HomeSense: A system which alerts the user to potential hazards within the home, such as open cupboard or appliance doors, allowing safe and independent navigation around the house.***
- ***ABAIR: A prototype Irish Language Reader with ABAIR Synthetic Voices incorporated into digital talking books (using the DAISY format).***
- ***Voices as Gaeilge for PC and Mac: Software which can be installed on Mac OS X (& later on PC) as an additional screenreading voice, speaking in Irish.***
- ***LookAround App: A Smartphone App which announces the current street, city, cross street, heading and nearby points of interest.***
- ***Storybud: A website of stories for children or adults which can be easily read or listened to.***

First Place European Laureate of Innovation 2012 Kieran O'Callaghan VisionRE™

VisionRE™

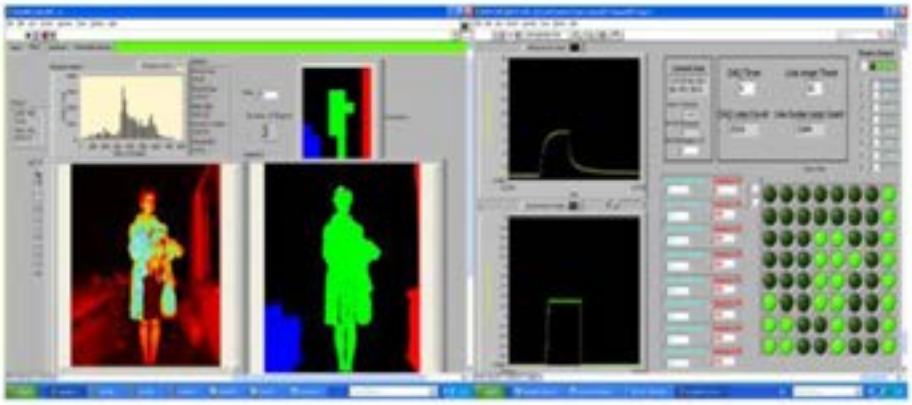
The Design and Development of a Real Time Interactive Obstacle Detection and Navigation Aid for the Visually Impaired

3D Obstacle Segmentation



Neurophysiology Testing of the Device

Optional Braille Interface



Design, Development and Testing of VisionRE™ Tongue Display Unit

Kieran's developing VisionRE™ device segments and classifies 3D objects/obstacles in real-time and presents the 3D information to the user in a more intuitive manner via multimodal electro-tactile, vibro-tactile and audio Human Machine Interfaces. The device identifies the presence, description and distance of objects and conveys that information to the user in a simple form. This kind of information can be used to allow the user to perform simple functions such as avoid obstacles as well as giving the user the ability to recognise their surroundings. This latter aspect of the device allows the vision impaired person to broaden their routines and be more independent.

The highly innovated Tongue Display Unit, developed by Kieran, has been designed and operates as a subject control and information system - the subject tongue effectively acts as a computer mouse, enabling the visually impaired user to select and control focus, range and breadth of determined Time of Flight vision data. The segmented visual information from the TOF camera is coded into electro-tactile pulses and presented to the user on the 64 channel electro-tactile tongue display unit designed by the author. The tongue is ideally suited to receive sensory information via electro-stimulation. The saliva in the mouth acts as an electrolyte which provides excellent electrical conductivity between the tongue and stimulator.

Recent advances in Time of Flight (TOF) imaging technology have presented new opportunities to develop improved sensory substitution systems for compensation of visual sensory loss. In sensory substitution, information from an artificial receptor/sensor is relayed to the brain via a Human Machine Interface. The brain is able to utilise this information as a substitute for what is usually transmitted from an intact sense organ such as the eye. EEG subject testing of the developing VisionRE™ device has demonstrated evoked potentials detected in the visual cortex. The potential for plasticity visual development/learning in the visually impaired points to a genuinely world class and life changing product for the visually impaired.

CIT

innovact

l'ORS.fr

VISION RE™

Vision Research Enterprises

http://visionre.ucd.ie

Presented by :

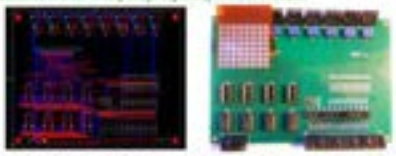
Kieran O' Callaghan
Norma Downing
Etaoin Ni hAilpin

Ambassador for the Irish Guide Dogs for the Blind
Ambassador for Cork City and County

MEDION L'ENTREPRISE

The novel aspects of our design include:

1. *The ability in real time and interactively select and control focus, range and breadth of determined Time of Flight vision data achieved by enabling the user tongue to act as an ultra-sensitive computer mouse, operating the subject control and information system.*
2. *The ability to provide distance, zone and classification information via audio means for objects selected by the tongue on the TDC (Feedback Loop).*
3. *The use of a TOF sensor to segment, classify and encode the spatial information regarding the users environment.*
4. *The use of independent ground electrodes to produce consistent and localised electrical stimulations.*
5. *An integrated constant current source to allow for changes in saliva and tongue resistance in order to keep the perception of stimulus constant.*



VisionRE™ Printed Circuit Board Layout and Manufactured Tongue Display Unit Circuit Board

A large area of the Somatosensory Cortex is dedicated to receiving sensory information from the tongue and hand compared to other parts of the body. A parallel hand based Braille Viewer system is also being developed by the author to take advantage of the high nerve density and area/time spatial resolution of the human hand.

VisionRE™ Braille Viewer Handset (Solid Model Design by Vision RE™)

VisionRE™ Sign Detection

Our extensive qualitative and quantitative research strongly indicates that VisionRE™ will greatly increase the spatial awareness of the visually impaired and in turn greatly increase their confidence. The VisionRE™ system can also read road warning signs and automatically alert the user via and audio warning.

Pedestrian Crossing, Pedestrian Walkway and Stop Sign Detection - VisionRE™ 2012

VisionRE™ is to distribute our products via direct mail through our website http://visionre.ucd.ie and also through the NCBI website www.ncbi.ie

VisonRE™

Terrain / Obstacle Detection System for the Visually Impaired

The VisionRE™ device utilises a developmental TOF camera to map the environment in front of the visually impaired user in three dimensions at a rate of 30 frames per second. The camera employs an integrated eye safe light source (850nm), which modulates from 10 to 31MHz. The emitted light is reflected by objects in the scene and travels back to the camera.

Vision RE™ Headset (Solid Model Design and Prototype by VisionRE™)

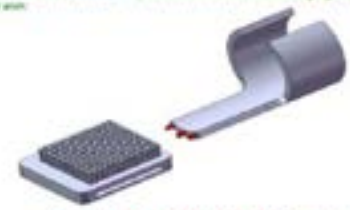
A process map for the VisionRE™ system is illustrated below. Machine Vision algorithms are developed to segment, classify, and encode spatial information from a TOF sensor in an intuitive manner. The developed device is capable of working in complete darkness and is unaffected by changes in lighting conditions due to the sun and clouds.

VisionRE™ System Process Map

VisonRE™ Braille Viewer

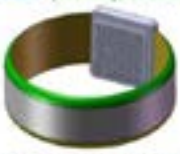
Terrain / Obstacle Detection System for the Visually Impaired

The VisionRE™ Braille Viewer is capable of analysing the foil surrounding 3D environment at an ultra-high real time rate of 32 times a second. VisionRE™ can detect objects at distances up to 4 meters. The VisionRE™ system can also read road warning signs and automatically alert the user.



VisionRE™ Human Machine Interface Detachment System
Solid Model Design by VisionRE™

The communication between headset and handset has been designed as a wireless system. The customer has the personalised tactile interface option of removal of the Braille Human Machine Interface Pad from the handset and placement on another body part, such as their arm, leg or back, using the developed VisionRE™ Velcro strap, as illustrated.

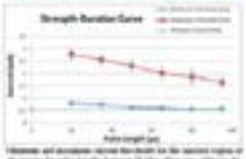


VisionRE™ Human Machine Interface Alternative Body Positioning System
Solid Model Design by VisionRE™

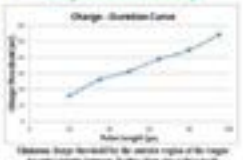
This innovation empowers the visually impaired individual with the capability of use of both hands simultaneously.

VisionRE™ Sample Test Results

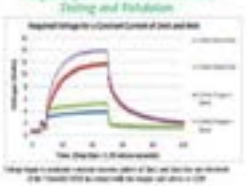
Minimum and Maximum Sensory Thresholds



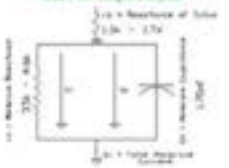
Charge Duration Relationship



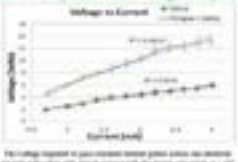
Tongue Capacitance and Electric Field Testing and Validation



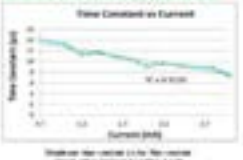
Electrical Equivalent Circuit Design for the Electrode-Tongue Interface



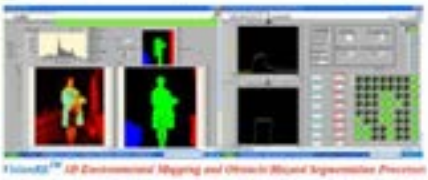
Resistance of the Electrode – Tongue Interface



Membrane Time Constant for Determination



The designed VisionRE™ obstacle segmentation process classifies obstacles and hazards in front of the visually impaired user in order of importance, with the closest objects in the direct path of the user given highest priority. The user can detect obstacles beyond up to a maximum distance of 8 meters. The user has the option to reduce the maximum range of the device if desired.

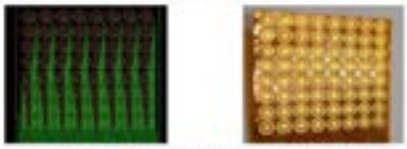


VisionRE™ 3D Environmental Mapping and Obstacle Hazard Segmentation Processes

The VisionRE™ suite transmits the following extensive range of obstacle information to user in real-time via the designed HMI (Human Machine Interface).

1. *Overall size of object/hazard. (Area information)*
2. *Obstacle Height (Y), width (X) and position within the user's Field of View (FOV).*
3. *Distance (Z) to objects in user's path.*
4. *Velocity of detected objects.*

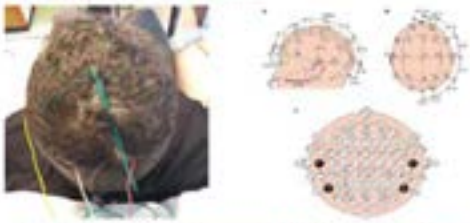
The VisionRE™ HMI was developed to evaluate the bimodal performance of the tongue and dorsal senses at interspersing segmented and coded visual information from a TOF sensor. The TDU element of the HMI consists of 64 electrodes, each with independent ground terminals to ensure localization and consistency of electro-tactile stimulation. The array measures 32mm x 32mm. All electrodes are gold plated and separated by a polyimide coverlay.



Wire Diagram and Manufactured 64 Channel Electro-Tactile Array

Visual Evoked-Potential (VEP) and Somatosensory Evoked-Potential (SSEP) Testing

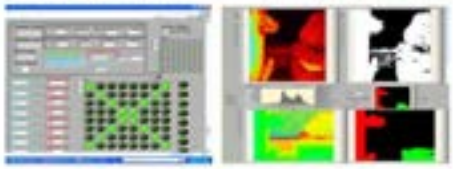
Visual Evoked-Potential assessment is achieved by the author through electrode testing on the surface of the scalp. The electrodes are used to monitor the electrical response in the visual cortex. EEG subject testing of the developing VisionRE™ device has demonstrated evoked potentials detected in the visual cortex. The potential for electrode visual investigation learning in the visually impaired would truly be groundbreaking and point to a genuinely world class and life changing product for the visually impaired.



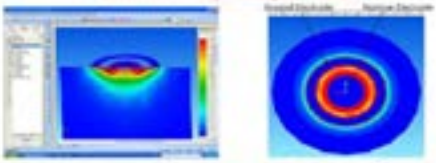
Visual Evoked-Potential (VEP) and Somatosensory Evoked-Potential (SSEP) Testing

VisionRE™ Device Evaluation and evoked potentials produced in the Somatosensory Cortex of the Inventor Kieran O' Callaghan 2012

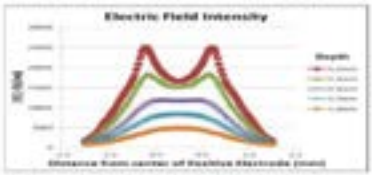
Designed Tongue Display Unit Evaluation Control Panel - Kieran O' Callaghan 2012



Electric Field Intensity Modelling and Validation



Electric Field Intensity (red-blue) and equipotential voltage distribution (black-lines) for a vertical cross section of one VisionRE TDU electrode (left). Plan view of electrodes (Right).



Electric Field Intensity under the surface of the tongue (0.2-1.0mm)

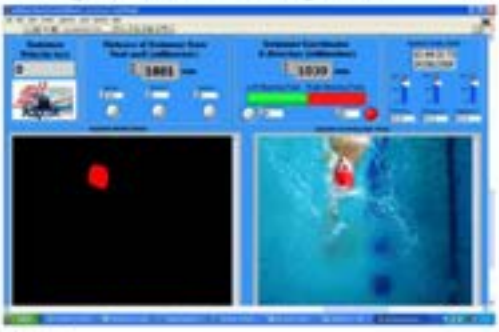
NCBI CFIT Technology Showcase

AquaEye™

NCBI
Working for People with Sight Loss

The Design and Development of a Swimming Aid for the Visually Impaired

Designed and Developed Swimmer Detection Control Panel and Prototype Receiver for AquaEye™



Abstract

People with visual impairment generally have lower levels of fitness than their sighted peers. Furthermore, daily living activities of the visually impaired demand increased energy. Swimming is one of the best exercise activities as few obstacles are encountered. Currently, a visually impaired swimmer must depend on an assistant to view him/her at the opposite end of the pool and to signal to him/her the approaching wall by a tap on the head/shoulder. The "Tapper" system has proved distracting, inadequate and occasionally dangerous.

Research, analysis, prototype design, development and testing of diverse technologies including Bluetooth, Sonar, Passive Infra-Red, Photo-Electric Detection and Machine Vision systems was undertaken. The suitability of each technology was assessed to meet requirements in relation to safety, reliability, portability, aesthetics and ease of use. These criteria were based on a survey of visually impaired swimmers.

