

Education

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Engineering Design Eureka!



Engineering Innovation and Entrepreneurship

at Cork Institute of Technology

SPEAK Ireland ● Understanding Electricity ● National Learning Network
Young Europeans learning about Europe ● Asian Studies at UCC ● Reviews

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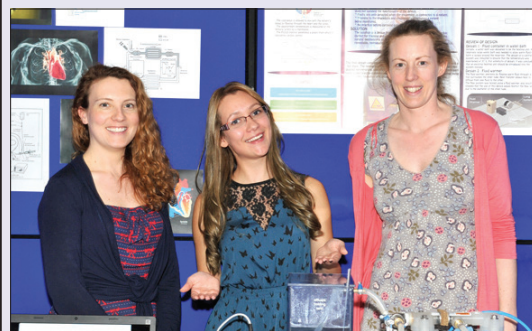
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Cover story: Engineering Design - Eureka!

CORK INSTITUTE OF TECHNOLOGY



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.

Pages ?????

Engineering Design Eureka!

Engineering Innovation and Entrepreneurship at Cork Institute of Technology

THE remarkable sustained global engineering design, innovation and entrepreneurship achievements of the students of Cork Institute of Technology is founded on a continuous and rigorous design core to the engineering courses at the Institute.

This success has been underlined by the major international and national achievements of CIT student design projects during 2014 including Innovact 2014 Reims France European Campus Student Innovator of the Year 2014 First Place and Outright Winner, International Medical Engineering Finals Westminster London 2014 JRI Prize for Best Undergraduate Medical Engineering Project Exhibition and Poster Presentation First Place and Outright Winner, Engineers Ireland Innovative Student Engineer of the Year 2014 Level 8 sponsored by Siemens National Award First Place and Outright Winner, Enterprise Ireland Institution of Mechanical Engineers Speak Out for Engineering National Award Dublin 2014 First Place, CADFEM Ireland and Ansys Users Conference EI HQ Dublin Best Presentation Paper (2014) First Place and MEETA - Asset Managers and Maintenance Association National Student Award 2014 Dublin.

CIT engineering degrees courses are centered on a strong hands-on design core in all years. Students undertake design projects from literature research, analysis, experimentation and validation right up to prototype production and commercial evaluation/business plan development. Many of the International and National Adjudication panels have averred to the integrated structure of the CIT student projects as a critical element in their success on the global stage.

A strong innovation and entrepreneurship ethos is encouraged within the CIT student body and links have been developed with students from other disciplines including ground-breaking multi-discipline team projects in liaison with Marketing, Accounting and Information Systems students. From student concept, current issues and needs are assessed and

addressed through applied engineering design solutions under the supervision of a young and vibrant staff via oral and written presentations and round-table student/staff fora.

A continuous design core, a strong innovation ethos, product development from student concept to prototype manufacture and optimisation, multi-discipline teamwork, business plan development, communication and exhibition skill

enhancement and a unique engineering education model have all combined to create a critical mass leading to the remarkable International and National successes over a sustained period of the students of CIT's engineering degree courses.

The 2014 successes capstone a remarkable decade of sustained CIT achievement both nationally and internationally as detailed and described in the box below:

National Prize-Winners in Engineering Innovation, Design and Entrepreneurship Innovative Product Development Laboratories including:

- 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)
- Five Enterprise Ireland I.Mech.E Speak Out for Engineering Awards (2014, 2013, 2007, 2006, 2004)
- Five MEETA Asset Management and Maintenance National Awards (2014, 2013(x2), 2011, 2006)
- One CADFEM Ireland and Ansys Users Conference EI HQ Dublin Best Presentation Paper (2014)
- Two Enterprise Ireland / Invest Northern Ireland Young Entrepreneur of the Year First Place Award (2013, 2007)
- Four Cruickshank Most Technologically Innovative Project First Place Award (2013, 2009, 2008, 2007)
- Seven Enterprise Ireland / Invest Northern Ireland National Awards of Merit (2013, 2012, 2010, 2009, 2008, 2007)
- 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)
- Two Enterprise Ireland / Invest Northern Ireland Academic Innovation Awards (2012, 2009)
- One Engineers Ireland Excellence Awards - Inaugural "Best in Class" Engineering Education Award (2011)
- 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 of the Year 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 and Entrepreneurship Innovative Product Development Laboratories including:

- 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)
- Eight 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 (2014, 2011, 2010, 2008, 2007, 2006, 2005)
- 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



European Student Innovation Awards Innovact 2014 Reims France

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



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.



