IMaR
Technology Gateway

INTELLIGENT MECHATRONICS AND RFID

Presidential Visit to IT Tralee

President of Ireland, Micheal D. Higgins, visited IT Tralee on Tuesday, February 24th, the world's first UNESCO chair in physical education, sports, recreation and fitness.

President Michael D. Higgins visits IT Tralee

A festival atmosphere greeted the President, with performers at every turn showing off the talent of the area. President Higgins chatted with the many different organisations, businesses, groups and charities who had assembled for the visit that lasted just over an hour. The team at IMaR were delighted to take this opportunity to meet with the President.

President Higgins, commended the college for their efforts in the onward protection of rights for people with disabilities. "The institute will continue to work on the very difficult interface between ignorance and understanding, between tolerance and intolerance, between prejudice and justice and between exclusion and inclusion", President Higgins said.
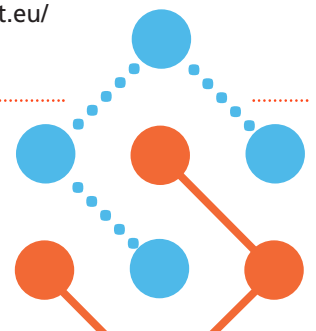
"The purpose of the chair is to advocate for policy change, conduct research, and deliver education and training to facilitate the creation of a more inclusive society, with physical education, sport, recreation and fitness acting as conduits towards the attainment of social justice," outlined the President.

IMaR and Consortium Members Secure European Funded Project 'The ProPAT'

The processing industries require a high degree of automation, monitoring, and advanced simulation and control for their often complex manufacturing processes and operations. Increased globalisation and competition are drivers for process analytical technologies (PAT) that enable seamless process control, greater flexibility and cost efficiency.

The ProPAT consortium is made up of 16 partners from 8 European countries. ProPAT aims to develop novel sensors and analysers for providing measurements on composition, particle size and local bulk properties, as well as more traditional but smart sensors for measuring key process parameters. These novel sensors will measure properties of the process streams accurately and in real-time and will integrate into a versatile global control platform for data acquisition, data processing and mining. The platform will also provide self-learning and predictive capabilities aimed for dramatically reducing costs derived from even slight deviations from the optimum process.

IMARs role in the project is to develop a suite of affordable smart sensors and integrate them into hardware (sampling chambers). These prototypes will form an early identification of system proving invaluable for both strategic and exception management for the ProPAT project. The sensors will be used within ProPAT's control platform which will implement process modelling and control, chemometric analysis and data fusion strategies. The ProPAT project results will represent a major step forward towards more efficient, reliable and sustainable industrial operation. http://pro-pat.eu/

INSTITUTE OF TECHNOLOGY
TRALEE
INSTITIÚID TEICNEOLAÍOCHTA TRÁ LÍ

Dr. Joseph Walsh presents at Engineers Ireland Conference

Dr. Joseph Walsh, Head of School of STEM, Institute of Technology, Tralee and Research Director at IMaR highlighted the opportunities in innovation, research and education in Kerry from an engineer's perspective at the recent Engineers Ireland Conference held on May 14th and 15th in The Malton, Killarney, Co. Kerry. Beginning his presentation with a powerful statement:

'Kerryman Richard Cantillon, born in the 17th century, was the first to coin the word 'entrepreneur'; he was one of the most important bankers, speculators and entrepreneurs of his age. To this day Kerry's entrepreneurial spirit has reigned. Kerry people are leading multi-national companies and introducing ground breaking technology to the world.'