Machine Vision based systems (individual swimmer-centric and comprehensive pool-wide solutions) have been designed and developed to alert swimmers of pool wall approach. On swimmer detection, a warning signal is encoded and transmitted. The transmitted warning signal is decoded by a developed waterproof receiver. The swimmer is alerted via form fitting audio earpiece and tactile feedback. A working prototype has been developed and has been extensively tested for functionality and quality. The developing products also show significant further potential to facilitate beyond training for sighted swimmers and as a real time coaching aid for competitive swimmers. The establishment of the AquaEye™ Vision Software and Technology as a standard installation in swimming pools worldwide is planned. The author wishes that every visually impaired individual in the world is empowered with the same opportunity to swim as their sighted peers.

Stephen Campbell, Irish Paralympics Swim Team – Project Partner

Introduction

AquaEye™ is a swimming aid for the visually impaired, designed to alert swimmers on pool end-wall approach. People with visual impairment generally have lower levels of fitness than their sighted peers. Furthermore, activities of daily living of the visually impaired demand increased energy. Swimming is one of the best exercise activities as few obstacles are encountered.

Current Swim Approval - The Headsquare "Tapper" System

Currently, a visually impaired swimmer must depend on an assistant to view him/her at the approaching pool wall by a single tap on the head/shoulder. The "Tapper" system has proved distracting, inadequate and occasionally dangerous.

"Our swim top swimmers, Stephen Campbell, has had quite a few accidents. He was nervous he crashed into the wall at the pool while swimming and broke his nose" - Geraldine Conway, Manager, Irish Paralympics Swim Team.

All research, analysis, prototype development, manufacturing and experimentation work presented in the essay, utilising Photo-electric and Machine Vision and Beta, acquisition systems, are the sole work of the author.

During the systematic design stages of AquaEye™, an extensive survey of potential users identified six key design criteria - safety, reliability, cost-effectiveness, portability, aesthetics and ease of use. A further five performance criteria were established by the author as the project progressed.

Vision Restriction System Investigation - Major Solutions

As the first generation of CameraWorld swimming computer, the author recommends a web camera above the pool wall-wall and acquired images of swimmers. The author used Orange, Black and Red colour swimming hats as these colours would result in the largest variation in pixel intensity (contrast) against the pale blue background. The front crawl, breaststroke, backstroke and butterfly were all recorded using each colour hat. A selection of the acquired images may be seen below:

Orange Hat – Butterfly AquaEye™

Orange Hat – Backstroke AquaEye™

Black Hat – Front Crawl AquaEye™

Black Hat – Breaststroke AquaEye™

Red Hat – Front Crawl AquaEye™

Red Hat – Backstroke AquaEye™

The Developed AquaEye™ Solution

AquaEye™ is a swimming aid for the visually impaired, designed to alert swimmers on pool end-wall approach.

The AquaEye™ designed and developed comprises two pool-wide cameras utilising Machine Vision and Data Acquisition Technology. AquaEye™ is able to monitor the position of swimmers in the pool so they wish to swim in a world wide scale. The developed system comprehensively satisfies all design and performance criteria in relation to safety, reliability, accuracy, swimmer tracking/pool position feedback, stroke analysis/velocity measurement, cost effectiveness, portability, ease of use, aesthetics, ergonomics, financial viability and ease of maintenance/installation.

Developed Machine Vision System – © AV Collaghan

Upon swimmer detection, a warning signal is encoded and transmitted. The transmitted warning signal is decoded by a developed waterproof receiver. The swimmer is alerted via form fitting audio earpiece and tactile feedback. A working prototype has been developed and has been extensively tested for functionality and quality.

- *AquaEye™ unit-1, is set to operate, depending on pool size and shape. Three cameras are of a similar type to a web-cam and will go unnoticed as they will be attached to the pool ceiling.*

An additional advantage of the developed AquaEye™ system is that it may be used as a communication device between swimmer and coach. At each swimmer carries a radio headset, a coach or friend can 'log into' either or all to the swimmer as they swim. The coach selects the individual swimmer (channel frequency) and relays a message through the earbud radios.

The developed communication capability signposts further potential in facilitating in-pool training for sighted swimmers and as a real time coaching aid for competitive swimmers.

Unique features of AquaEye™ include:

- *More accurate, reliable, and safer than other warning methods currently available.*
- *Gentler, alerts swimmers in their position relative to the pool lane dividers.*
- *The swimmer can adjust the distance before warning of wall.*
- *The swimmers position is updated 30 times a second.*
- *Measures the speed of each swimmer.*
- *Playback feature can be used to analyse swimmer stroke and technique.*
- *Transmitter Encoder and Receiver Decoder System - 100% reliable and interference free.*
- *Individual coach to swimmer communication.*
- *External: light weight and portable.*
- *Adjustable earbud to fit all for maximum comfort.*
- *Durable earbud/earbud headphones in place even when diving.*
- *Vibration function as an aid to those with visual hearing impaired swimmers.*
- *Suitable for visually impaired swimmers, competitive swimmers, summer swimmers and club standard swimmers.*
- *100% Waterproof.*
- *Form fitting silicone earpieces readily adjust to provide watertight fit for individual ear canals. (Figure 1 and Figure 2).*

Stephen Campbell, Irish Paralympics Swim Team – Project Partner

Analysis of Acquired Images:

Over thirty image sequences were acquired during testing. Each image sequence lasted 15 seconds. In total 450 individual images were analysed. Vision Analysis Software was utilised to view each image within an image sequence as illustrated.

A 24 bit colour AquaEye™

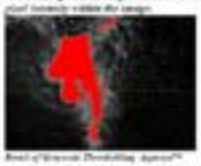
Processing of RAW Images:

The acquired 12 bit RGB (Red, Green, Blue) raw images of the swimmer contained up to 24.7 million different pixel values. Using image acquisition and analysis software, the author was able to extract 8 bit unique planes from the acquired 12 bit RGB images as illustrated below:

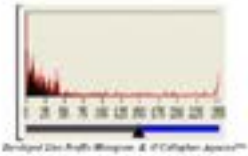
Raw Image of swimmer with Red Hat – AquaEye™

Extracted Red Colour Plane – AquaEye™

The extracted colour planes were analysed in the hope of detecting the swimmers hat using grayscale thresholding, image filters and grey morphology techniques. The data obtained from grayscale thresholding was then represented on linear histograms, for in depth analysis into the variation of pixel intensity within the image.



Result of Grayscale Thresholding AquaEye™



Developed Linear Profile Histogram © AV Collaghan AquaEye™

The correct hue of 8 bit colour planes and subsequent grayscale thresholding resulted in the entire swimmer's body being detected along with the swimmer's red hat. The author discovered this method unsuitable as the leading edge of the swimmer was not always consistent. After much research and deliberation, the author concluded that the only alternative was to try and detect the swimmers red hat in the more grayscale insensitive 12 bit image format and then convert to an 8 bit format.

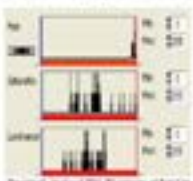
Processing of 12 bit Images:

The acquired 12 bit RGB raw images were then converted to their corresponding HSL (Hue, Saturation, Luminance) values. The variation in HSL pixel intensities that represented all three colour swimming hats were profiled and the results extensively analysed.

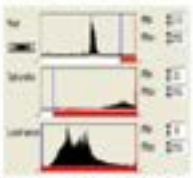
HSL image of swimmer with Red Hat – AquaEye™

Line profile of Red Hat – AquaEye™

The distribution of the pixel intensities for the red cap and entire image are illustrated below:



Developed Analytical Hue Histograms of Red Cap © AV Collaghan AquaEye™



Hue Histograms of Pixel Intensities in Entire Image © AV Collaghan AquaEye™

Particle Analysis:

The distribution of pixel intensities for the Hue, Saturation and Luminance values required to produce the colour red corresponding to the swimmers hat were analysed using histogram techniques. Using these results a filter was designed to accept only the range of pixel intensities required to produce the colour red. The chosen range of pixel intensities resulted in an 8 bit binary image of the swimmer's hat.

8 bit Binary Image after Thresholding © AV Collaghan AquaEye™

NCBI CFIT Technology Showcase

AquaEye™

People with visual impairment generally have lower levels of fitness than their sighted peers. Furthermore, activities of daily living of the visually impaired demand increased energy. Swimming is one of the best exercise activities as few obstacles are encountered.

Currently, a visually impaired swimmer must depend on an assistant to warn him/her of the approaching pool wall by a single tap on the head/shoulder. The "Tapper" system has proved demeaning, inadequate and on occasion dangerous. "Our own top swimmer, Stephen Campbell, has had quite a few accidents. Last year he crashed into the wall at the pool while swimming and broke his nose"- Geraldine Conway, Manager, Irish Paralympics Swim Team.

Based on a survey of Visually Impaired Swimmers, I undertook research, analysis, prototype design, development and testing of Bluetooth, Sonar, Passive Infra-Red, Photo-Electric Detectors and Machine Vision Software to meet requirements in relation to safety, reliability, portability, aesthetics and ease of use.

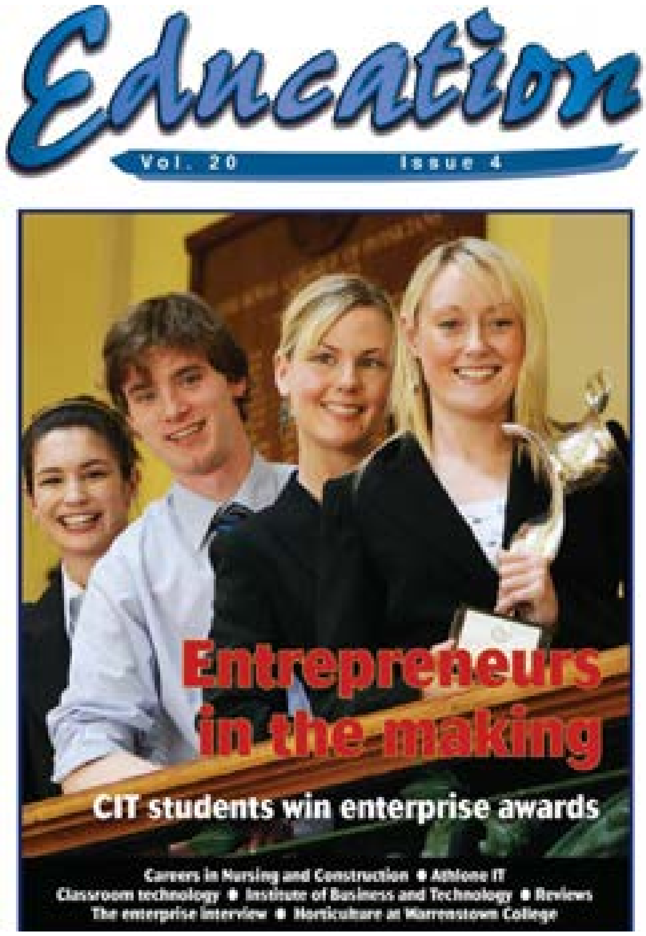
Experimental Assessment of PIR System - Thermal Camera *Aquaeye™ Developed Detector Buoy System*

Two individual systems have been designed to alert swimmers as they approach the pool wall. Once the swimmer is detected a warning signal is encoded and transmitted. A waterproof receiver decodes the warning signal and alerts the swimmer via an audio earpiece and tactile feedback. A working prototype has been developed and has been extensively tested for functionality and quality.

Aquaeye™ Developed Machine Vision and Data Acquisition System

Headphone Developed Solid Model - Aquaeye™ Designed and Developed Swimmers Radio Headset *Developed Marketing Website*

The developing product also shows significant further potential to facilitate in-pool training for sighted swimmers and as a real time coaching aid for competitive swimmers.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THE EUROPEAN FORUM FOR YOUNG INNOVATIVE ENTERPRISES
Le forum européen de la jeune entreprise innovante
14ème édition
2 et 3 mars 2010
Reims - Centre des Congrès
14th edition
2nd and 3rd March 2010
Reims - Congress Center


Siemens
Young Engineer
of the Year
Award
22

2011 Awards

2011 European Science Engineering and Technology SET Awards Millennium Hotel London

The Babcock Award

European Mechanical Engineering Student of the Year 2011

First Place

http://www.setawards.org/

First Place Babcock Award - Best European Mechanical Engineering Student 2011:

Rian Edman of Cork Institute of Technology
Thermodynamic Analysis, Testing and Evaluation of a Concept 6 Stroke Engine

Runners Up Finalists:

Benjamin Lindley of the University of Cambridge
Waste incineration in a pressurised water reactor

Ross Doak of Heriot-Watt University
Design of a spherical mobile robot

THE SET AWARDS

THE SET AWARDS

SCIENCE ENGINEERING & TECHNOLOGY STUDENT OF THE YEAR AWARDS

CIT's Rian Edman wins Babcock Award Best European Mechanical Engineering Student 2011 2011 European Science Engineering and Technology SET Award Finals

– see http://www.setawards.org/set/newstpl.php?pid=228

Mike Homer, Managing Director of the Marine and Technology Division at Babcock International Group presents Rian Edman with the Babcock Award for Best European Mechanical Engineering Student 2011 at the 2011 European Science Engineering and Technology SET Award Finals during a glittering awards ceremony in the Millennium Hotel, Grosvenor Square, Mayfair, London

At a glittering awards ceremony in the Millennium Hotel, Grosvenor Square, Mayfair, London and following a gruelling and intense final day of competition comprising project presentation, demonstration and personal interview before a distingushed panel of Industrial and Academic judges in Birdcage Walk, Westminster, London, the following result has just been announced at the 2011 European Science Engineering and Technology SET Award Finals:

Rian was presented with his First Place Mechanical Engineering 2011 European Science Engineering and Technology SET Award at a spectacular ceremony bringing together hundreds of technology students and academics, as well as senior figures from industry, government, science and the media.

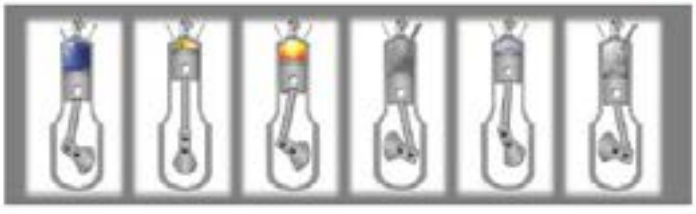
This is the first time a student from Cork Institute of Technology (or indeed from any Institute of Technology in Ireland) has been short-listed for the European Science Engineering and Technology SET Awards - so it is indeed magnificent achievement and a great honour to have won the First Place Mechanical Engineering Babcock Award.