Pic: Guillaume Gellert



Pic: David Keane

First Place European Campus Student Laureate of Innovation 2014

John Roberts, PyraAid™, "Wheelchair Enablement Device"
Cork Institute of Technology, Ireland



Pic: Guillaume Gellert



Pic: Guillaume Gellert

Engineers Ireland Innovative Student Engineer of the Year 2014

SIEMENS

sponsored by Siemens



Pic: Naoise Culhane

Engineers Ireland Innovative Student Engineer of the Year 2014 James King with Shirley McDonald El and Aiden Cawley Siemens



Pic: 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”

THE self-conceived product Medical Transportation Pod - Medi-Pod™ - is an aerodynamic self-cooling pod for transporting medical supplies via aerial drone or personal transportation methods.

Between the years of 2001-2011, there have been 4,596 combat related fatalities in Iraq and Afghanistan. A study (1) carried out in 2012, stated that 26.3% of these combat deaths were potentially survivable - it was suggested that if the ideal conditions, i.e. if the equipment and expertise were available, these troops would have had a stronger chance of survival and the percentage of combat deaths could have been significantly lowered.

The developing Medi-Pod™ device is designed to be attachable to aerial drones - allowing fast and safe trans-

portation of critical medical supplies between medical facilities and over large distances to remote, inaccessible and war torn areas without danger to personnel.

Drone compatibility requirements determined include operation, efficiency, safety, robust



Lightweight, Durable, Drone Compatible Medical Transportation Device

external shell, aerodynamic shape, temperature stabilisation at extreme temperature ranges, ease of attachment, low material coefficient of

friction, versatility and drone attachment universality.

The design, testing and build of the self-conceived product Medical Transportation Pod - Medi-Pod™ - prototype has been comprehensively undertaken yielding the finished functional conforming prototype. Validation has been achieved by both computer simulations and physical model testing.

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

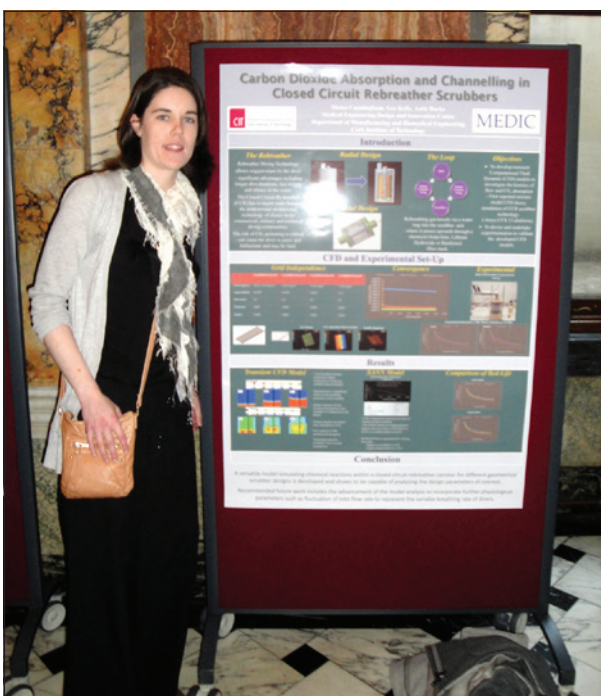
"Medication Capsule Thermoforming Process Improvement and Electrostatic Analysis"

Runner Up Finalists: David Williams, Cardiff University
"Exploring Knee Loading Using Magnetic Resonance Imaging"
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.



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





MEETA - Asset Managers Association



National Student Awards 2014

MEETA National Student Award 2014



Damien McAuliffe. Mechanical Engineering CIT

“Incinerator Scrubber System Analysis and Optimisation in conjunction with GlaxoSmithKline”

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.