Dr. Joseph Walsh, Research Director at IMaR, Head of School of STEM, IT Tralee

Dr. Walsh continued by recognising this entrepreneurial spirit within indigenous firms such as the Kerry Group, Dairymaster, FEXCO, Spectra Group and Aspen Grove Solutions who have blossomed into major international companies while maintaining their headquarters in Kerry. Joseph continued to highlight Innovation and Entrepreneurship in Kerry stating that two of the national Enterprise Ireland Technology Gateways are located at the IT Tralee, while also remarking that Kerry has the highest level of National Success per county at the Ernst & Young Awards with overall winner in 2012 - Dr. Edmond Harty, Industrial Partner of IMaR.
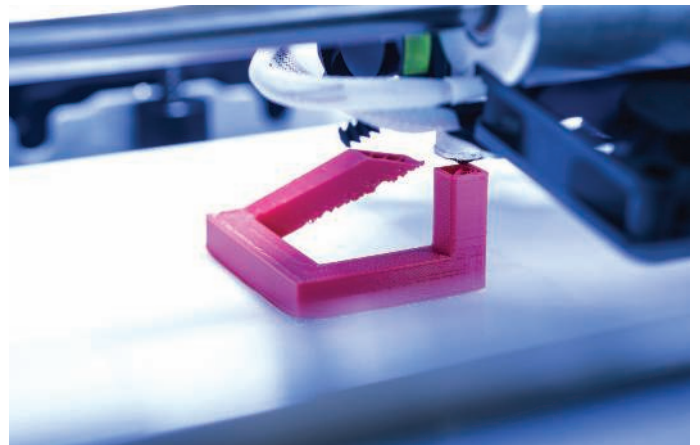
Dairymaster also presented information on the importance of education at IT Tralee and specific to his own sector, The School of STEM while also detailing activity within the Kerry Technology Park, with Kerry Partners and the availability of Enterprise Supports.

Dr. Walsh presented IMaR as Irelands Leading Intelligent Mechatronics and RFID Industrial Partner listing IMaR - Profile of Work/Current hot topics namely App development, Back end Supported development, Product / process optimisation, sensor based engineering, manufacturing process automation, precision instrumentation, automated end-of-line and life-cycle testing / validation and wireless communication systems. Dr. Walsh closed his presentation by stating that our economy is recovering and that we have a need for more SMEs to become 'M' and 'L', more SMEs to engage in both innovation and R&D, and we need to continue to attract FDI - international tax provides challenges & opportunities.

http://engineersirelandconference.ie/wp-content/uploads/2015/05/joseph-walsh-2015-conference-presentation.pdf

3D Printing at IMaR

IMaR has just commissioned its new 3DSystems ProJet 260Pro full colour powder-based 3D printer. With 0.1mm print resolution, 20mm/hr. vertical print speed and recycling of waste material, this unit offers high quality and economic proof-of-concept and prototyping opportunities to our research partners. Contact Dr. Daniel Riordan on 066 7144216 or email daniel.riordan@staff.ittralee.ie for a demo or to discuss any of your 3D prototyping needs.

IMaR Team lead judging panel at SciFest International Science and Technology Regional Competition

SciFest is a one day international science and technology competition for second level students who showcase original projects. IT Tralee played host to one of fifteen regional finals on Thursday, May 7th. Students were judged on their entries for a variety of awards to be won. The overall winner is then entered into the national competition, where the winner of that will get a chance to represent Ireland abroad.

In total there were 76 entries from around the south-west region from 180 students taking part nationally, including 16 projects from Tralee schools, Mercy Mounthawk, CBS The Green and Gaelcholáiste Chiarraí.

Tralee students were among the winners at the IT Tralee North Campus for the SciFest science competition, including Gaelcholáiste Chiarraí, students, Lorraine De Nais, Ursula Ní Mhochóir and Janine Ní Chonchúir won the 'Sustainable Energy Award'. They invented a system that would both generate electricity and stop coastal erosion.

For Mercy Mounthawk, John McCrohan, Robin Porter, picked up the 'Health Awareness Award' for their project that investigated the levels of micro–organisms on everyday technological devices.

It's been continued success for student Timothy McGrath, Donal Brennan and team at Killorglin Community College who followed their Young Scientist award with further accolades. The mobile app Virtual Visual on which IMaR provided technical assistance received the Boston Scientific Medical Devices Award at this year's SciFest, the Sentinus Big Bang Award in Belfast, the app was featured on RTE and even saw Timothy jetting off to participate at the Liberty Global Appathon in Amsterdam.