The Science, Engineering & Technology Student of the Year Awards are established as Europe's most important awards for science and engineering undergraduates

– see http://www.setawards.org/index/europe

Rian had travelled home from Boston, USA, to compete in the Finals.

Rian hails from Raleigh, Macroom, Co. Cork. This is not the first international achievement for the Edman family. Rian's father Lars founded, owns and runs the internationally renowned Toy Soldier Factory in the beautiful West Cork Village of Cill na Martra – see http://www.princeaugust.ie/cork-visitor-centre-activities/



6 Stroke Engine Concept Design by R. Edman 2011

CIT Institiúid Teicneolaíochta Chorcaí Cork Institute of Technology

Engineers Ireland Excellence Awards 2011

ESB Award for Outstanding Contribution to Engineering

presented to

CIT Senior Lecturer Sean F. O'Leary

CIT Senior Lecturer Sean F. O'Leary and Mary O'Leary with the ESB Award for Outstanding Contribution to Engineering at the Engineers Ireland Excellence Awards in the Four Seasons Hotel Dublin on November 4th 2011.

The national award was presented to Senior Lecturer Sean F. O'Leary based on his contribution over many years to the promotion and achievement of excellence in the engineering profession both in Ireland and on the international stage.

Over the past two years alone, students tutored and mentored by Sean have won a glittering array of international and national awards including the Babcock Award for Best European Mechanical Engineering Student, the European Laureate of Innovation " Innovact "Award, The Vicon and Corin International Medical Engineering Awards, The Engineers Ireland Innovative Student of the Year Award, The Oscar Wilde and William Butler Yeats Gold Medals, Undergraduate Awards of Ireland and Northern Ireland and The MEETA Asset Managers National Student Award.

The CIT Innovative Product Development Laboratories major submission " Engineering an Innovation Eco-System " , authored by Senior Lecturer Sean F. O'Leary, was also declared the Inaugural Winner of the Best in Class Engineering Education 2011 Award at the Engineers Ireland Excellence Awards.

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

meeta
THE ASSET MANAGERS

ENGINEERS IRELAND

SIEMENS

Siemens Engineers Ireland - Innovative Student of the Year 2011
First Place National Award
MEETA - Asset Managers Association - Student Award 2011
First Place National Award

Winners: Daniel Allen, Patrick Byrnes, Richard Childs Mechanical Engineering CIT

"Automation of Prosthetic Shoulder Stem Blasting Process"

Croom
Precision Medical

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Abbott Ireland Interns of the Year 2011

John Caplice – CIT Mechanical Engineering

Marlene Clarke – CIT Chemical Engineering

Pictured Left to Right :

Ms Elaine Fennessy, Talent Acquisition Specialist, Abbott Ireland
Minister Sean Sherlock TD, Minister for Research & Innovation
Ms. Marlene Clarke CIT, Abbott Intern of the Year 2011
Mr. John Caplice CIT, Abbott Intern of the Year 2011
Dr. Barry O'Connor, Registrar and Vice President for Academic Affairs, CIT

Minister of State at the Department of Education and Skills, Sean Sherlock T.D., presented the inaugural Abbott Ireland Intern Bursary Award to two students from Cork Institute of Technology.

John Caplice from Mallow, and Marlene Clarke from Rylane, were chosen from a group of 30 students from third level institutions across Ireland who had undertaken internships with Abbott Ireland and were presented with a €1,000 bursary each. Patrice Bohan, Senior Talent Acquisition Manager, Abbott Ireland said that John and Marlene had been selected for the inaugural bursary for "Exceeding the expectations of their respective roles, and making a strong contribution to Abbott."

John, who is studying mechanical engineering in CIT, spent six months working with Abbott Ireland's vascular facility in Clonmel while Marlene, who is studying chemical engineering spent six months in Abbott Ireland's pharmaceutical facility in Sligo.

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Engineers Ireland National Award
Chartered Engineer of the Year 2011
First Female Winner of
Chartered Engineer of the Year Accolade

Louise Connolly, ESBI, CIT Mechanical Engineering

Graduating from CIT with an honours degree in Mechanical Engineering in 2004, Louise joined ESB International. She is currently a consultant engineer in ESBI Engineering's power plant department and works on Irish and international power plant and gas pipeline projects.

Engineers Ireland

CIT Cork Institute of Technology

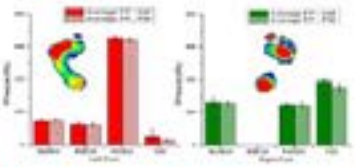
Engineering in Medicine and Health Division

Westminster London 2011

CIT Students Mark Quigley, Padraig Herbert and Gavin O'Sullivan achieve Second Place Overall and Top Undergraduate Awards at the 23rd Annual International Medical Engineering Project Competition - 23 February 2011 Westminster London

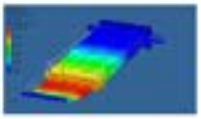
Following short-listing from a large international entry and an exhaustive process of submission investigation, CIT Students Mark Quigley, Padraig Herbert and Gavin O'Sullivan undertook prototype presentation, demonstration and exhibition before a distinguished adjudication panel of internationally renowned Medical Engineering Industrialists and Professors at the 2011 International Medical Engineering Finals and Extravaganza in Westminster, London.

Corin Group Prize for Best Healthcare Technology Project
Joint Second Place Overall and First Placed Undergraduate Student
Mark Quigley - Cork Institute of Technology
" Contact Lens Manufacturing Process Optimisation" - Bausch and Lomb



JRI Prize for Best Medical Engineering Exhibited and Presented Project Joint Second Place Overall and First Placed Undergraduate Student
Padraig Herbert - Cork Institute of Technology
" Dorsiflexion Assistance and Stability Control of the Talocrural Joint in a Subject with Post Polio Syndrome "

JRI Prize for Best Medical Engineering Exhibited and Presented Project
Finalist Award - Gavin O'Sullivan – Cork Institute of Technology
" Design and Development of a User Friendly, Integrated, Ergonomic Wheelchair "



2011 Undergraduate Awards of Ireland and Northern Ireland

presented by President Mary McAleese on Oct 28 in Dublin Castle

Oscar Wilde Gold Medal Winner

http://www.undergraduateawards.com/

Rian Edman - Oscar Wilde Gold Medal Winner 2011 Engineering and Mechanical Sciences pictured with Mr. Barry Leach, Chairman of the Distinguished Adjudication Panel, UAINI

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

2011 Undergraduate Awards of Ireland and Northern Ireland

Engineering and Mechanical Sciences

Oscar Wilde Gold Medal

http://www.undergraduateawards.com/

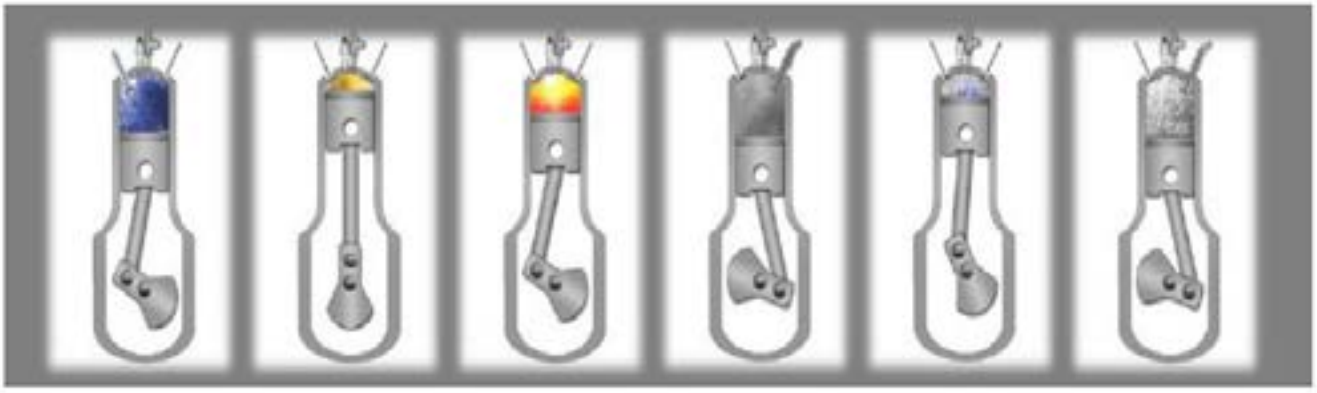
THE SET AWARDS

Thermodynamic Analysis, Testing and Evaluation of a Concept 6 Stroke Engine

Concept Design Drawing by R. Edman 2011

Rian Edman, Final Year Mechanical Engineering

Self Conceived Student Capstone Project



6 Stroke Engine Concept Design by R. Edman 2011

CIT Cork Institute of Technology

Cork County and City Enterprise Boards

CIT Prize forMost Technically Innovative Product 2011

€2,000 First Place Award 2011

Winner: Eamon Hayes of Safety First™

Final Year Mechanical Engineering

Cork Institute of Technology

Engineers Ireland Excellence Awards
"Best in Class" Engineering Education
Inaugural National Award 2011

Engineers Ireland "Best in Class" Engineering Education Award Winners 2011
Engineering an Innovation Eco-System IPD Laboratories Development Team of Cork Institute of Technology
Michael Walsh, Daithi Fallon, Matt Cotterell, Sean F. O'Leary, Chris Gibbons, Michael J. O'Mahony Pic: Maxwells

The CIT Innovative Product Development Laboratories major submission "Engineering an Innovation Eco-System", authored by Senior Lecturer Sean F. O'Leary, was declared the Winner of the " Best in Class " Engineering Education 2011 Award at the Engineers Ireland Excellence Awards

Presented to Matt Cotterell
Head of School of Mechanical and Process Engineering
Four Season Hotel Dublin - November 2011 Pic: Maxwells

The development and delivery of ground-breaking Innovative and New Product Development Multi-Disciplinary Engineering / Business Laboratories modules and projects at Cork Institute of Technology has dovetailed with the implementation of major initiatives including CIT innovation start-up company internships, CIT innovation week and student prizes for innovation, CIT engineering and innovation exhibition (180 stands in 2011) to engineer a college-wide student innovation eco-system.
Apart from the critically important benefit of the inculcation and enablement of an innovation / entrepreneurial spirit and ethos amongst the student body, the implementation of the new Innovative Development Laboratories has also led to an unprecedented flowering of Irish student international / national achievement.

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Engineers Ireland Excellence Awards 2011

"Best in Class" Engineering Education Inaugural National Award

Engineering an Innovation Eco-System at Cork Institute of Technology

SafetyPot Child Proof Cook Friendly Secure Saucepan Ltd Development Team
Daniel Collins, David Irwin, Maria O Shea, Olivia Tobin, Damien O Hea and Paul O Sullivan

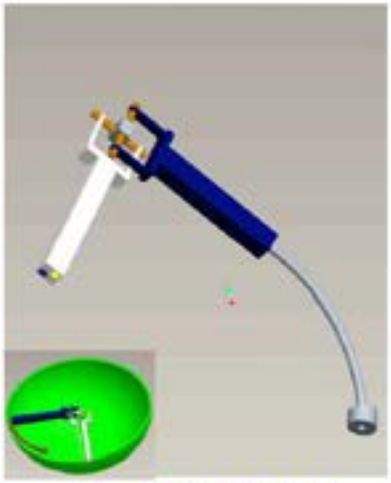
SOS Sir Emergency Breathing Aid Development Multi-Discipline Start-Up Innovation Team
Robin Holbein, Jamie Hudson, Isabel Rossiter, Brendan Weathers and Eugene Byrne

FlowStopper Water Leak Detection and Cut-Off Multi-Discipline Start-Up Innovation Team
Ciaran Connolly, David Lewis, Gillian Crowley, Tracey Murphy, Jason McCarthy, Maurice O'Brien

PING Automated Glass Polishing Machine Multi-Discipline Start-Up Innovation Team
Jonathan Miller, Denise Keogh, John Cagney, Sean Garvey, Maria Cronin, Timothy Lane, Lilli Broderick

2010 Awards

European Laureate of Innovation 2010
Ms. Xiao Fang Zhang



Med-Ware™ 2010

Medical Infusion System Air Bubble Extractor Design and Development by Ms. Xiao Fang Zhang, Final Year Mechanical Engineering Degree, Cork Institute of Technology in conjunction with Cork University Hospital

Three Innovact Student Laureates 2010 Announced in Reims
Finals of the European Student Innovation Awards - Innovact 2010 March 3rd Reims

From a large Europewide Entry and 28 Short-listed European Finalists, the three European Innovation Student Laureates 2010 are:

Cecille Schomollgruber - Stereolabs - France
Eric Hogner - Windflip - Norway
Xiao Fang Zhang - Med-Ware™ - Ireland

A delighted Ms. Xiao Fang Zhang of Med-Ware™ of Cork Institute of Technology has been interviewed by French Television.

The Med-Ware™ team comprises: Ms. Xiao Fang Zhang, Bachelor of Engineering in Mechanical Engineering and Mr. Peter Sullivan, Ms. Michelle Bowse, Ms. Carmel Linehan, Bachelor of Business Studies in Information Systems.

Inventor and Designer, Ms. Xiao Fang Zhang drew her project inspiration from both Chinese and Irish sources, quoting dual inspiration from Mr. Ger Flynn, Chief Biomedical Engineer, Health Service Executive Southern Region, Cork University Hospital, her Lecturer, and Mr. Gou Yu Zhang, Veterinary Surgeon, Liao Ning Province, China, her Dad.

2010 European Hopes for Innovation
Innovact – L'ORS – L'Etudiant

Medical Infusion System Air Bubble Extractor Med-Ware™

Cork University Hospital

The European Hopefuls for Innovation - 8th Edition Innovact 2010

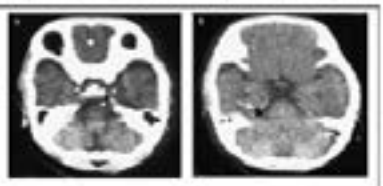
Medical Infusion System Air Bubble Extractor

Med-Ware™

Xiao Fang Zhang, Peter Sullivan, Michelle Roche, Cormel Linehan

Intravenous infusion is the most common access method in both hospital and paramedic services of administering nutrition and medication. Air introduced to an infusion drip line constitutes a critical hazard of the intravenous infusion process. Air access frequently occurs when the infusion tubing becomes entangled while a patient is getting out of bed, causing coma, paralysis or death depending upon its size, duration and location.

