

Manufacturing

The Enterprise Ireland
Technology Gateway Network 2018

A Guide For Companies

The objective of the Enterprise Ireland Technology Gateway Network is to deliver near to market technology solutions to Irish based companies to assist them develop new products, processes and services.



Figure 1 Graphical Representation of the Enterprise Ireland Technology Gateway Network

Technology Gateway Sectoral Clusters

To optimise the power of the Network, Gateway clusters were established to deliver market lead innovation solutions for Irish companies, in the areas of Applied Internet of Things, Engineering, Materials and Design and Food and Beverages.

EMD Ireland (Engineering, Materials & Design) Cluster

EMD Ireland (Engineering, Materials & Design) is a cluster of six Enterprise Ireland Technology Gateways operating within the engineering, materials and design sector. The cluster provides a range of expertise for companies who are looking to access research and development within these areas. The cluster can connect with industry researchers in areas such as Precision Engineering, Biotechnology, Polymers, Protective Coatings, Prototype Design, Medical Imaging Technologies and 3D Metal Additive Manufacturing.

THE EMD IRELAND TECHNOLOGY GATEWAY CLUSTER CONSISTS OF:

- APT: Applied Polymers (Athlone Institute of Technology)
- CREST: Innovative Coatings (DIT)
- Design: + Applied Design (Institute of Technology Carlow)
- MET: Medical & Engineering (Galway Mayo Institute of Technology)
- PEM: Precision Engineering and Manufacturing: (Institute of Technology Sligo)
- SEAM: Materials & Engineering (Waterford Institute of Technology)

Applied Internet of Things (A-IoT) Cluster

The Applied Internet of Things (A-IoT) Cluster is a consortium of five Enterprise Ireland's Technology Gateways, providing a single point of contact for companies looking to access technical capabilities for Internet of Things (IoT) research and development. Via the cluster, industry can avail of full-time researchers and engineering professionals in software, hardware, communications/networks, data analytics, control, UI/UX and trialling. The A-IoT Cluster is available to assist companies of any size including, start-ups, SME's, HPSU's and multinationals.

THE A-IOT TECHNOLOGY GATEWAY CLUSTER CONSISTS OF:

- TEC Technology Gateway (Cork Institute of Technology)
- IMaR Technology Gateway (Institute of Technology Tralee)
- WiSAR Technology Gateway (Letterkenny Institute of Technology)
- TSSG Technology Gateway (Waterford Institute of Technology)
- COMAND Technology Gateway (Athlone Institute of Technology)



Gateway profiles



APT based on the Athlone IT campus. APT is providing polymer technology solutions for companies in the medical, composite, recycling and pharmaceutical sectors. APT provides industry with access to:

- Pilot and Production scale Injection Moulding, Blow Moulding, Thermoforming, Extrusion and Compounding lines and 3D additive printing.
- Advanced Analytical Facilities for materials research, testing and troubleshooting.
- Design, Rapid Prototyping and Micro-Moulding Capabilities.



CREST based in DIT delivers coatings innovation solutions for industry in the engineering, construction, healthcare and biomedical industries. CREST offers companies expertise in:

- Protective Coatings for challenging environments
- Surface treatment of metal components
- Coatings for Environmental Applications
- Biomedical Devices



The IMaR Gateway based in IT Tralee is applying its core expertise in the areas of hardware (mechatronics, robotics, control systems), software (data management and intelligent systems), IoT (RFID, Sensors) and data analytics to deliver increased productivity in the manufacturing, agriculture and process sectors to industry partners.

IMaR Technology Offering is:

- Intelligent mechatronics, process automation and robotics for agricultural technology and advanced manufacturing
- Industrial Internet of Things, RFID and Data analytics for Industry 4.0



PEM Gateway based in IT Sligo has a technology offer for industry in precision engineering, manufacturing and materials targeted at companies based in the North West and nationally which consists of:

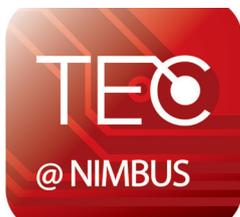
- Precision Engineering and Design
- Manufacturing Process Modelling and Simulation
- Advanced Process Monitoring and Control
- Advanced Material Syntheses and Characterisation