This is a great example of how NFC can be used as an assisted technology and proves how these once niche technologies are becoming increasingly accessible.

Timothy McGrath, Donal Brennan and team at Killorglin Community College pictured with President Michael D. Higgins

IMaR attend Technology Gateway Network Industry Show Case at The Silversprings Hotel in Cork

Enterprise Ireland in partnership with the Institutes of Technology has established a nationwide network of 12 Technology Gateways (www.technologygateway.ie) which deliver technology solutions for Irish industry close to their market needs. The Gateways have a proven track record of working with industry and since 2008 along with their predecessors the AREs have completed over 1,200 innovation based industry projects with over 600 Irish based companies.

This showcase event took place on May 18th, and was an opportunity for companies to network with the 12 Technology Gateways and discover how the Technology Gateways can help companies on its innovation journey. Technical demonstrations from each Gateway as well as testimonials from industrial partners on how their collaborative industry projects with the Gateways were presented on the day. Enterprise Ireland staff provided information to companies on Innovation Support to assist in the development of a high impact collaborative project with the technology gateways.

On the day, our Industrial partner Damien Browne from Standard Access presented and launched a new product to market. In collaboration with IMaR, Damien created the hardware, software and lock combination that facilitates secure access to a building using a smartphone or a tablet, with an integrated client management system. This product has since been sold internationally. Damien was chosen as one of ten promising Irish tech start-up companies to assemble at The NY Digital Irish and VentureOut Ireland held in New York on November last. Here is the link to access the website: http://standardaccess.co

Samco, Winner of Farm Innovation Award 2015

The IMaR team attended the first ever Dairymaster Rural Innovation Awards Ceremony was held on 26th May 2015 at Ballygarry House Hotel, Tralee with over 240 attendees. The competition was open to innovators from every county in Ireland and finalists from the four provinces were in attendance. The excitement on the night was electric as businesses eagerly awaited the results of three category winners and the overall winner of the Dairymaster Rural Innovation Awards.

"Innovation is like baking a cake, once you get the right ingredients, it's what you do with those ingredients that makes the difference" said Dr Edmond Harty, CEO, Dairymaster. "These awards are all about the people, its people who innovate, whether by accident or breaking rules - they find a way. Agriculture touches the lives of everyone every day. In rural communities and businesses, innovation is the difference between thriving and dying. As a company we've always focused on innovation and people. That's why these awards had to be established and why Dairymaster is sponsoring them."

Dr. Edmond Harty (CEO Dairymaster) presents prizes to Samuel Shine, SAMCO. Included are family and team members.

Samco scoped up the award as 'Farm Innovations Winner 2015'. Samuel Shine developed a bag press as an innovative solution for storing moist feed for animals on farms. Now that milk quotas have been removed farmers will seek to produce more. This could solve a lot of challenges on dairy farms in relation to buffer feed storage.

Other awards on the night went to The Recovery Haven - Community Focused Innovations Winner and Overall Winner 2015, and Fresh Extend-Rural Business Innovations Winner 2015.

IMaR at the World's Leading Trade Fair for Industrial Technology

IMaR Technology Gateway in partnership with SEAM Technology Gateway and APT Technology Gateway representatives along with Dr. Mark Whelan from Enterprise Ireland and the ICMR attended the Hanover Messe Tradeshow 2015. The event took place on the 13th to the 17th of April with Integrated Industry - as its keynote theme.

Angela Merkel and Vladimir Putin at Hanover Messe

HANNOVER MESSE 2015 attracted more than 220,000 trade visitors, where some 6,500 companies from 70 countries showcased technologies for tomorrow's production plants and energy systems. Major emphasis was placed on the digitization of manufacturing as well as on human-machine collaboration, innovative subcontracting solutions and intelligent energy system.