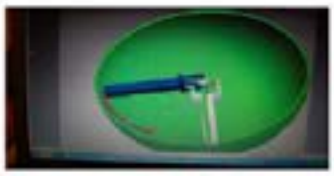
Intravenous infusion induced air bubbles in the carotid arteries and venous sinuses of an 11 weeks old infant



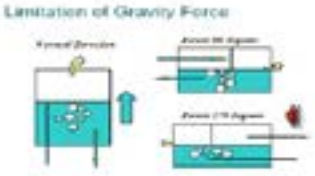
Preventative measures, devised by both hospitals and medical device manufacturers, comprise complicated "air-in-line" detector and bubble removal processes. The current standard procedures are manual and time consuming, requiring the physical exclusion of the air and the monitoring of the infusion process.

The project aim is thus to remove all air bubbles passing through an infusion drip line system before the bubbles reach the blood stream and without stopping the infusion process. The Inventor and Designer, Ms. Xiao Fang Zhang, hails from Liao Ning Province, China and drew her project inspiration from both Chinese and Irish sources, quoting dual inspiration from Mr. Ger Flynn, Chief Biomedical Engineer, Health Service Executive Southern Region, Cork University Hospital, her Lecturer, and Mr. Gou Yu Zhang, Veterinary Surgeon, Liao Ning Province, China, her Dad.

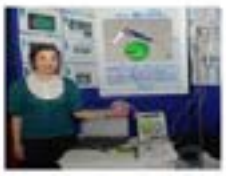
Analysis of the physical source of the air bubbles and the effect on patient health is undertaken. Performance and design criteria for air removal are determined and implemented. Filter, ultrasonic vibration and diverse gravity application methodologies are conceived and investigated. Vertical axis air elimination testing is undertaken and validated. Double ball and storage chamber, sink and floating ball, modified universal joint concepts are investigated and comparatively assessed. A comprehensive 360 degree orientation air bubble removal system solution, incorporating novel application of airplane fuel tank technologies, is achieved and validated. Optimised prototype production and proof of concept testing are undertaken.



Concept Design/ Solid Model by X. F. Zhang



360 Degree Orientation Air Bubble Removal System Prototype Testing by X. F. Zhang



Prototype miniaturisation and further medical validation is researched and planned. Commercialisation of the developing solution is investigated. A patent is filed on the developing technology. Market potential is assessed. Competitive analysis is undertaken. The brand Med-Ware™ is established.

Presided over by Philippe VANRIE, CEO - European Business Network

2010 Undergraduate Awards of Ireland and Northern Ireland

Engineering and Mechanical Sciences

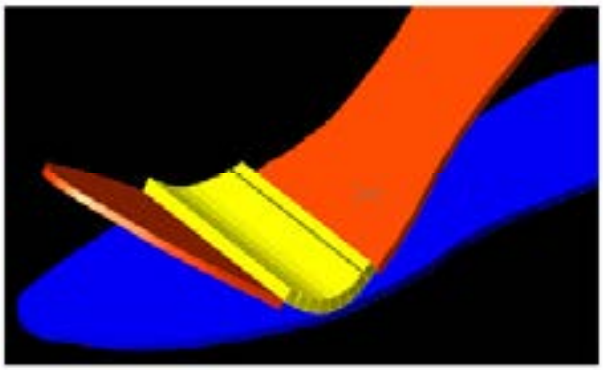
Gold Medal

Winner:

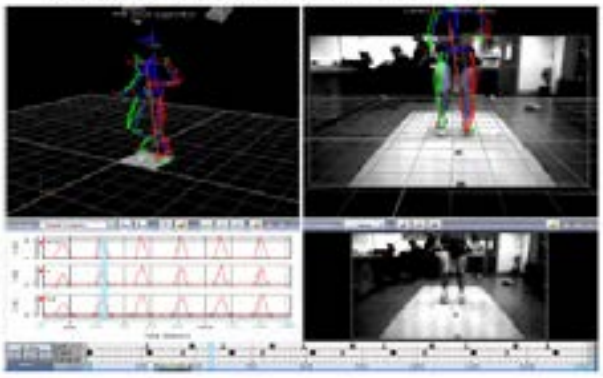
William Holland

Mechanical Engineering

Cork Institute of Technology



Design, Modelling, Prototype Production and Testing of Innovative Sports Footwear Outsole



Outsole Design for the Enhancement of Support and Performance in Sports Footwear

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

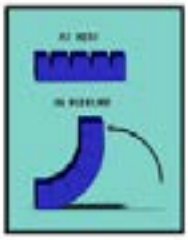
2010 Undergraduate Awards of Ireland and Northern Ireland - Gold Medal Winner

OUTSOLE DESIGN FOR THE ENHANCEMENT OF SUPPORT AND PERFORMANCE IN SPORTS FOOTWEAR

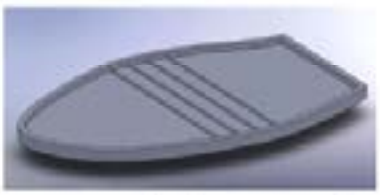
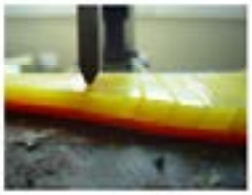
William Holland - Mechanical Engineering - Cork Institute of Technology

Inspired by a sports injury suffered by a housemate and a personal interest in football, this student conceived project is concerned with the enhancement of support and performance in the outsole of football boots and other certain types of sports footwear. The innovative device is designed to increase acceleration and reduce metatarsal fracture caused by excessive foot flexure. Metatarsal fracture is an injury which has, in recent years, affected many high profile footballers, including five members of the current English international football team.

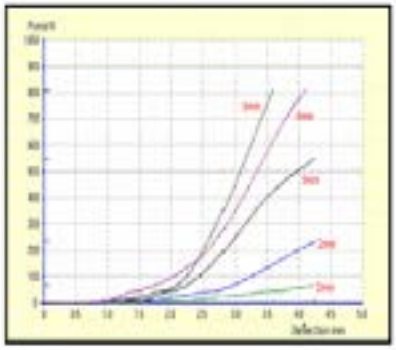
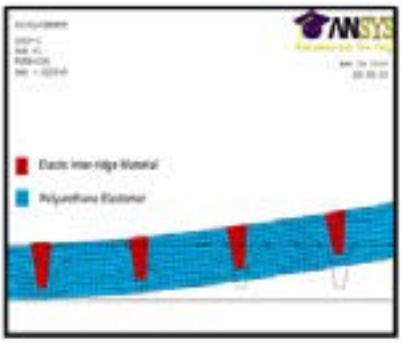





A concept design for an innovative castellated outsole has been developed to provide support to the metatarsals at the critical point of excessive flexure. When the ridges meet, the stiffness of the outsole increases rapidly, thus providing support to the metatarsal bones. Installation of a highly elastic material between the ridges provides an energy return and highly beneficial enhanced acceleration from the outsole to the foot during the toe-off phase of the gait cycle of the footballer or athlete.

A prototype has been manufactured using a castable polyurethane elastomer. Mechanical experimentation, fatigue testing, gait analysis and computer aided design finite element analysis are investigated and undertaken to validate, progress and optimise the innovative design.

The design and testing of the Meta-Sol™ innovative sports footwear outsole has proven to be very promising and warrants further major development to fully exploit its significant potential. Specialist consultation, including international sportswear designers / athletes / footballers and the Medical Engineering Design and Innovation Centre (MEDIC), is of critical importance to the project and innovative product advancement.

Financial and promotional expertise is harnessed through establishment of links with business students to formulate the "Meta-Sol™" business plan and brand. A patent is filed on the developing technology.

Reduction in metatarsal injuries and legitimate enhanced athletic performance are determined as realistic and achievable goals for the developing Meta-Sol™ innovative product.

Enterprise Ireland / Invest Northern Ireland

Young Entrepreneur of the Year Competition 2010

National Enterprise Award €6,500

Mobilis™

The Portable Intravenous Infusion Solution

Winner: Mobilis™ of Cork Institute of Technology

Mark Keane, Myles Murray, Gavin O'Sullivan - Mechanical Engineering

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Westminster London Thursday 24th June 2010

CIT Undergraduate Students David Kelleher and Ciara McKenna Win Overall First and Three of Top Four Awards at the 22nd Annual International Medical Competition

Ms. Ciara McKenna, Senior Lecturer Sean F. O'Leary, Mr. David Kelleher at London Finals

Following short-listing from a large international entry and an exhaustive process of submission investigation, prototype presentation demonstration and exhibition before a distinguished adjudication panel of internationally renowned Medical Engineering Industrialists and Professors, the 2010 International Medical Engineering Student Award Winners were announced on Thursday 24th June in Westminster, London:

International Medical Engineering Competition Overall Prize for Best Published and Presented Paper
Open to all Undergraduate and Postgraduate (Masters and PhD) Entries

First Place - David Kelleher, Cork Institute of Technology
Development of Bovine Teat 3D Sensing System for Disinfection Purposes

International Medical Engineering Competition Best Project involving the Design or Development of a Medical Device
Open to recent graduates (2009), third/fourth year undergraduates and taught Masters degree students, who have completed or are working on a project involving the design or development of a medical device

First Place - David Kelleher, Cork Institute of Technology
Development of Bovine Teat 3D Sensing System for Disinfection Purposes

Second Place - Ciara McKenna, Cork Institute of Technology
Evaluation of the Pullout Strength of Orthopaedic Screws in a Developing Novel Bone Cement

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Development of Bovine Teat 3D Sensing System for Disinfection Purposes

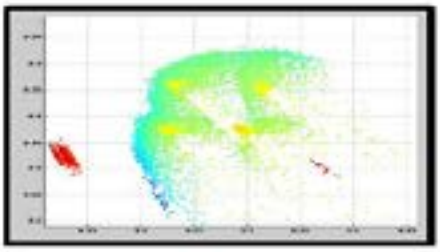
David Kelleher - Final Year Mechanical Engineering Undergraduate Degree Project

Recent research (1) indicates that the occurrence of bovine mastitis on dairy farms is increasing, thereby giving rise to major economic and animal welfare concerns. The balanced application of teat disinfectant is the most effective method of preventing mastitis infection. Over-application has adverse implications for natural immunity against the disease. Under-application undermines the efficacy of prevention (2). Current manual methods are both labour intensive and unreliable. Current automated disinfection systems are either unsuitable for grazing based dairy systems or apply excessive solution to the udder region as these systems do not accurately locate and measure the teat parameters.
A case study of a high production Irish dairy farm by the author indicates significant economic and animal husbandry benefits to effective and appropriate disinfection application.

The development of a vision-based sensing system to comprehensively locate and describe the teats for disinfection purposes is undertaken. Suitable sensor technologies are investigated and assessed. A comprehensive sensor selection process is undertaken. Experimental time of flight camera technology is selected and employed. In-situ milking parlour experimentation is undertaken including the establishment and optimisation of 3D depth map camera settings and positioning. Field of view image filtration, segmentation and identification methodologies are investigated, assessed and employed. A robust teat identification methodology, based on bovine teat statistical data, is devised, applied and tested.

The development of and implementation of an image processing algorithm, incorporating neighbourhood assessment and region growth capabilities, is undertaken. The developed algorithm enables the accurate and precise identification and measurement of the bovine teat surface parameters and characteristics with a view to optimal disinfection application. Experimental methodologies to test the effectiveness of the system are developed and validated.

Study of Optimal Camera Position



Normalisation of Udder Data

Identified Teat

A 3D vision system laboratory based test rig and methodology is designed, manufactured and commissioned. The developed test rig allows the system to be tested on a wide variety of teat and udder arrangements. Initial tests are highly promising with successful identification for a diverse range of commonly occurring bovine teat / udder configurations. Commercialisation of the developed solution is investigated. Market potential is assessed and competitive analysis is undertaken.

Future work includes more extensive testing and optimisation of the 3D teat sensing system and the parallel development of compatible robotic disinfectant applicator technology.

(1) Kelly, P. T. (2009). *Farm management factors associated with bulk tank somatic cell count in Irish dairy herds.* Irish Veterinary Journal Volume 62.

(2) *Use post-milking teat disinfection- spray or dip at every milking.* Countdown: http://www.countdown.org.au/pdf/technotes/TN%2007%20-%20disinfect%20-%202003%20Feb.pdf

Ciara McKenna, Cork Institute of Technology

Evaluation of the Pullout Strength of Orthopaedic Screws in a Developing Novel Bone Cement

Introduction

Conventional polymethylmethacrylate (PMMA) cements, Calcium Phosphate cements (CPC) and more recently Bisphenol-a-glycidyl dimethacrylate (BIS-GMA) composite cements are employed in applications in dentistry, vertebral augmentation, stabilization of prosthetics and as anchors for various screw and plate constructs in osteoporotic bone. Unfortunately disadvantages associated with these materials have emerged including, a high curing exotherm, the incorporation of toxic components in their formulations, and critically, exhibition of a modulus of mismatch between cement and bone. Glass polyalkenoate cements (GPCs) have been considered as an alternative material. GPCs are bioactive with mechanical properties similar to bone. GPCs adhere to both surgical metals and the mineral phase of the bone and set without shrinkage or significant heat evolution. GPCs have had major success in dental applications. However the suitability of GPCs for skeletal applications is limited by the presence of the aluminium ion (Al^{3+}), a neurotoxin, which causes defective bone mineralisation and aluminium-induced encelphalopathy. Fortunately, Zn^{2+} can act in a similar fashion to Al^{3+} thereby giving rise to the development of GPCs based on calcium-zinc silicate glasses. Zn-based GPCs (Zn-GPCs) have potential for orthopaedic applications. These cements have relatively good strengths, but have not yet been evaluated.

Objectives

The objective of this research is to evaluate the pullout strength of orthopaedic screws in a Zn-based GPC in accordance with the standard that governs the uniaxial pullout testing of orthopaedic screws – ASTM F543-07. One formulation of a Zn-GPC is evaluated as a function of time from one to 21 days and as a function of different pH levels, 3 and 7.4. The Zn-based GPC formulation evaluated in this project is found to have a very short working time and setting time, making it a relatively difficult material with which to work. Previous research has shown that the addition of an organic additive TSC (Trisodium citrate) to this cement formulation has improved the working time and setting time without adversely affecting the compressive and biaxial flexural strengths. This project also determine swhat affect the addition of TSC has on the pullout strength of orthopaedic screws in this novel bone cement. The evaluated Zn-GPC formulation comprises of a glass component, termed BT101; a bioactive glass comprising of zinc, silicon, calcium, and strontium, an acid component, Polyacrylic Acid (PAA), and distilled water.