The SEAM Gateway delivers design for manufacture and reliability solutions for in sectors such as Bio-medical devices, Pharmaceuticals, Micro-Electronics, Precision Engineering & Construction

SEAM has core expertise in:

- X-Ray Micro-tomography (XMT): 3D Non-destructive characterisation
- Finite Element Analysis: 3D Software Modelling
- 3D Metal Additive Manufacturing
- Materials & Precision Engineering: engineering design & characterisation
- Bio Medical Engineering: Development of Novel materials



TEC develops 'Internet of things' prototypes for a broad range of companies, connecting everyday objects and systems and making them 'smart' with a focus on the following sectors:

- Energy: Intermittency & Demand
- Water: Remote monitoring,
- Location Based Services and Applications: Security, Tourism and eHealth



WiSAR based in LyIT provides solutions to Irish industry for The Internet of Things (IoT) using expertise in wireless, embedded systems and power electronics and offers this expertise to companies in the following sectors:

- Wearable Tech: Healthcare, Sport & Tourism
- Remote monitoring: Industrial Control, Environmental, Marine
- Power electronics: Renewable Energy and Electric Vehicles
- Communications: WLAN, Zigbee, Bluetooth, UWB, RF and Microwave



Gateway Case Studies

The following company approved case studies give an example of the variety of manufacturing capabilities that exists within the Network. For more information please go to www.technologygateway.ie.

Company Name: Chameleon Colour Systems

Funding: Partly Funded by Enterprise Ireland Innovation Partnership

Project Title: Intelligent Paint Mixing Technology

Profile of Company:

Have you ever had a custom paint colour made? There is a good chance that the retailer's paint mixing machine has been manufactured by Chameleon Colour Systems, in Tuam Co. Galway. The company, established in 1992, is a market leader in innovative Colour Tinting and Mixing Systems technology solutions selling machines world-wide. Their major market is the paint and coatings industry where Chameleon products are frequently installed into paint retailers to offer customers ever-expanding choices of paint colours.

Problem to Be Solved:

Chameleon collaborated with WiSAR Lab at LYIT to develop a bespoke shaker and mixer control system to address the technical challenges facing the company and to further strengthen its position within the industry in Ireland and abroad. We are living in an age where everything is gradually being connected to the internet providing productivity benefits for both the suppliers of products and services and the consumers alike. This trend is often referred to as the Internet of Things (or IoT) and it is widely predicted that 50 billion things will be connected to the internet in the near future. Chameleon needed to refresh their product line and took the opportunity to develop an intelligent IoT enabled paint mixing platform.

How Gateway Delivered Solution for Industry:

WiSAR developed a bespoke hardware and software solution to control the different aspects of the shaking and mixing machines and to give Chameleon an intelligent machine with connectivity to the internet. The hardware comprised of a multi-board solution with a mini-computer at its heart. Embedded electronics captures button press data, I/O status, sensor information relating to different aspects of the machine and control information for turning on/off contactors and motors. For example, the system holds a paint can in place using a clamp motor which is precisely controlled by correlating the current drawn by the motor to the distance travelled by the clamp motor.

The prototype machine is packed with advanced and industry first features. It guides store employees to best practice, self corrects for mis-use and can distinguish between one large paint can or multiple smaller cans. However, the biggest potential benefits of the new platform are related to the data which can be gathered remotely and automatically from each machine. A record of each mixing cycle is stored in an internal database, tracking the size of can, speed, time and if the cycle was stopped prematurely allowing the generation of an accurate report of the whole life cycle of a machine. Then by utilising a WiFi or Ethernet network connection and ubiworx™, an Emutex software framework, the system can be managed remotely including automatic alert report generation to technical support when the system encounters an issue. Ultimately, by gathering data from paint mixing machines remotely from around the world Chameleon will be able to predict failures and provide world leading support to their clients.

Company Testimonial

"Chameleon Colour Systems has had a working relationship with the WiSAR Lab in Letterkenny Institute of Technology for many years so, when it came to consider an investment in new product development, they were our natural choice. WiSAR developed a working prototype and a technology platform which we are presently bringing to production with our IoT partners Emutex, we look forward to building upon the technology to fulfil our vision of a data driven intelligent paint mixing systems".