Internet of Things (IoT) week 2015 was held in Lisbon. Master Student, Dan Dowling studying relationship classification in the Internet of Things was in attendances on behalf of IMaR. The three day summit was divided into research, industry and innovation days with speakers from major companies and research institutes. Sessions on interoperability, security, privacy, m2m, 5G, standardisation were among parties with different technical solutions. Outstanding issues that arose included managing data in real time, the difficulty of automation, the difficulty of IoT indexing and how to control and get business value from IoT data.

Policy keynotes addressed Europe's role in the future IoT. Europe was a leader in mobile technology but is not a leader in smart technology which is dominated by companies like Google Apple Samsung and Huawei in the USA and Asia. Much of the work being done by companies like IBM and Cisco is

superior in scale to European research, forecasting a more expansive IoT than Europe has prepared for. To address this the IoT summit hosted ten newly formed Alliance for IoT Innovation (AIOTI) working groups and a steering committee. The working groups were meetings of industry partners in areas identified by PwC as vital to Europe's role in the IoT. These included smart farming and food security, smart metering and water management, and smart living and healthy aging among others.

These large scale projects will be well funded by the EU. The AIOTI groups will identify barriers, players and champions, establishing activity chains, gather information and develop IoT ecosystems across industrial partners. The recruitment of new AIOTI stakeholders was identified as the most immediate concern to be addressed.

The International Joint Conference on Neural Networks

Sunil Maharjan presenting IMaR at the Neural Networks Conference in Killarney recently

The International Joint Conference on Neural Networks is the premier international conference in the area of neural networks organized by the International Neural Network Society (INNS), and sponsored jointly by INNS and the IEEE Computational Intelligence Society.

IMaR postgraduate students Padraic Moriarty and Sunil Maharjan were in attendance at the event which took place at the Killarney Convention Centre in Killarney on July 12 - 17, 2015. It featured plenary talks by world-renowned speakers in the areas of neural network theory and applications, computational neuroscience, robotics, and distributed intelligence. In addition to regular technical sessions with oral and poster presentations, the conference program included special sessions, competitions, tutorials and workshops on topics of current interest.

TRADEIT at IT Tralee

TRADEIT, a collaboration between researchers, food networks, traditional food SMEs, academic institutions, SME clusters, technology providers, food associations and entrepreneurial networks held their Food Safety Brokerage Event in IT Tralee on Thursday 1st of October.

This €4 million EU project led by Shannon Applied Biotechnology Centre (ABC), IT Tralee is set to increase competitiveness of Agri-food SME's.

Commenting on the project Dr. Helena McMahon, TRADEIT lead, Shannon ABC, IT Tralee said, *'Many Traditional, Craft and Artisan Food producing SMEs do not have the resources or capability for research and innovation, absorption of emerging technologies or opportunities to participate in collaborative projects with universities or research centres. It is recognised that this issue requires significant investment and support on an EU level and this has been realised with the four million euro investment in TRADEIT.'*

IMaR, IT Tralee were among a range of speakers and technology providers who shared their insights and innovations on the day. For more information on this project use the follow the link:
http://www.tradeitnetwork.eu/TRADEIT--Support-for-the-Traditional-Food-Sector#&panel1-1

IMaR attend National Digital Week in Skibbereen

Skibbereen held Ireland's first ever National Digital Week on November 3rd - 8th. Speaking sessions and workshops were tailored to cater for all interests and age groups to include Farming 2030, Digital Future of Education & STEM, Empowering a Billion Women 2020 & Social Entrepreneurship, Digital Revolution of retail and services, The Digital and Industry Fusion, Energise Enterprise Workshop and The Story of Entrepreneurship & the Internet of Things: Re-Imaging a connected world.

The Ludgate Digital Hub, Ludgate@Skibbereen, is scheduled to open in December. It is a not-for-profit initiative, which aims to create an entrepreneurial ecosystem in the Skibbereen and West Cork region and is expected to initially attract 75 jobs in the first phase of its development, with the capacity to create 500 jobs and 1000 indirect jobs, generating an estimated €34m in GDP for the region, over 5 years. The hub is the first of its kind in a non-urban area and will be 10,000 sq ft in size. It enables Skibbereen to rival international cities in terms of its connectivity and ability to reach worldwide audiences with speed and clarity as the first rural hub to receive a massive 1GB (1000Mb) connectivity.