Fig. 1: Test setup

Methodology

- Glass Synthesis
- Physiological solution preparation (ISO 10993-14)
- Cement Synthesis
- Specimen preparation
- Incubation
- Testing

Results

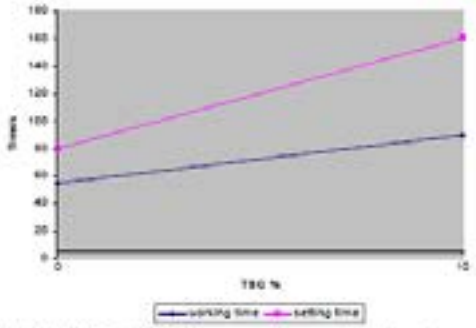


Fig. 1: Effect of TSC on working and setting times

The addition of TSC was found to increase the working time and setting time of the experimental bone cement improving the workability and handling of the cement.

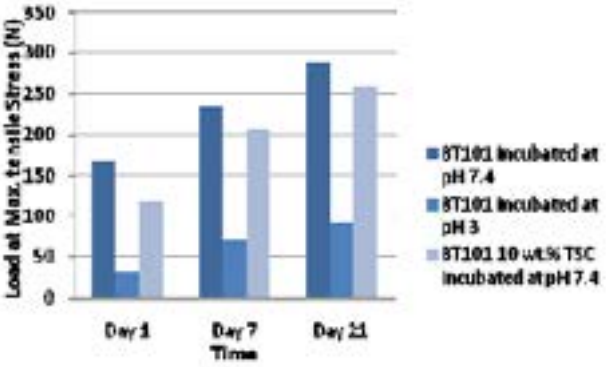


Fig. 2: Pullout Loads at max. Tensile stress (N)

The specimens containing 0% TSC that were incubated in the pH 7solution exhibited the highest pullout strengths over the specified time frame. The incorporation of TSC was found to have an adverse effect on the pullout strength. The strengths of the specimens immersed in the pH 3 (acidic) solution were found to be poor in comparison.

Conclusion

All results show an increase in pullout strength with time. This increasing strength is associated with a gradual increase in the density of ionic cross-links forming within the matrix. PMMA cements inhibit pullout strengths in the range of 2000N while CPCs have been found to have considerably lower strengths in the region of 300N. As the experimental bone cement exhibits strengths near to those of CPCs it indicates that this bone cement may have potential as a candidate for orthopaedic applications. The pullout strengths may be suitable for the initial fixation of screws and prostheses, and promote long term biological fixation. However, further improvements are required for increasing mechanical strength. Several factors can affect the mechanical properties. Such factors include; the concentration and molecular weight of the PAA, the powder to liquid ratio in the cement composition and the overall composition of the cement.

Cork County and City Enterprise Boards
CIT Prize for Innovation 2010
Entrepreneur of the Year 2010
First Place €4,000 Award

County & City Enterprise Boards

Winner: Laurence Barry of Hydrostack™
Final Year Mechanical Engineering
Cork Institute of Technology

" Design and Development of an Innovative Heat Exchanger for a Chimney Flue "

CIT Institiúid Teicneolaíochta Chorcaí Cork Institute of Technology

MECHANICAL ENGINEERING DEGREE - CA0 Code CR108

Enterprise Ireland / Invest Northern Ireland
Young Entrepreneur of the Year Competition 2010
National Enterprise Award €4,000

Winner: Tip Top Cue Tips ™

Jonathan Howley, Aidan Vaughan, Daniel Henderson, Ronan O'Donoghue
Third Year Mechanical Engineering
Cork Institute of Technology

" Design, Development and Testing of an Innovative Chalk Free Cue Tip "

Pictured with
Minister Billy Kelleher,
Minister for Trade and Commerce

Cork County and City Enterprise Boards
CIT Prize for Innovation 2010
Most Technologically Innovative Project 2010
First Place €2,000 Award

County & City Enterprise Boards

Winner: Tip Top Cue Tips ™

Jonathan Howley, Aidan Vaughan, Daniel Henderson, Ronan O'Donoghue
Third Year Mechanical Engineering
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" Design, Development and Testing of an Innovative Chalk Free Cue Tip "

CIT Institiúid Teicneolaíochta Chorcaí Cork Institute of Technology

MECHANICAL ENGINEERING DEGREE - CA0 Code CR108

2009 Awards

Kansas City Missouri, USA

Global Student Entrepreneur 2009 Award for CIT's Kieran O'Callaghan

Global Student Entrepreneur Finalist 2009 Award sponsored by the Entrepreneurs' Organisation in conjunction with Mecedes-Benz Financial

Vision Research Enterprises - Vision RE™ - is a machine vision research, development and consultancy student company - the company name (phonetically Visionary) reflecting the main technology development / research interests, commercial applications and entrepreneurial ethos of the core organisation.

The Vision RE™ Company was formed after the exceptional success of Kieran's first entry level product AquaEye™. Vision RE™ are currently designing and developing two major hallmark innovative products for Heavy Goods Vehicles (HGV's) - Drive Safe ™ and the Visual Impaired Community - VisionRE SE™.

http://visionre.cit.ie

Enterprise Ireland /Invest Northern Ireland /Cruickshank Student Enterprise Awards

Academic Innovation Award 2009

Cork Institute of Technology

Island-wide Innovation Award Winning CIT Student Teams

Senior Lecturer Sean F. O'Leary
of Cork Institute of Technology
pictured with
Mr. Donal O'Connor,
Cruickshank Intellectual Property Attorneys
and
Mr. Richard Murphy, Enterprise Ireland

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Siemens Engineers Ireland
Innovative Student Engineer of the Year 2009
National Competition
First Place
€2,000 Award

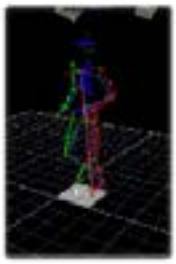
Winner: Artificer Colm O'Brien
of Cork Institute of Technology
and the Naval Service

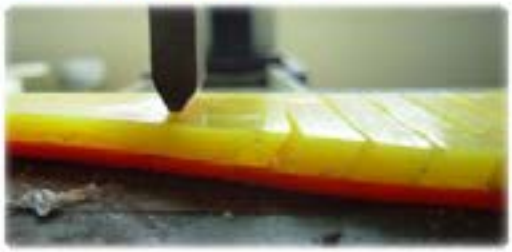
" Design and Development of an Automated Home/Office Environment through Intelligent Tags "

CIT
Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

I MECH E

SOFE Paris 2009
Award for
Ireland's William Holland



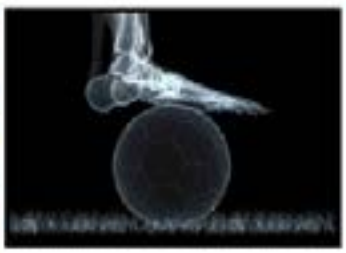


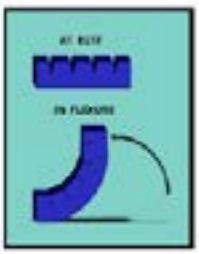
Great news from Hotel Mercure at the base of the Eiffel Tower, Paris, where the results of the Paris 2009 Speak Out for Engineering Awards have just been announced:

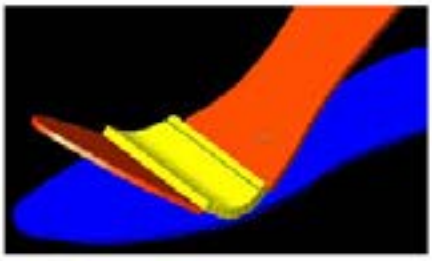
First Place Overall and Outright Winner:
Ms. Catherine Marshall, EOLE Renewable Energy Systems - Mediterannean,Avignon,France - "Wind Energy in France"

Second Place Overall and First Undergraduate Student Project:
Mr. William Holland, Cork Institute of Technology, Cork, Ireland
" Design and Development of an Innovative Sports Footwear Outsole "

Inspired by a sports injury suffered by a housemate and a personal interest in football, this student conceived project is concerned with the enhancement of support and performance in the outsole of football boots and other certain types of sports footwear. The innovative device is designed to increase acceleration and reduce metatarsal fracture caused by excessive foot flexure. Metatarsal fracture is an injury which has, in recent years, affected many high profile footballers, including five members of the current English international football team.







META-SOL™

Enterprise Ireland / Invest Northern Ireland
Young Entrepreneur of the Year Competition 2009
Solving Problems for Industry
€7,500 First Place Award

Winner: Nebulaer™ of Cork Institute of Technology

Ciara McKenna – Biomedical Engineering
Kevin Gilmartin – Mechanical Engineering
Luke Crowley – Mechanical Engineering
William Murray – Mechanical Engineering

" Nebuliser Noise Attenuation System Development "

Many nebuliser users and fellow patients / families complain of aural distress and increasing isolation during often prolonged periods of nebuliser treatment. The primary objective of NebulAer™ is to reduce the excessive, irritating and potentially damaging noise levels outputted by existing current nebulizer units.

The NebulAer™ system is designed and developed from student concept to working prototype for universal use with the wide range of commercially available nebulisers. The NebulAer™ universal solution system allows current nebulizer users (both hospital and home based) to employ their nebulisers as normal , critically without that annoying and isolating sound!

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Cork Institute of Technology Prize for Innovation
Entrepreneur of the Year First Place €5,000 Award
Enterprise Ireland / Invest Northern Ireland
Young Entrepreneur of the Year Competition 2009
National Award of Commendation €2,500 Prize

Winner: Rigi-Jig™ of Cork Institute of Technology

Fiona Hedderman – Mechanical Engineering
Damian Buttimer – Mechanical Engineering
Dave Cronin – Biomedical Engineering
William O'Shea – Mechanical Engineering

Rigi-Jig™ " Innovative Engine Tool Development "

With a growing auto service market and a declining new car market, innovation in car engine maintenance has assumed increased importance. Rigi-Jig™ is a unique innovative engine tool designed and developed from student concept, which remarkably reduces work time for a particular engine operation from 6 hours to between 30 and 60 minutes. The product confers significant time saving and safety competitive advantage to utilizing garages, thereby driving potential sales.

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Enterprise Ireland / Invest Northern Ireland
Young Entrepreneur of the Year Competition 2009
Cruickshank Most Technologically Innovative Project
€7,500 First Place Award
€20,000 Intellectual Property/ Patent Consultancy Award

VisionRE™ of Cork Institute of Technology

" Terrain / Obstacle Detection System for the Visually Impaired "

Etaion Ni hAilpin – Business Administration
Norma Downing – Business Administration
Kieran O'Callaghan – Mechanical Engineering

Supervisors: Lecturer Finbarr Sheehan, Dr. Michael J. O'Mahony, Lecturer Chris Gibbons, Senior Lecturer Sean F. O'Leary

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Inaugural Abbott Ireland Intern Award and Bursary 2009

Paul Walsh

Final Year Mechanical Engineering Degree

Pictured Left to Right :
Dr. Michael J. O'Mahony, Course Coordinator, CIT, Dr. Barry O'Connor, Registrar, CIT, Mr. Paul Walsh, Final Year Mechanical Engineering Degree, CIT , Ms. Elaine Fennessy, Talent Acquisition Specialist, Human Resources, Abbott Ireland, Vascular Division, Dr. Brendan Murphy, President, CIT, Mr. Matt Cotterell, Head of School of Mechanical and Process Engineering, CIT

The Inaugural €1,000 Abbott Ireland Award and Bursary was based on Paul's excellent participation as a CIT Work Placement Student in Abbott Ireland, Vascular Division, Clonmel, Co. Tipperary during the academic year 2008/9.

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

2008 Awards

CIT Mechanical Engineers Kieran O'Callaghan and Xiao Fang Zhang
International and National Award Winners 2008

CIT Prize for Innovation Multi-Discipline Team 2008
Mechanical Engineering - Kieran O'Callaghan
Business Studies - Imelda Callanan, Aidan Sheehan and Stephen Hunt.

CIT Mechanical Engineer Kieran O'Callaghan declared Outright Winner of

- Siemens Engineers Ireland Innovative Engineer National Award Dublin 2008

- Design and Development of a Biomedical Device International Award London 2007

IRCSET PostGraduate Scholarship 2008 - €24,000 per annum

Mr. Kieran O'Callaghan, Final Year Mechanical Engineering Degree Student
Cork Institute of Technology
Project Title: " Design and Development of a Swimming Aid for the Visually Impaired "
Industrial Partners: National Council for the Blind Ireland
The Irish Paralympics Swimming Team

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE

CA0 Code CR108

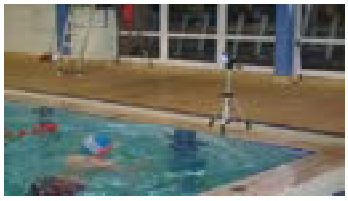
Design and Development of Swimming Aid for the Visually Impaired

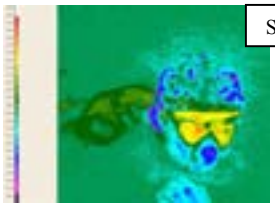
Student: Kieran O'Callaghan, Final Year Mechanical Engineering

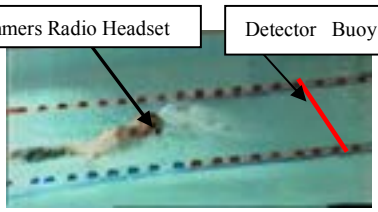
People with visual impairment generally have lower levels of fitness than their sighted peers. Furthermore, activities of daily living of the visually impaired demand increased energy. Swimming is one of the best exercise activities as few obstacles are encountered.

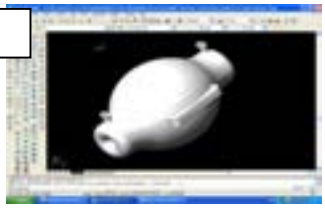
Currently, a visually impaired swimmer must depend on an assistant to warn him/her of the approaching pool wall by a single tap on the head/shoulder. The "Tapper" system has proved demeaning, inadequate and on occasion dangerous. "Our own top swimmer, Stephen Campbell, has had quite a few accidents. Last year he crashed into the wall at the pool while swimming and broke his nose"- Geraldine Conway, Manager, Irish Paralympics Swim Team.

Based on a survey of Visually Impaired Swimmers, research, analysis, prototype design, development and testing of diverse technologies was undertaken. Bluetooth, Sonar, Passive Infra-Red, Photo-Electric Detection and Machine Vision Software systems are assessed as to suitability to meet requirements in relation to safety, reliability, portability, aesthetics and ease of use.