Padraic Timon, CEO of Chameleon Colour System



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Company Name: Kostal Ireland GmbH

Funding Source: Innovation Partnership Feasibility Study & Innovation Partnership

Project Title: Development of Collaborative Robotics for Flexible Automotive Manufacturing

Profile Of Company:

Kostal Ireland GmbH, employing in excess of 800 people, was established in Abbeyfeale, Co. Limerick in 1981, opening a second facility in Mallow, Co. Cork in 2001. Kostal Ireland manufactures automotive electronic systems and a range of technologies for end users.

Problem To Be Solved:

While completing an Innovation feasibility with Kostal Ireland GmbH, IMaR researchers and Kostal's process engineer team identified a need for the semi-automation of complex tasks within the production line. This resulted in IMaR and Kostal collaborating on an EI Innovation Partnership for the research and development of an innovative flexible robotic system, capable of integrating into the current manufacturing process of an automotive manufacturing plant such as Kostal Ireland with a minimum of set up time and training.

How IMaR Delivered Solution For Industry

This project undertook the research, design and development of collaborative robotic systems within the field of automotive component manufacture, based on the ABB Yumi Collaborative Robot. A collaborative bespoke robotic solution, based on the ABB Yumi, was developed to address the pick'n'place requirements of Kostal. Vision, lighting and gripper hardware were designed, developed and implemented to realise the potential of the robot. Vision algorithms, as well as robotic control algorithms were developed to achieve a precision and accuracy of 0.02mm for the final system. IMaR research staff have demonstrated and proven the safety of a collaborative robotic system, for operation in a manufacturing setting in close proximity to operators. The system has been trailed in Kostal, Abbeyfeale and is currently under final evaluation and implementation by Kostal. The developed system allowed the semi-automation and quality control for tasks currently un-feasible for full automation, but enabling production line staff to directly interact and work in close proximity to a robotic system, without the need for physical safety barriers and reduced speed operation.

Impact For Company

This project has developed a process automation robotic solution which it is envisaged will be refined and commercialised by Kostal for use within their production facility for the purpose of product manufacture and assembly. This will allow Kostal to increase production in its Irish facility, thereby providing economic benefit for the country. Without systems such as this, Kostal feel that it may become impossible to implement the high quality and efficient process solutions of their production lines.



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Company Name: Kilkenny cooling Systems

Funding: Enterprise Ireland Innovation Voucher

Project Title: Development of a prototype Beer Cooler

Profile of Company:

Kilkenny Cooling Systems is a leading manufacturer of refrigerated storage equipment for the dairy, brewing and food processing sectors. A sector they are particularly prominent in is the beverage cooling industry. Their equipment is currently installed in over 12,000 pubs, clubs, hotels, and restaurants houses throughout Ireland and abroad.

Problem to Be Solved:

The equipment currently used relies on ice as a phase change medium for stored cooling. This technology is simple, reliable and has been used for decades in their products for various cooling applications from beer chilling to food production systems.

How Gateway Delivered Solution for Industry:

Through an Enterprise Ireland funded Innovation Voucher and Partnership Feasibility study, the TEC Gateway in CIT undertook a performance assessment of the company's VS prototype beer cooler, and bench-marked it against competitor cooling systems such as a conventional ice bank system and a full glycol system. Parameters investigated included cooler performance co-efficient, dispense temperature variation and electricity consumption. Analysis of the comparative experimental data demonstrated the superior performance of the VS prototype in terms of thermal cooling and energy consumption performance.

Impact for the Company:

The Kilkenny VS Beer Cooling System went on to be shortlisted for the Sustainable Energy Authority of Ireland Award for Innovation in 2015 and the 2016 IBEC Environment Award for best new product, winning the latter. Further work by the TEC Gateway has outlined a plan for the development of the next generation of the Kilkenny VS prototype beer cooler, integrating increased functionality and intelligent control of the device to optimise its operational efficiency to achieve increased energy and cost reductions. TEC Gateway and Kilkenny Cooling are now in discussions to develop this technology further.