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”

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: www.cit.ie/ equaliser

Brian is to graduate on 20th October 2014 at Cork Institute of Technology with a Bachelor of



■ Derek Sweeney of CadFem Ireland Presents Best Paper Award to Brian Hand

Engineering in Mechanical Engineering Level 8 First Class Honours Degree. Brian has also been awarded a CIT Rísam PhD Scholarship



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: 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 www.cit.ie/medipod



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"

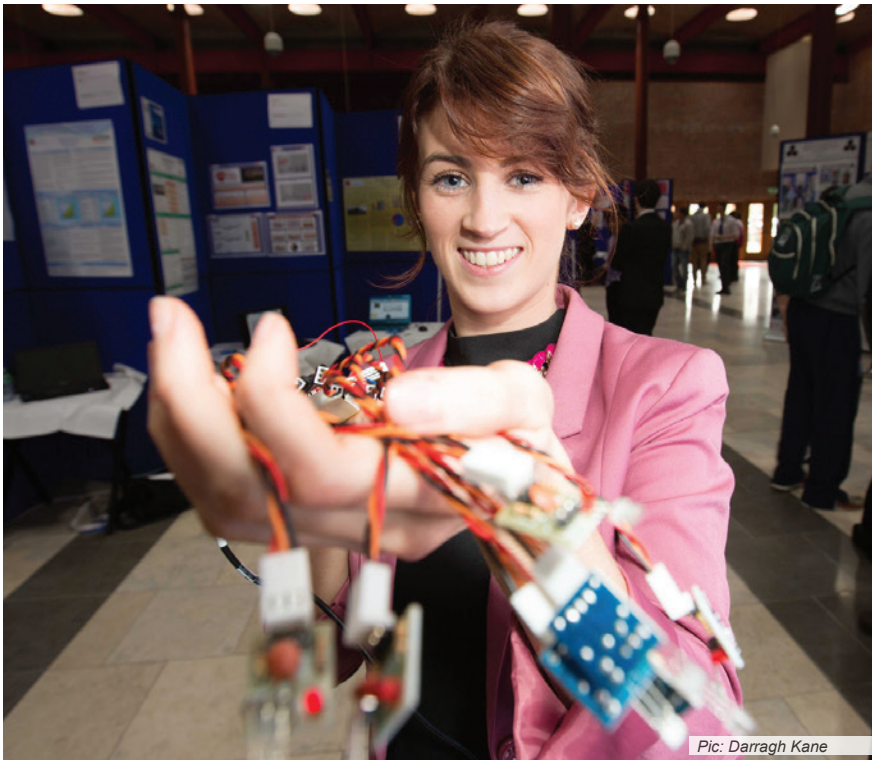
Congratulations also to two other CIT graduates who were also nominated for excellence awards -

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.



Sounds good at CIT



Pic: Darragh Kane



Pic: Clare Keogh



Pic: Darragh Kane

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.

CIT Student Nicola O'Mahony (top picture) 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.

"MUSICABILITY"

CIT Biomedical Engineering Student James Fogarty (middle picture) developed an assistive music technology system "Musicability" to help facilitate music making for the SoundOUT programme in Cork City. With James and the developed instrument is Jenny Garde from the SoundOUT programme.

James demonstrates his final year enablement project to Rebecca Casey (bottom picture) at the Cork Mechanical, Manufacturing and Biomedical Engineering Exhibition.

James' 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.

James is to commence a graduate internship in Abbott Vascular in Clonmel, Tipperary shortly and he is also planning to continue developing the Musicability system, which can be adapted for other users.



Pic: Naoise Culhane

■ Engineers Ireland Innovative Student Engineer of the Year 2014 Level 7 Finalists CIT Mechanical Engineering 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.

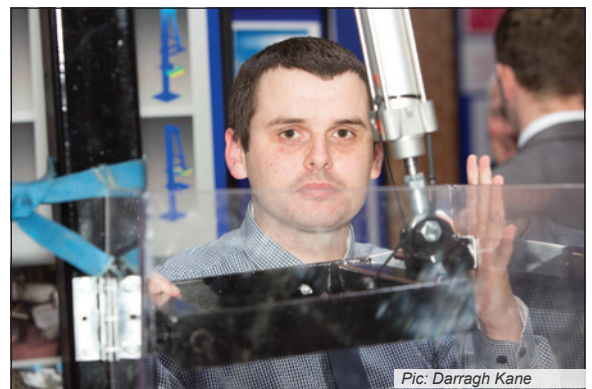


Pic: Darragh Kane

■ The Design and Development of a Lineout Training Device carried in conjunction with Munster Rugby whose Elite Training Facility is located on the CIT Campus.

■ Motor Rally Car Engine Cylinder Measurement and Performance Optimisation by CIT Mechanical Engineering Students Dan O’Brien, Sean Moynihan and Maurice McSweeney.

■ The Design Development and Testing of a Bovine Jaw Breaking Device by CIT Mechanical Engineering Student Jeremiah Brennan.



Pic: Darragh Kane