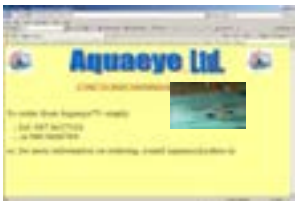




Experimental Assessment of PIR System - Thermal Camera *Aquaeye™ Developed Detector Buoy System*

Dual complimentary systems (individual swimmer-centric and comprehensive pool-wide solutions) have been designed and developed to alert swimmers of pool wall approach. On swimmer detection, a warning signal is encoded and transmitted. The transmitted warning signal is decoded by a developed waterproof receiver. The swimmer is alerted via form fitting audio earpiece and tactile feedback. A working prototype has been developed and has been extensively tested for functionality and quality.

Aquaeye™ Developed Machine Vision and Data Acquisition System



Headphone Developed Solid Model - Aquaeye™ *Designed and Developed Swimmers Radio Headset* *Developed Marketing Website*

The developing product also shows significant further potential to facilitate in-pool training for sighted swimmers and as a real time coaching aid for competitive swimmers.

National Academy for the Integration of Research, Teaching and Learning (NAIRTL Ireland)

Inaugural Excellence in Teaching Award

presented to

CIT Senior Lecturer Sean F. O'Leary

CIT lecturer receives Excellence in Teaching award

by Áilín Quinlan

OVER the years his students have won a glittering array of international and domestic prizes — now it's teacher Seán O'Leary's turn to receive a prestigious award for his innovative work.

O'Leary, a senior lecturer at the Department of Mechanical Engineering at Cork Institute of Technology's School of Mechanical and Process Engineering, has just been selected for one of five inaugural Excellence in Teaching Awards.

The awards are being made by the National Academy for the Integration of Research & Teaching & Learning (NAIRTL), an organisation set up by the third level sector to honour exemplary teachers who are also innovative researchers in higher education.

A second Excellence in Teaching award goes to a group of four staff at the UCC School of Nursing and Midwifery; Irene Hartigan, Angela Flynn, Siobhán Murphy and Nuala Walshe. Three others are to be presented to academics at Trinity College Dublin and NUI Galway.

"The award is a recognition not just of myself, but of the quality of teaching at CIT and of the quality of the graduates we produce," said Mr O'Leary, a father-of-four from Ballinspittle, Co Cork.

In recent years O'Leary's students have swept the board at award ceremonies in Ireland and abroad.

In five out of the past six years, his students won the most prestigious engineering award in Ireland, the Siemens' Engineers Ireland Innovative Engineer of the Year Awards (2008, 2006, 2005, 2004 and 2003) along with an array of gold and silver medals at a number of prestigious international competitions.

"This award is also a recognition of the new teaching methods we have developed in the college, including the new innovative product development modules, where students are given the opportunity to come up with ideas and products which they then design and develop to prototype stage."

Mr O'Leary is the founder and organiser of the college's hugely successful annual April exhibition of students' projects and prototypes, to a mixed audience of industrialists, academics, schools and student peers – which is the biggest academic engineering exhibition in the country.

Recent years saw displays of Ferrari and Jordan Formula One Racing Cars at the exhibition, as well as a display of the engineering inventions of Leonardo da Vinci.

Sean O'Leary: Recognition of quality of teaching staff.

Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

Enterprise Ireland / Invest Northern Ireland
Young Entrepreneur of the Year Competition 2008
Cruickshank Most Technologically Innovative Project
€10,000 First Place Award
IRCSET Post-Graduate Scholarship 2008
€30,000 per annum

Innovative Product Development Laboratories Multi-Discipline Team

Med-Ware™

Xiao Fang Zhang

Bachelor of Engineering

in Mechanical Engineering

Peter Sullivan *Michelle Bouse* *Carmel Linehan*

Bachelor of Business Studies

in Information Systems

Medical Infusion System Air Bubble Extractor Design and Development by Ms. Xiao Fang Zhang, Final Year Mechanical Engineering Degree in conjunction with Cork University Hospital

CIT Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE

CA0 Code CR108

2007 Awards

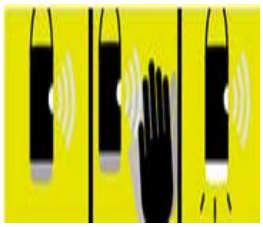
HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE -- CA0 Code CR108

Ulster Bank Enterprise Ireland / Invest Northern Ireland
Young Entrepreneur of the Year 2007
€10,000 First Place Award
Cruickshank Most Technologically Innovative Project 2007
€5,000 First Place Award

First Placed Innovation Team – ApriCot (Awards presented by Ruth Badger of TV's Apprentice Fame)
Mechanical Engineering Student - John J. Barry - Designer and Inventor
Accounting and Information Systems Students - Niamh Brady, Orla Houlihan, Regina O'Donoghue
- Developers of Business Plan

This is the first time in the 23 year history of this prestigious islandwide innovation competition – 132 entries in 2007 at PhD, Masters and Undergraduate Team levels – that the top two awards have been won by one project and team.

This product encapsulates the development, testing, analysis, and design of a sleeping aid to simulate womb conditions.



An integrated system to mimic the slow pulsation of a heart and the gentle motion of a person breathing is central to the operation of the developed human contact simulation product.

HONOURS LEVEL 8

MECHANICAL ENGINEERING DEGREE

Celebrating 25 Years of Success at the Enterprise Ireland / Invest Northern Ireland Student Awards

Cork Institute of Technology's ApriCot Centrepiece at Farmleigh House Launch

Donal O'Connor, Senior Partner, Cruickshank Intellectual Property Attorneys; John J. Barry - Designer and Inventor, ApriCot, CIT; Minister for Enterprise, Trade and Employment Micheál Martin T.D.; Niamh Brady - Developer of Business Plan, ApriCot, CIT; Jay Bourke, Enterprise Ireland Student Awards Ambassador; Regina O'Donoghue - Developer of Business Plan, ApriCot, CIT; and Frank Ryan, Chief Executive Officer, Enterprise Ireland.

HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE -- CA0 Code CR108

CIT's ApriCot Centrepiece at Farmleigh House Launch

The launch of the 2008 Enterprise Ireland Student Enterprise Awards took place on Wednesday 21st November, in the august surroundings of Farmleigh House, Phoenix Park, Dublin.

The Cork Institute of Technology ApriCot Team - Project "Therapeutic Sleeping Aid for Infants" won the €10,000 First Place Award in the Ulster Bank Enterprise Ireland/Invest Northern Ireland Young Entrepreneur of the Year 2007 Competition and the €5,000 First Place Award in the Cruickshank Most Technologically Innovative Project 2007 Competition. This is the first time in the 25 year history of this prestigious islandwide innovation competition that the top two awards have been won by one project and team. There were 132 entries in 2007 at PhD, Masters and Undergraduate Team level.

Minister for Enterprise, Trade and Employment Mr. Micheál Martin T.D. announced details of the €65,000 prize fund and competition. The audience of journalists, entrepreneurs and academics were also addressed by Mr. Frank Ryan, Chief Executive Officer, Enterprise Ireland and Mr. Jay Bourke, Enterprise Ireland Innovation Ambassador.
The CIT ApriCot team, Outright Winners of the 2007 competition from hundreds of entries islandwide, were lauded at length by all speakers and took centre stage right throughout the proceedings. An extensive photo shoot, focussing on the ApriCot team, took place with the backdrop of the internal splendour, imposing façade and extensive grounds of the ancestral home of the Guinness family. A major campaign to promote the 2008 competition is to be undertaken by Enterprise Ireland over the coming months and the ApriCot team have pledged all possible support in this promotion of innovation and entrepreneurship.

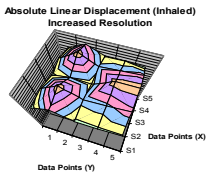
Apricot Demonstration by John J. Barry at
2007 Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition

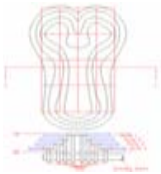
Design and Development of Human Contact Simulator

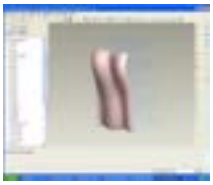
John J. Barry - Designer and Inventor
Niamh Brady, Orla Houlihan, Regina O'Donoghue - Developers of Business Plan
Cork Institute of Technology

ApriCot™

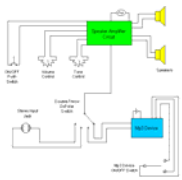
ApriCot™ is an apparatus, which acts as a therapeutic and sleeping aid for infants, promoting healthy sleeping patterns in both baby and parent. An integrated system to mimic the slow pulsation of a heart and the gentle motion of a person breathing is central to the operation of the developed human contact simulation product. The developing device is also designed to address critical recommendations of the FSIDS to reduce Infant Sudden Death Syndrome.

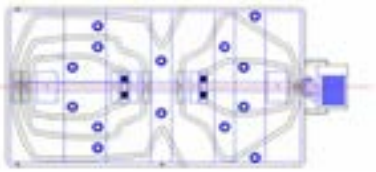






Experimental Investigation of respiratory changes in the configuration of the chest wall in a female subject are undertaken. Self-generated anthropometric research, including numerous anthropometric experiments, are conducted. Data acquisition software is utilised to attain and analyse results. PeopleSize 2000 anthropometric largest civilian database software is employed to yield data on infant sizes. Human chest motion reproduction incorporates detailed design drawings generated for contour plates in the vertical direction. Design and analysis for manufacture of the device is undertaken. Numerous suitable materials are investigated. Calculation of critical design components are undertaken.





Heart and womb simulation critical design parameters employed include: Speaker system to output sound, high bass to output vibration, recordings of heart and womb, memory to store information, medical expert recommended motion/timer sensor system to trip device on/off and to aid Human Contact incorporated. Simulator for progressive weaning of Infant is developed and implemented. Application of Catalyst software to develop the physical ABS models. State of the art rapid prototyping technology is utilised to build the representative 3D models from bottom up. Complexity of the final design and data interpretations incorporated.

Current Human Contact Simulator Prototype Design Iteration

Modeling is undertaken of relative difference of fully inhaled and exhaled female representative chest and the formation of separate entities or islands at certain contour levels identified with medical research paper validation.
ApriCof™ meets the Health and Safety regulations / classification requirements of the M.D.D. as a Class 1 Medical Device.

Extensive medical validation has also been undertaken through consultation and demonstration of the developing product with internationally renowned medical professionals in the areas of neo-natal and paediatrics. Medical feedback has been very positive and further device enhancements identified. A four page article on the developing device has just been published in the Autumn 2007 issue of the "Spectrum" Biomedical and Clinical Engineering Magazine.

Developed Promotional Website

A comprehensive Business Plan, incorporating extensive Market Research, International and National Sales Forecasts, Competitor Evaluation, Financial Marketing Analysis, Profitability Analysis, Company Portfolio and Organisational Plan, has been developed in conjunction with Enterprise Ireland / Innovation Centre consultants. Specialist Patent Lawyers have also been consulted and a Patent on the developing technology filed with the Irish Patent Office. The ApriCot™ Brand has been established. A promotional Website, with Marketing, Ordering and Sales capabilities/potential, has been developed.

Following a highly competitive island-wide competition from hundreds of submitted entries, ApriCot™ has been adjudged the Outright Winner of the €10,000 Ulster Bank Enterprise Ireland / Invest Northern Ireland Young Entrepreneur of the Year and the €5,000 Cruickshank Innovation 2007 Awards – the first time in 25 years that the Enterprise Ireland top two entrepreneurship and technical innovation awards have gone to one product and team.

Gold Medal
International Medical Engineering Competition
Design and Development of a Biomedical Device
International Award London 2007 – First Place

AQUA EYE – Swimming Aid for the Visually Impaired

Mechanical Engineering Students
Kieran O'Callaghan, Ciara Dwan, Ken Allen, Finbarr Brassil, Paul O'Keeffe
Designers and Inventors

Accounting and Information Systems Students
Imelda Callanan, Norma Barry, Colin Aherne, Ciara Aherne, David Barker
Developers of Business Plan

HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE

CA0 Code CR108

Silver Medal
International Medical Engineering Competition London 2007
Suture Tension Measurement Investigation and Analysis

Kenneth Bourke, Final Year Mechanical Engineering, CIT

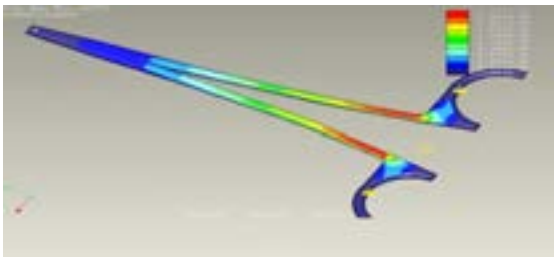
Sutures are used to close wounds in skin, internal organs, blood vessels and other tissues of the human body after they have been severed by surgery or trauma.

The goals of wound closure in the primary care setting are to stop bleeding, prevent infection, speed healing and preserve the function and appearance of the wounded area.

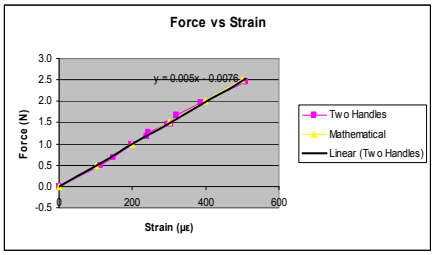
Surgeon experience over many years points to a relationship between suture tension and wound healing. This relationship has not been scientifically investigated to date as no method has been developed to measure the tension in a suture as a wound is closed.

The objective of this project is to therefore to research and design an experimental technique to allow the surgeon to accurately measure the tension required to close a wound.

Initial research is undertaken into the suturing process and measurement technologies. Mathematical and Finite Element models of the suture and needle holder tensioning process are developed. A direct correlation between suture tension and needle holder strain is established. Optimum strain measurement location and orientation is determined. An initial single gauge prototype measurement device is developed and validation experimentation undertaken.