Company Testimonial

"The Enterprise Ireland Innovation voucher scheme played a key role in the progress of our VS Beer Cooler R&D project. I would strongly encourage any business considering undertaking their own R&D to avail of an EI Innovation Voucher. Having expertise on hand such as that provided by Nimbus was extremely helpful and definitely contributed to this project's successful outcome"

John Smee, Kilkenny Cooling systems



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Company Name: ATA Air Tools Ltd

Funding: Enterprise Ireland Innovation Voucher

Project Title: Performance enhancement of Turbine

Profile of Company:

ATA Air Tools (ATA) manufactures and distributes pneumatic air tools to over 50 countries in major industries such as Aerospace and Automotive. They are the only precision engineering company in the world to provide both tools and consumables for a variety of deburring, material removal and finishing needs - across any material and any application.

Problem to Be Solved:

Pneumatic tools are most commonly power by compressed air through a vane motor. This type of motor requires lubrication which can be problematic for many applications in particular in the aerospace sector. ATA have developed an innovative air driven motor which removes the need for lubricant, and also achieves the required torque in a compact design. However, one of ATA's leading products was performing lower than expected, specifically in relation to the turbine power output and rotational speed.

How Gateway Delivered Solution for Industry:

The PEM Technology Gateway undertook a design review of the existing product, identifying potential causes for underperformance. Using CAD modelling, Computational Fluid Dynamics (CFD) was used to develop and analyse potential design solutions before rapid prototyping of key components for direct testing.

Impact for the Company:

Improved motor performance of key product. Design change applied across a range of products.

Company Testimonial

"The work carried out by PEM has proved invaluable in the design of our latest high speed air driven turbine motor. The CFD analysis provided allowed us to experiment with various jet configurations, these were then 3D printed by PEM enabling us to run the necessary power, torque & speed tests. This process allowed us to optimise the motor output while learning a great deal about the flow & expansion of the air through the assembly. I look forward to working with PEM on further design projects in the future."

Hugh McManus, R&D manager.



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Company Name: Sulzer Pumps Ireland

Funding: Enterprise Ireland Innovation Voucher

Project Title: Redesign of the impeller and shaft section of a submersible pumping system

Profile of Company:

Sulzer Pumps Ireland, based in Wexford, has a wide range of pump manufacturing capabilities, including machining, assembly, motor winding, packaging and shipping of submersible pumps – ranging from 100 W to 52 kW – for the submersible wastewater segment. A product research and development team is located on site and the plant in Wexford is home to a state-of-the-art product testing facility. The facility in Wexford has a long tradition in manufacturing wastewater pumps since 1973, and it has developed into the largest producer of submersible pumps of the ABS product brand. The Wexford facility currently employs 270 people.

Problem to Be Solved:

Sulzer Pumps Ireland have collaborated with the SEAM Gateway in WIT on a number of notable projects, such as the redesign of the impeller and shaft section for their range of submersible pumping systems.

How Gateway Delivered Solution for Industry:

SEAM undertook FEA analysis on the current design before proceeding to investigate a number of design options and then selecting the most suitable solution to provide improved lifetime of the shaft component.

Impact for the Company:

Validation of the final design is currently ongoing at Sulzer. The partnership provided Sulzer with access and expertise to expensive computer simulation software, which is greatly more cost effective than having such facilities in-house. The collaboration with SEAM has provided Sulzer the opportunity to refine and fully explore design concepts without the cost of building full-scale prototypes.

Company Testimonial

“SULZER’s contact with SEAM began in September 2015 with the re-design of a rotorshaft on the XFP PE3 submersible, solids-handling sewage pump. This is the second largest pump built at the SULZER plant in Wexford with P2 of 22kW. Each report from SEAM contained analysis, inferences and recommendations which is a great benefit to the customer and truly collaborative. Throughout the process there have been helpful discussions and exchanges of information as required, avoiding delay. SEAM provide a complete materials investigation, design support and failure analysis service. Design improvements implemented on the XFP PE3 in April 2016 based on the above collaboration with SEAM have proven to be entirely successful. In January 2017 over 5000 units have been shipped to customers since implementation with zero shaft or fixing screw failures reported”.

Ben Breen - Technical Manager



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Company Name: C & F Automotive

Funding: Enterprise Ireland Innovation Voucher

Project Title: Automotive OEMs

Profile of Company:

Formerly known as Iralco, C & F Automotive is now part of the C & F Group and employs 370 staff at the Collinstown site in Co. Westmeath. The company exports aluminium trim to automotive OEMs (Original Equipment Manufacturers) such as VW, Volvo, Daimler, Porsche and Bentley. The CREST Gateway has a long collaborative relationship with C & F Automotive. From an Enterprise Ireland Innovation Partnership project, CREST and C & F Automotive developed a sol-gel coating technology called Dualion that was applied to the company's aluminium trims to pass the Volkswagen TL182 performance standard (e.g. immersion in pH 13.5). The Dualion technology was licensed to C & F Automotive and was subsequently successfully tested by Volvo and Daimler. Trial batches were originally synthesised in Finland by Millidyne, a recognised sol-gel manufacturer.

