



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



CIT Award Winning Teams in Quad NUI Galway with Dr. Breda Kenny, Head, Hincks Centre for Entrepreneurship Excellence and Senior Lecturer Sean F. O'Leary CIT

From over 400 Entries and following three gruelling days at the Enterprise Ireland / Invest Northern Ireland Think Outside the Box Student Entrepreneur Finals in Galway, Three Major Awards Winners were announced for Cork Institute of Technology by Minister John Perry:

**Enterprise Ireland / Invest Northern Ireland
First Place and Student Entrepreneur of the Year 2013 - €10,000**

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

**Enterprise Ireland / Invest Northern Ireland
Think Outside the Box Award of Merit 2013 - €1,500**

Enterprise Ireland / Invest Northern Ireland 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

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 McDonagh, James Cahill**

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.



■ Gillian Slattery Enterprise Ireland with Mastech Think Outside The Box Entrepreneurs of the Year 2013



■ Mastech with Minister John Perry, Mayor of Galway Terry O'Flaherty and Mr. Richard Murphy, Enterprise Ireland



■ Minister John Perry and Mastech



2013 Think Outside the Box Finals Galway

Cruickshank Intellectual Property Attorneys

Most Technologically Innovative Product 2013 - €5,000



■ Hush Hush Hairdryers with Donal O'Connor, Cruickshank's and Barry Egan, Enterprise Ireland

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

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



■ Hush Hush Hairdryers with Minister John Perry, Mayor of Galway Terry O'Flaherty and Mr. Richard Murphy, Enterprise Ireland



■ Hush Hush Hairdryers with Minister John Perry

2013 Think Outside the Box Finals Galway

National Award of Merit 2013 - €1,500



■ Robobox with Frankie McCourt Invest Northern Ireland

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**

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 FitnessTM is an Irish based company - the brainchild of a multidisciplinary student team - developing the RoboboxTM product - a novel boxing pad trainer.

Not limited to just boxing, Robobox



TM also provides a great cardio workout. Robobox TM, 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 TM an all-encompassing product - suitable for men and women of different sports, backgrounds and fitness levels.



■ Robobox with Minister John Perry

Business and engineering in harmony

SIGNIFICANTLY, the three major award winning teams in Galway all came from the CIT Innovative Product Development Laboratories (IPD) and New Product Development (NPD) parallel structured multidisciplinary engineering and business modules.

Business and engineering students are brought together through an action learning project in which multidisciplinary teams collaborate in conception, research, design, development, experimentation, validation, prototype production, proof of concept of an innovative product, estimate its commercial potential and plan for its exploitation.

Multi-discipline student teams are formed to devise and progress self-initiated product innovation and development projects, assessing and implementing safety, sustainability and engineering ethical considerations as primary driving design imperatives.

Employing educational and research tools, methodologies and skills acquired, developed and honed over many years' experience of board face lecturing and industrial cooperative applied research, the laboratory and workshop based modules centre on the practical development and inculcation of engineering systematic product research, design, development and production skills, experimental and modelling techniques, commercial investigation/assessment, marketing, communication and interdisciplinary teamwork management.

Environmental impact, lifecycle, safety and hazard analysis techniques are introduced and implemented in the innovative product design, production, validation, optimisation, utilisation and disposal.

Product development learning outcomes are achieved through the application of innovative teaching techniques - hands-on student exposure to state of the art product development technologies and methodologies, formal laboratories and workshops, self-initiated and self-directed learning, formal report writing, informal multi-disciplinary staff/ student round table fora, progressive presentation development, brain storming, team and meeting management.

The implementation of innovative product development, market research and management in the business/work environment including intellectual property right protection and demonstration of collaboration and conflict

[Cont. >>>](#)



■ WSATM - Weightlifting Safety Device
Multidisciplinary Innovative Product Development Team. Niall Keohane, Danny Stone, Michael Murphy, Eugene O' Connor, Philip Stranger, David O'Donovan
CIT 2013



■ SolaSolTM - Novel Headphones Design Multidisciplinary Innovative Product Development Team. Aisling O'Shea, Operations Manager, Sean McArthur, Accountant and Financial Advisor, Sean Geary, Production Manager, Sam O'Driscoll, Safety Officer and Quality Director, Andre Falzon, Research Manager and Electronics Director, Aidan Davies, Head of Design, Mark Ryan, Managing Director, Sales and Marketing Director - CIT 2013



■ R AidTM - Rugby Training Aid Multidisciplinary Innovative Product Development Team. Natasha Curry - Marketing, Management, Johnathan O'Connell - Design, Testing, Niall Stenning - Project Management, Mark Carroll - Design, Research, Aidan Barrett - Design, CAD, Shane Crowley - Design, Research, David Kinnear - Design, Manufacturing - CIT 2013.

management, team communication and team leadership and decision making skills is undertaken.