Congratulations to ...

IMaR researcher Sunil Maharjan successfully completed his degree of Masters by Research in May 2015. His area of research included Artificial Intelligence, Big Data and Data Analytics. His primary focus was on: "Reality Mining Techniques Applied to Telecommunications Data".
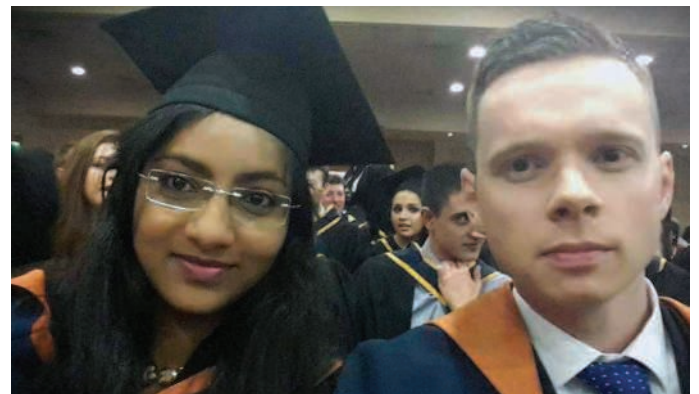

In this project, he developed a location predictive model by applying Reality Mining techniques, which would incorporate the use of Machine Learning algorithms, to location-driven mobile phone data. This model built can predict the future locations of individuals at any given time based on their past location data records collected from their mobile phones. He believes that the techniques revealed from this research project could be used in developing vertical solutions to urban area problems such as automobile traffic congestions and infrastructure planning.

Sunil Maharjan on his Graduation Day

Adrian Locke received his Masters by Research in March 2015. Adrian's area of research involved treating LED Luminaries as single entities and then applying techniques used in integrated circuit reliability testing to the luminaires to shorten the test duration times without compromising the reliability standards.

Adrian used accelerated test conditions to generate failure data, while failure analysis was performed on the failed luminaries and the failure data was mathematically modelled. The model was then used to relate the accelerated test data to normal use conditions and allow meaningful lifetimes to be predicted from accelerated test conditions.

Amruta Helwatkar and Adrian Locke on their Graduation Day

Congratulations to Amruta Helwatkar who recently completed her Masters of Engineering by Research. The title of Amrutas thesis is "An intelligent approach for application and integration of embedded, wearable sensor technology and fuzzy logic for development of dairy animal health monitor (DAHM)".

This study focused on the development of a prototype which used ultra-low power microcontroller, various sensors, sub 1GHz transceiver, data logging on FRAM and fuzzy logic. It also includes a meticulous study of 9 major dairy cattle diseases and comprehensive analysis of power consumption.

Additions to the IMaR Team

Welcome to Carol Collins who joined our team as Business Development Assistant in March last. Carol completed her MBA in 2012 at Heriot Watt University, Edinburgh. In 2008 Carol obtained a BSc Business from the University of London. Carol also holds a Diploma in Economics and Information Technology from the University of London. Since joining our team, Carol is actively involved in project administration, linking academia and industry, developing business leads, attending conferences, seminars and up skilling events on behalf of the IMaR team.

Congratulations to Sunil Maharjan, a Software Developer with an interest in building mobile and web applications, who joined the IMaR team as a Research Assistant this September. He received his Bachelor of Science in Computing Science from Griffith College Dublin (2011), and Master of Science by Research (Computing) from Institute of Technology Tralee this year. His research experience includes Machine Learning Techniques, Data Analytics, 3D Modelling, RFID Sensors and Bluetooth Technology.

Congratulations to Krishna Panduru our new Mechatronics strand leader. Krishna has a Bachelor of Electronics and Instrumentation Engineering from Jawaharlal Nehru Technological University, India (2010), a Masters of Intelligent systems and Robotics from the University of Essex, UK (2011).Since joining IMaR in 2012 Krishna has gained vast research experience in sensor systems, instrumentation, embedded systems, robotics, hybrid intelligence and fuzzy logic. While leading the Mechatronics strand within IMaR, Krishna is still actively involved in the project management of ProPAT.