Problem to Be Solved:

In November 2012, the TL182 standard was revised with UV requirements and the preferred version of Dualion was altered to meet the specification.

How Gateway Delivered Solution for Industry:

CREST and C & F staff reformulated the Dualion technology within the scope of the existing patent to meet the needs of C & F clients. 2015 saw several variations synthesised with a final preferred technology developed with sufficient scratch resistance and UV resistance. This project involved CREST staff working on site for 6 months in partnership with 2 former CREST students now employed by C & F.

Impact for the Company:

This final version of Dualion, M8, was approved by Volvo for qualification assessment. To achieve qualification, C & F had to prepare full size parts (lengths of 1.2m-1.4m) which required new equipment and large volumes. CREST and C & F Automotive collaborated with TE Labs (Tullow, Co. Carlow) to begin full part coating production trials in September 2015. In 2016 C&F installed three new production tanks with a total capacity over 6,000 litres at the Westmeath site. In early 2017 production of trim packs for the Volvo XC60 began and 60,000 kits have been exported by the end of the year. In December 2017 C&F closed their plant in Germany and moved full production back to Ireland with the plant moving to a 24/7 operation.

2018 will see the coating being applied to three new executive models and expanded capacity at the plant began in Q1 to meet the expected increase in parts

Company Testimonial

“This technology has secured sales contracts of over €75m for the Irish site and will create more than 50 new jobs in Ireland”

Mike Young - Business Development Manager C&F



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Applied Polymer Technologies



an Enterprise Ireland
Technology Gateway cluster

Company Name: Athlone Extrusions,

Project Title: Optimisation of new lab extrusion equipment

Profile of Company:

Athlone Extrusions, based in Westmeath, is a thermoplastic sheet extruder and compounder founded in 1971. It supplies bespoke sheet sizes, colours and finishes in a wide variety of styrenic polymers to small and large consumers alike. The company has sales offices in Ireland, England and the Netherlands, and exports co-extruded sheets to over 50 countries worldwide, destined for sectors/ uses such as building, sanitary ware, automotive, screen-printing, packaging, white goods, electronics and point of sale and display.

Athlone Extrusions's manufacturing facility of 14,000 sq. metres houses the extrusion division - consisting of fourteen sheet and film lines, all with co-extrusion or multi-layer capability, and the masterbatch and compounding division, containing seven compounding extruders. The plant capacity is currently 36,000 tonnes per annum.

Problem to Be Solved:

The company's continued growth is achieved through an ongoing investment in the production facility to expand capacity, a focus on efficiency through technical innovation, coupled with a focus on new product development and material innovation.

Impact for the Company:

Athlone Extrusions has a long working relationship with the APT Gateway in Athlone IT. APT continues to provide material analysis support for production optimisation and new product development activities within the company. In addition, Dr Zhi Cao, a Research Engineer based in APT, was recently seconded into the Athlone Extrusions facility to provide support with the installation and optimisation of new lab extrusion equipment.

Mark Hallinan, Technical Manager of the Colour Division at Athlone Extrusions (a former graduate of the polymer research department in Athlone IT with over 15 years' experience working in the polymer materials field), leads a technical team conducting new product development & research into innovative new products for the thermoforming industry. Over the past number of years, Mark has expanded the labs at Athlone Extrusions, adding advanced material testing capabilities having seen their effectiveness through numerous collaborations with AIT.

Company Testimonial

We frequently use the team in APT for specialist polymer testing and investigations beyond the capabilities of our own lab here in Athlone Extrusions, and consistently find their support invaluable. A real synergy exists in the relationship between APT and Athlone Extrusions, with APT providing advanced material science capabilities and some specialist equipment for product development and our team here, who frequently provide APT with colour masterbatch and thermoforming sheet for their research needs

Mark Hallinan - Technical Manager, Athlone Extrusions



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