The student learning process is enhanced by academic, industrial, peer and public review through formal demonstration and exhibition of the developing solutions. Industrial professional expertise is harnessed through the incorporation of formal consultations and day/ evening lectures by leaders of industry and research, project managers, entrepreneurs, patent lawyers, marketing analysts, innovation centre managers and international / national innovation award winners.

OTHER AWARDS

Further major national awards achieved by CIT

Engineering Students in 2013 also include:

- Engineers Ireland Innovative Student Engineer of the Year 2013 sponsored by Siemens. First Place Patrick Byrnes, Mechanical Engineering, Cork Institute of Technology
- Speak Out for Engineering 2013 First Place National Award - John Roberts, Mechanical Engineering, Cork Institute of Technology
- MEETA Asset Managers Association National Student Overall Award 2013 sponsored by ESS First Place - Shane Fogarty, Mechanical Engineering, Cork Institute of Technology



■ Siobhan Hickey, Bachelor of Engineering First Class Honours Biomedical Engineering Graduate CIT, whose research, design, development and testing capstone project on boccia paralympics ball characterisation and manipulation was carried out in conjunction with Jack Cronin, Paralympic Boccia Gold Medalist.

Engineers Ireland Innovative Student Engineer of the Year 2013

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"

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.

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.

sponsored by **SIEMENS**

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.

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



■ Margie McCarthy, Membership Director, Engineers Ireland and Liam Mulligan, Siemens Sustainability Manager with Patrick Byrnes, Engineers Ireland Student Engineer of the Year 2013

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.

Speak Out for Engineering 2013

First Place National Award

Institution of
**MECHANICAL
ENGINEERS**

Republic of Ireland
Young Members

**ENGINEERS
IRELAND**
young engineers

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 through 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. 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.

Advanced analytical, CAD and experimental techniques are utilised. State of the art material selection and manufacturing methodologies have been employed to achieve

material optimisation. Three iteratively developed prototypes of Pyra-Aid are manufactured and laboratory/field tested. Design for safety is central and includes a novel pendulum design anti-tipping device. Operational efficiency testing has led to further innovations including quick application universal prototype attachment / detachment mechanism, step structure support system (wheel rotation restriction) and low cost functional castor alignment system.

A significant mass reduction of 80% is achieved for the child friendly Mark 3 prototype. Sustainability is centrally addressed - long life, recyclable/optimum use of existing materials, retrofit, wheelchair upgrade transferable, no external power. PyraAid Mark 3 optimised alloy material is high strength, lightweight, good machinability, corrosion free and bacterial growth retardant - very important for hospital environments. Field performance step/kerb mount tests of mark 1/2/3 prototypes are very promising. Castor alignment device optimisation shows significant potential for operational improvement. Future work includes further extensive testing with a broader range of subjects. Market research indicates a worldwide market opportunity for the low cost, retrofit, momentum powered, universal, kerb mounting wheelchair enablement device - Pyra-Aid.



John Roberts Speak Out National Winner with Robert Simpson, Chairman Institution of Mechanical Engineers



MEETA - Asset Managers Association

National Student Awards 2013



MEETA Overall Student Award First Place 2013

ELECTROSTATIC analysis of capsule flow through a thermoforming machine in a pharmaceutical environment was undertaken and theoretical basis of electrostatic generation in an industrial setting formulated.

Validation was achieved through the development and implementation of a standardised electrostatic measurement procedure, leading to identification and quantification of major areas of electrostatic generation on the thermoformer.

A systematic design approach was devised and applied to develop a novel capsule feeding tube section with particular design focus on electrostatic generation reduction. Product quality assurance and regulatory compliance were central to the devised and undertaken validation testing.

The root cause of electrostatic generation was identified and eliminated - resulting in an increase in efficiency of 3%. The redesigned process resulted in the thermoformer operating at a four year high of

92.5% efficiency - representing a saving of €51,000 per year for the company and a significant reduction in waste and quality issues.



Winner: **Shane Fogarty** Mechanical Engineering CIT
"Process Improvement and Electrostatic Analysis of Thermoforming Machine"



Shane Fogarty MEETA Awards Winner 2013 with Jerry Larkin of GE Healthcare and MEETA and Ray O'Neill of ESS and MEETA