Krishna Panduru   *Daniel Riordan*

Congratulations to Dr. Daniel Riordan who took up the position of IMaR Centre Manager in October. Dr. Riordan has a Bachelor of Electronic Engineering from Dublin City University (2005), a Masters of Computer Science from IT Tralee (2008) and a Ph.D. in the area of Electronic Engineering & Auto-ID Systems from University of Limerick (2012) under an Irish Research Council (IRCSET) scholarship. Dr. Riordan has worked within the CIMSS / IMaR group since 2008. He has gained invaluable research experience in artificial intelligence, computer modelling systems, sensor systems, bio-instrumentation, electro-magnetic interference analysis, digital signal processing and hardware and embedded electronics.

Welcome to postgraduate students Trevor Murphy and Niall O'Mahony who have been recruited by IMaR to research for H202 funded PROPAT project and Ivan Morris who is working on a postgraduate project in collaboration with Borgwarner Tralee Ltd. IMaR wish all new team members the very best in their roles.

Innovation Voucher Call

Innovation Vouchers worth €5,000 are available to assist a company or companies to explore a business opportunity or problem with a registered knowledge provider such as IMaR Technology Gateway. If you wish to apply for an Innovation Voucher, there are three options:

- **Standard Applications: call schedule opening date is 20/01/2016 and closing on 03/02/ 2016**
- **50-50 co-funded Fast Track Applications** - may be submitted anytime.
- **Horizon 2020 (Pilot Call)** open to all small and medium-sized companies (less than 250 employees) in Ireland.

For further details contact Dr. Daniel Riordan on 066 7144216 or email daniel.riordan@staff.ittralee.ie or visit the Enterprise Ireland website: www.enterprise-ireland.com/Innovation-Voucher
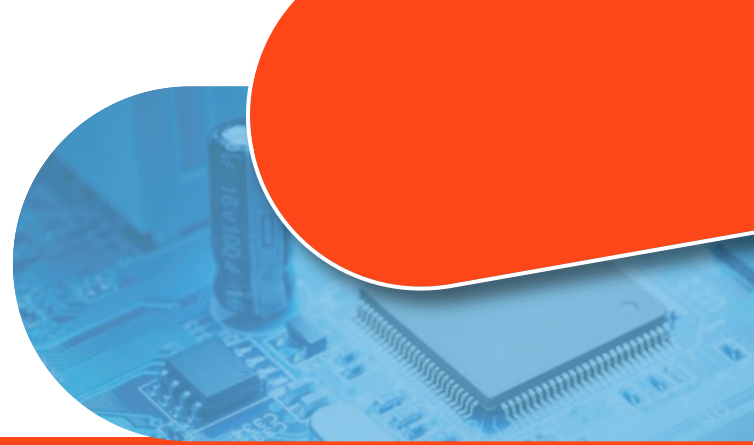

The recently renovated Caherciveen Heritage Centre, formerly the Royal Irish Constabulary Barracks.

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Upcoming Projects

IMaR are currently working with Relate Labs and Techcare Ltd. to make Caherciveen, Co. Kerry Ireland's first Smart Rural Town. By creating a living lab for Internet of Things in the town, the team hope to provide a test bed for emerging IoT technology and communications initiatives, with a focus on their application within rural towns. The town-wide wireless data platform is hoped to be in place in mid-December 2015, while the official launch of the Caherciveen Smart Rural Town is scheduled for April 2016.

How IMaR can help you

There is no set defined pattern of engagement with companies. At IMaR we commonly engage with companies in a number of ways but we are open to suggestion and would love to hear from you.

Common engagement mechanisms with companies include:
• National Funding Mechanisms
• Service Level Agreements
• FP7 / Horizon 2020
• Consultancy
• Direct costed R&D

Contact us

If you or your company are interested in working with IMaR do not hesitate to contact us

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