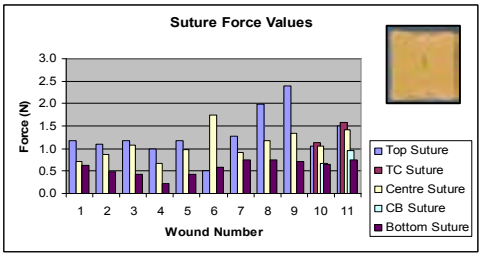
Finite Element Model by K.Bourke



Accuracy of Developed Prototype ±2%

Prototype Testing by Surgeon

An optimal dual gauge measurement configuration is designed, developed and tested yielding greatly enhanced accuracy. Laboratory testing of the developed measurement system is undertaken by the partner surgeon on a variety of specimen wounds in 'suture foam'. Experimental parameters investigated include suture size, technique of wound closure, wound size variation and controlled versus underlined wound comparison. Initial surgeon tests are highly promising - conforming to surgeon expectation and results consistent with current best theatre practice. These results are to be formally presented to the Royal College of Surgeons of Ireland national conference.



Surgeon Suture Force Measurement

Future Development - Embedded and Bluetooth Conceptual Design by K.Bourke

Commercialisation of the developing measurement technique is investigated with potential markets and uses identified including basic research device, surgeon training tool and theatre surgical aid applications.

Future development work encompasses investigation of embedded and bluetooth technologies and data acquisition / analysis.

The developing technique has major applications both in addressing the current research knowledge deficit in regards to suture tension versus wound scarring relationship and as a much needed aid to surgeons in the accurate measurement and appropriate application of suture tension in a variety of surgical procedures.

FIRST PLACED
ENGINEERING DEGREE PROJECT IN IRELAND 2007

National Competition Finalists from TCD, UCD, NUIG, DCU, DIT and CIT

Bill Quinn, a Final Year Mechanical Engineering
Degree student at Cork Institute of Technology, has achieved
First Place in the Enterprise Ireland Institution of Mechanical Engineers
2007 National "Speak Out for Engineering"Competition Finals

Bill's Award Winning project titled
" Optimisation of Capping Chamber Parameters in
Contact Lens Manufacture "
was carried out in conjunction with Bausch & Lomb Ireland, Waterford

HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE

CA0 Code CR108

FIRST PLACED
ENGINEERING TECHNOLOGISTS OF THE YEAR
NATIONAL AWARDS 2007

CIT Students declared Joint Winners of the Inaugural Engineers Ireland Engineering Technologist of the Year 2007 Competition

The result of the Inaugural Engineers Ireland Engineering Technologist of the Year 2007 National Competition was announced by Mr. Jack Golden, President, Engineers Ireland:

Joint First Place
Student: Michael Kinsella - Cork Institute of Technology
Project Title: "Process for Converting Rape Seed to Repoleum Fuel"
Course: Bachelor of Engineering in Electrical Engineering(Level 7)
Department: Electrical Engineering

Joint First Place
Student Team: Damien Healy, Joseph Jameson, Jason Mullins - Cork Institute of Technology
Project Title: "Design and Development of Fusion Folding Press"
Course: Bachelor of Engineering in Manufacturing Engineering (Level 7)
Department: Manufacturing, Biomedical and Facilities Engineering

This double victory in the first ever Engineering Technologist National competition represents a remarkable success for both students and supervisors and is a resounding validation of the standard of engineering courses presented at Cork Institute of Technology.

Enterprise Ireland / Invest Northern Ireland
National Award of Merit 2007
€2,000 Award

The Development of an Anti-Claw Splinting Device for Ulnar Nerve Palsy Treatment was undertaken by the " Ulnar Pal " Multi-Discipline Mechanical Engineering / Business Student Team.

National Award of Merit Innovation Team – Ulnar Pal

Mechanical Engineering Students - Designers and Inventors
Tadhg Lyne, Joshua Walsh, Kieran Aherne, Dermot Drew, Paul Nolan

Accounting and Information Systems Students - Developers of Business Plan
Helena Fleming, Padraig O'Shea, Alan Meely

UlnarPal Ltd. is a student development company, specialising in the design, patenting and marketing of medical devices related to the ulnar nerve palsy niche market.
Ulnar Nerve Palsy is a condition which occurs, when the nerve traveling from the shoulder down to the wrist, has been damaged due to prolonged pressure or trauma.
The design and development of a glove is undertaken with a view to increasing patient stability and enhancing recovery rates.

HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE - CA0 Code CR108

2006 Awards

cork institute of technology

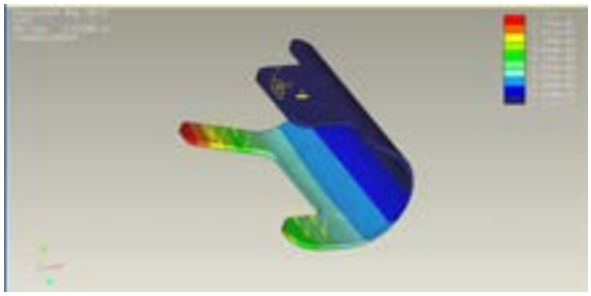
HONOURS LEVEL 8MECHANICAL ENGINEERING DEGREE

CA0 Code CR108

CIT Mechanical Engineer Kathleen Hurley declared Outright Winner of - Siemens Engineers Ireland Innovative Engineer National Award Dublin 2006 - Design and Development of a Biomedical Device International Award London 2006

Ms. Kathleen Hurley, Final Year Mechanical Engineering Degree Student
Cork Institute of Technology
Project Title: " Fractured Finger Splint System Design and Development "
Industrial Partner: Mr. James Harty, Consultant Surgeon

Ulnar gutter splint



Finite Element Model by K.Hurley

Prototype "Finger Fit " Device by K.Hurley

The objective of this project is to research and design an improved support system for the treatment of a fractured fifth metacarpal (also known as a boxer's fracture) as an alternative to the current conventional treatment - the cumbersome Ulnar gutter splint encased in plaster paris. From Surgeon concept, an aluminium splint is designed to provide a three point pressure system to immobilise the fifth knuckle. The new fractured finger splint is developed in parallel with an innovative neoprene glove support system to prevent rotational deformity.

HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE -- CA0 Code CR108

CIT Mechanical Engineer Timmy O'Keeffe declared Outright Winner of - Best Medical Engineering Project International Award London 2006

Mr. Timmy O'Keeffe, Final Year Mechanical Engineering Degree Student
Cork Institute of Technology
Project Title: "Design, Development and Commissioning of an Orthodontic Thermal Cycler"

The project was originated by and carried out in conjunction with Professor Declan Millett, Professor of Orthodontics, University Dental School and Hospital, University College Cork.

Orthodontic brackets are used to reposition teeth in the mouth. The thermal cycling (e.g. hot and cold drinks), experienced during everyday eating and drinking, produces stress/ strain cycles in the adhesive which bonds the bracket to the enamel.

Timmy's project concerns the development of an accelerated testing unit to simulate the thermal cycling conditions experienced by the bracket and adhesive assembly under oral condition.

HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE -- CA0 Code CR108

CIT Mechanical Engineer Brian Guilly wins
- ISEA International Sports Engineering Association Silver Medal London 2006
- I.Mech.E. Frederic Barnes Waldron Award 2006

Mr. Brian Guilly, Final Year Mechanical Engineering Degree Student
Cork Institute of Technology
Project Title: " Equine Tendon Support Boot Testing "
Industrial Partner: Dalmar Ireland

Sports injuries of the tendons are common in race, show jumping and other performance horses.

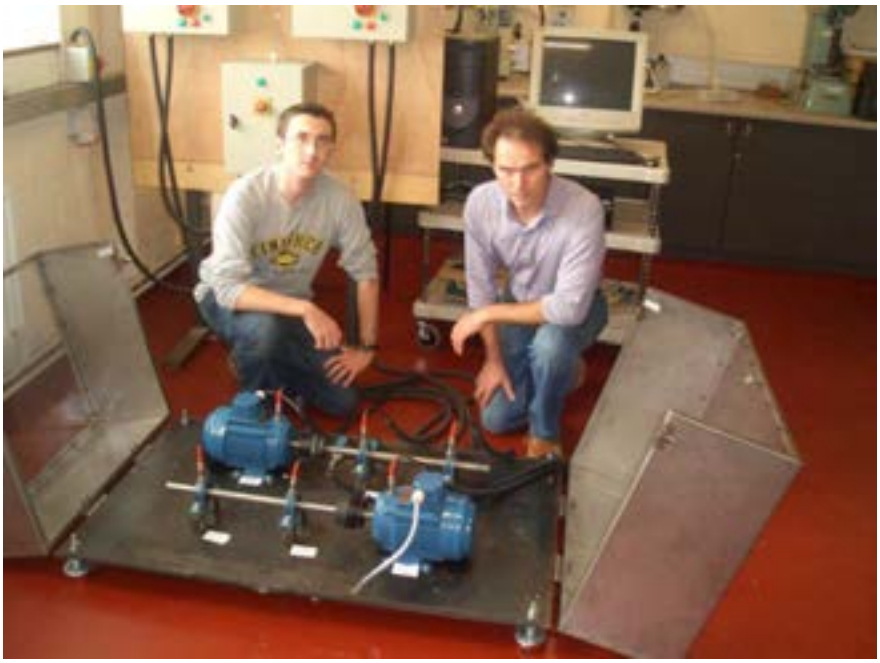
On average over 150,000 horses are affected annually - resulting in a reduction in sporting appearances and often leading to retirement of the horses (to the big racecourse in the sky).

The equine sports medicine project was carried out in conjunction with Dalmar Ireland, a small but dynamic equine medicine company based in Glanmire, Co Cork, specializing in the design and manufacture of technologically advanced products for the effective prevention and treatment of lower leg injuries in horses.

This new boot will facilitate natural healing of the damaged tendons, and bring the horse back to full performance fitness. It is unique in that it allows movement of the fetlock joint whilst still supporting the tendons in a controlled manner over healing time.

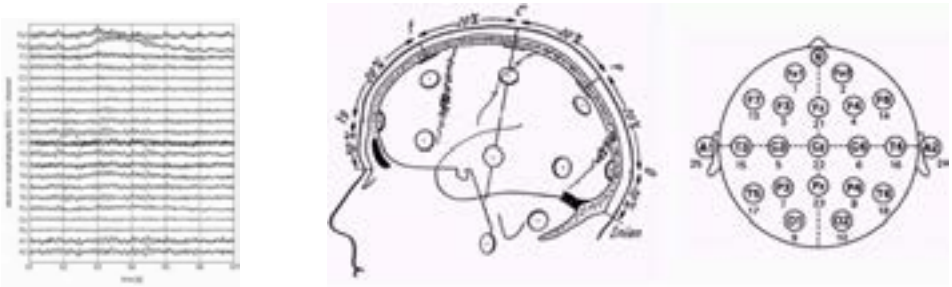
HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE -- CA0 Code CR108

Brain Wave Pattern Analysis inspires CIT Mechanical Student to National Maintenance and Asset Management Award 2006



Cork Institute of Technology Master in Mechanical Engineering Degree student Martin O'Riordan has just been announced as the outright winner of the 2006 National MEETA Student Project Award for students undertaking a project in a maintenance, reliability or asset management area at Honours Degree/ Masters Degree level.

Martin's project concerned " Multiple Vibration Source Separation " in conjunction with Cara Partners under the supervision of Dr. Michael J. O'Mahony



Solution Inspiration: Brain Wave Pattern (EEG) Analysis

Martin has just commenced work within the Johnson & Johnson (J&J) family of companies on a unique global operations leadership development (GOLD) programme.

In this prestigious GOLD programme, Martin will be rotated through three work assignments, each lasting eight months, within the J&J family of companies in Europe. Currently, he is working for the Global Supply Chain in DePuy, based in Cork. DePuy are world leaders in the manufacture of orthopaedic implants. After this rotation, Martin will spend an assignment in an engineering role in the pharmaceutical industry in mainland Europe and an operational role in the medical devices and diagnostics industry in the United Kingdom

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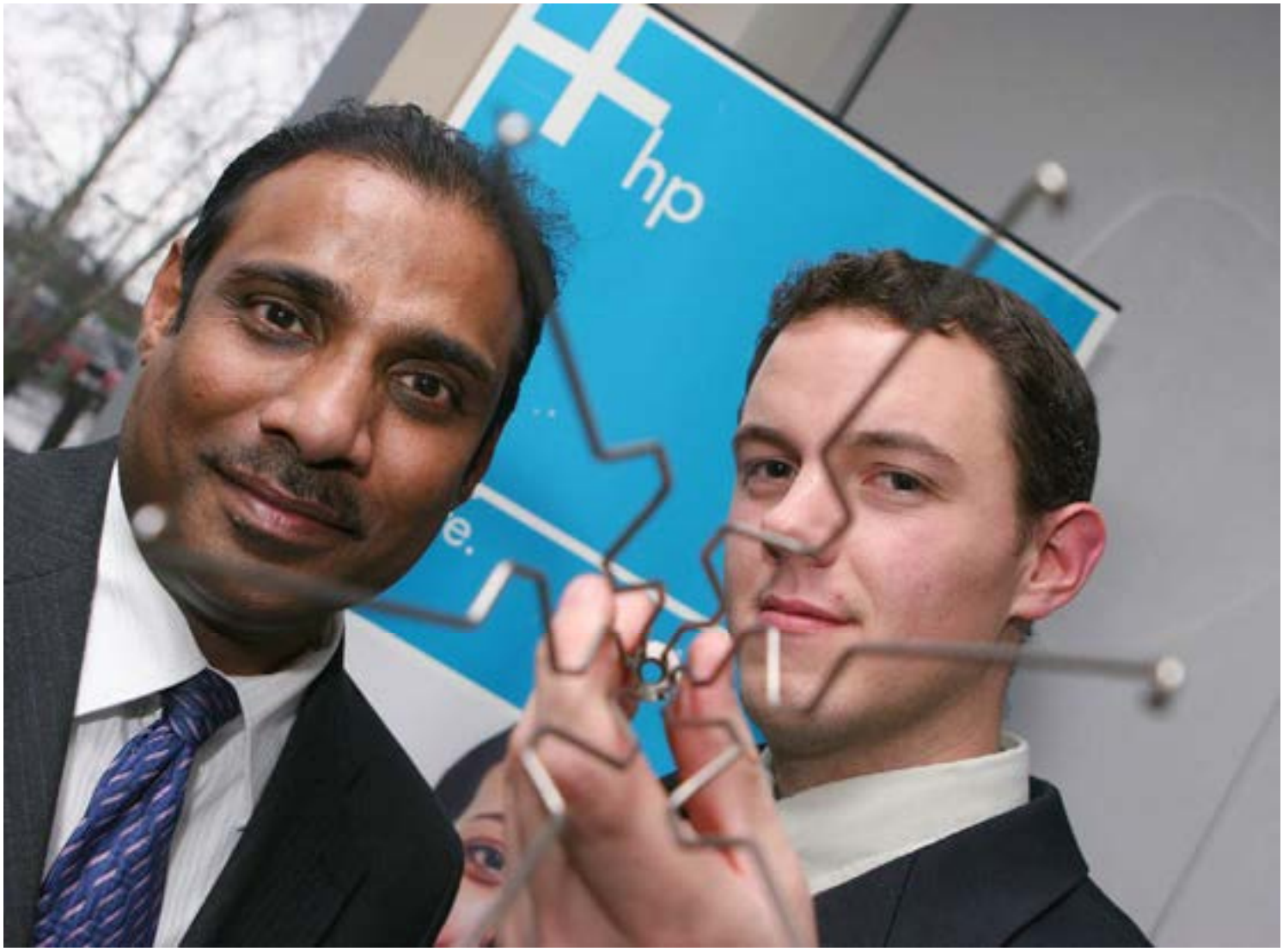
2005 Awards

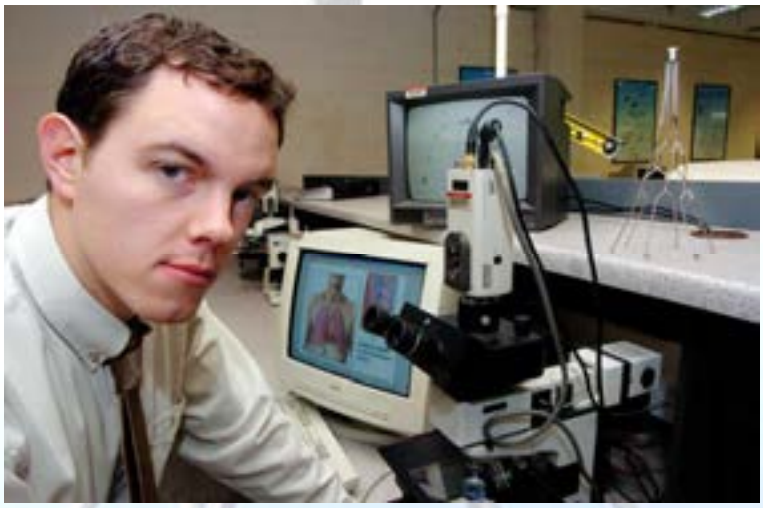


HONOURS LEVEL 8

MECHANICAL ENGINEERING DEGREE

CA0 Code CR108

PULMONARY EMBOLISM
BLOOD CLOT FILTER DESIGN PROJECT
WINS HP INVENT €7,500 AWARD 2005
AND INTERNATIONAL MEDICAL ENGINEERING AWARD
FOR CIT MECHANICAL DEGREE STUDENT



John Geary's highly acclaimed Final Year Mechanical Engineering Project on

"Vena Cava Blood Clot Prototype Filter Hook
Design Analysis and Testing "

carried out in conjunction with Boston Scientific Cork, was awarded the

Hewlett Packard INVENT €7,500 Award 2005 for
Best Honours Degree Project in
Science, I.T. and Engineering in Ireland

and the

Institution of Mechanical Engineers
International Best Medical Engineering Award 2005

John Geary graduated with a
First Class Honours Mechanical Engineering Degree
at the Cork Institute of Technology in October 2004.

Since graduation, John has been working with
Queensland University of Technology in Australia
on the related topic of the development of
Titanium Scaffolds for Bone Tissue Growth.

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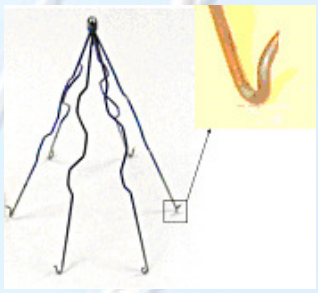
Vena Cava Blood Clot Filter Hook Design, Analysis and Testing

John Geary

The prototype medical device consists of a six legged titanium filter structure, which is inserted, utilising minimally invasive surgery techniques, into the Vena Cava main vein, connecting the heart to the lungs. The device works by filtering the blood passing through the vein and capturing any travelling blood clots (emboli), preventing a pulmonary embolism.

At the end of each leg of the filter, a specially shaped hook is formed. These hooks are critical to the efficient performance of the medical device. The hooks firmly attach the filter to the vein wall and stabilise the orientation of the device relative to the blood flow, while preventing excessive penetration and hence damage to the Vena Cava wall during operation.

This project involves optimisation of the hooks formation for a prototype filter design. The new design concentrates on reducing the overall dimensions of the filter hooks to reduce the size of the filter deployment cartridge required, hence reducing patient stress during insertion.

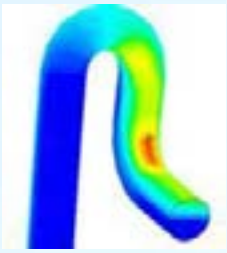


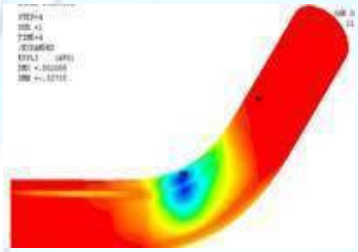
Vena cava filter

Scale of hook

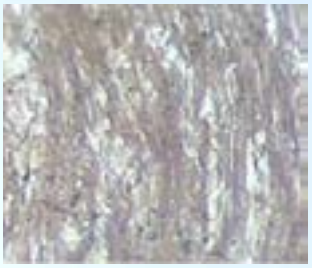
Material property variation and structure behaviour during the forming processes are investigated. Finite Element Analysis and Experimental Testing/Validation has been undertaken to yield an improved formed hook design, enabling efficient manufacture and increased structural strength during operation. This outcome has been achieved through manipulation of the hook microstructure and use of optimised forming operations

The undertaken research work has discovered and introduced knowledge and technologies, which will aid more stable filter production, shorter Lead In Time for new products and development of superior filters including Miniaturization for Minimal Invasive Surgery.
The major project benefits are to reduce patient Trauma and Stress and to optimise a Life Saving Device.





3D Elastic-Plastic FE Analysis by J.Geary



Microstructure Analysis by J.Geary

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2005 International Sports Engineering Award for Brendan's Hurling Helmet Testing Project

CIT Mechanical Engineering Degree Student Brendan Quirke has won the 2005 ISEA Top International Sports Engineering Award for his Hurling Helmet Testing Project.

The International Sports Engineering Association Competition to determine Best International Sports Engineering Degree Project 2004/5 took place in late June 2005 at Birdcage Walk, London.

***First Place** was achieved by Mr. Brendan Quirke, Cork Institute of Technology, for his project on*

" Hurling Helmet Impact Testing "

carried out in conjunction with MycroSports Ltd. Of Ballincollig,

The Runner-up Shortlisted Sports Engineering Finalists were:

Pavel Sztefek , Queen Mary, University of London
"Finite Element Analysis of Adaptable Bobsleigh Structure for British Olympics Team"

Eleanor van der Heijden - University of Bath.

"Downhill Soapbox Racer"

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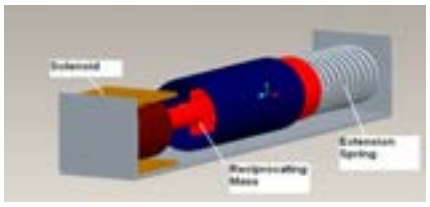
FIRST PLACED
ENGINEERING DEGREE PROJECT IN IRELAND 2005

Colm McLaughlin, a Final Year Mechanical Engineering Degree student at Cork Institute of Technology, has achieved First Place in both the Siemens IEI 2005 Innovative Engineer of the Year Competition and the Institution of Mechanical Engineers 2005 National "Speak Out for Engineering"Competition Finals

Colm's Enclosure Design



Colm's Recoil Device Design

The title of Colm's Award Winning project Is
" Infrared based Engagement System for Wargaming & Military Training "

HONOURS LEVEL 8

MECHANICAL ENGINEERING DEGREE

CA0 Code CR108

2004 Awards

Queen's Silver Jubilee Award
for Best Engineering Degree Project
in Ireland and Britain 2004

CIT Mechanical Engineering Degree Student Niamh Thompson has won the 2004 Top National and International Engineering Awards for her Total Hip Replacement Project.

The Queens Silver Jubilee Institution of Mechanical Engineers Competition to determine best Engineering Degree Project in Ireland and Britain 2003/2004 took place on Thursday, 4th March, 2004, at Birdcage Walk, London.

***First Place** was achieved by Ms. Niamh Thompson, Cork Institute of Technology, for her project on*

"Influence Of Surgical Solutions on the Fatigue *Properties of Total Hip Replacement Bone Cement"*

carried out in conjunction with Orthopaedic Surgeons at Cork University Hospital and St. Mary's Orthopaedic Hospital, Cork.

Niamh had previously won the National award in Dublin in January 2004.

HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE

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Total Hip Replacement Project wins 2004 Siemens IEI National Award for CIT Mechanical Engineering Degree Student Niamh Thompson

The Finals of the Siemens IEI National Competition for best Engineering Degree Project in Ireland took place on Monday 21st June, 2004, in the Lecture Theatre at the Institution of Engineers of Ireland's Headquarters, Clyde Road, Ballsbridge, Dublin 4.

Finalists from all disciplines of Engineering, representing Trinity College Dublin, Dublin Institute of Technology, University of Limerick, National University of Ireland - Galway, Institute of Technology Tallaght, University College Dublin and Cork Institute of Technology, presented to an expert panel of judges.

2004 Siemens IEI National Award for CIT Mechanical Engineering Degree Student Niamh Thompson

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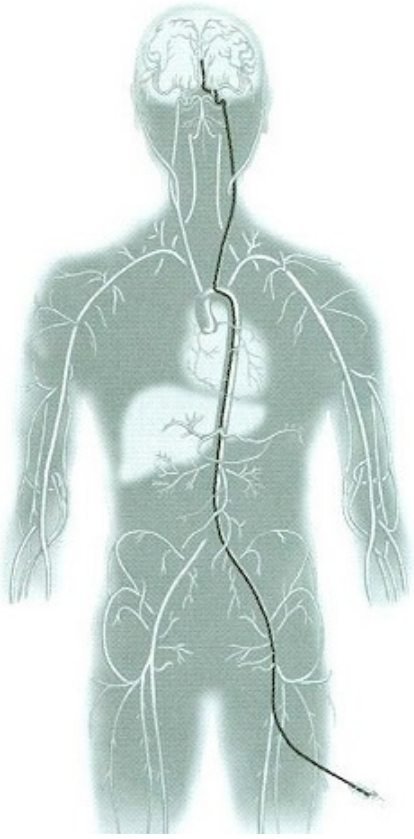
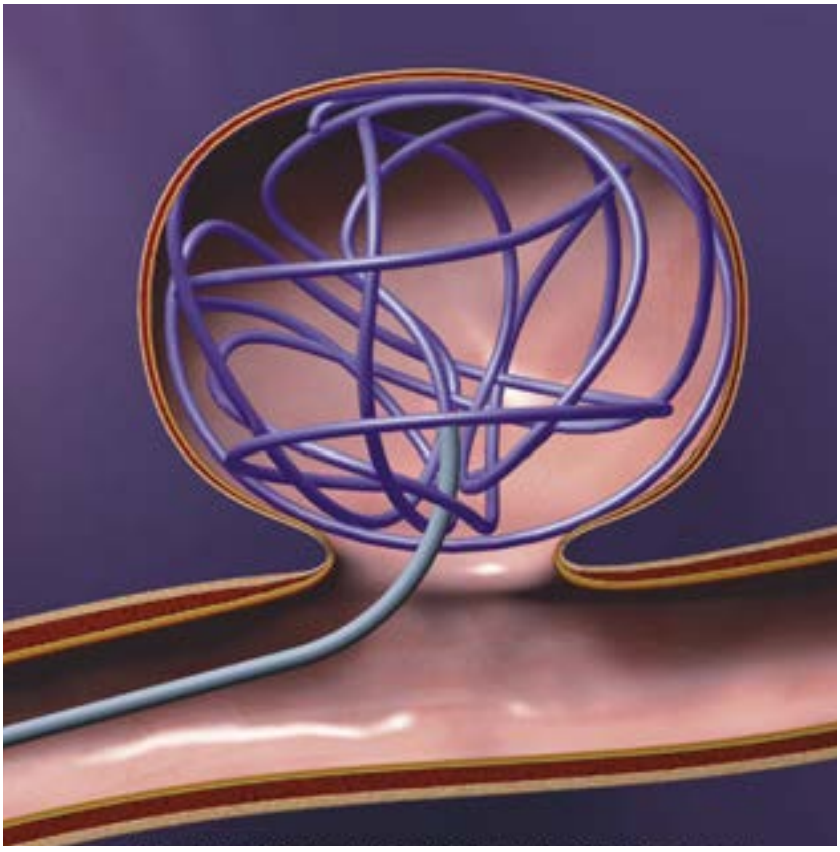
2003 Awards





BRAIN ANEURYSM TREATMENT

Charles Daly's highly acclaimed Final Year Mechanical Engineering Project on

"Precision Inspection, using Diffraction techniques, of Platinum Coils used in Minimally Invasive Surgery for the Treatment of Brain Aneurysms"

HONOURS LEVEL 8 MECHANICAL ENGINEERING DEGREE -- CA0 Code CR108

CIT YOUNG ENGINEER OF THE YEAR WINS NATIONAL AND INTERNATIONAL AWARDS FOR BRAIN ANEURYSM TREATMENT PROJECT

Charles Daly's highly acclaimed Final Year Mechanical Engineering Project on

"Precision Inspection, using Diffraction techniques, of Platinum Coils used in Minimally Invasive Surgery for the Treatment of Brain Aneurysms"

carried out in conjunction with Boston Scientific Cork, was awarded

(1) the Siemens Institution of Engineers of Ireland Prize for Best Undergraduate Engineering Degree Project in Ireland

(2) the Society of Manufacturing Engineers Prize for Best Published and Presented Paper (of 56 International Undergraduate, Postgraduate and PhD Entries) at the 20th International Manufacturing Conference. This award is an unprecedented achievement for an undergraduate student.

Charles' paper was published in the Institution of Engineers of Ireland Journal, the Irish Medical Times and has been the subject of many press articles.

Charles Daly graduated with a First Class Honours Mechanical Engineering Degree at the Cork Institute of Technology .

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CIT Mechanical Engineering

CAO Code CR108

CIT Biomedical Engineering

CAO Code CR520

CIT Engineering Innovation and Entrepreneurship

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Design, Innovation and Ethical Engineering

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