

MTU supporting 40 years of Cork tech-sector growth

MTU's Department of Electrical and Electronic Engineering introduced the first course in Ireland in Computer Engineering more than 50 years ago.

Since then, we have continued to innovate to meet Cork's industry needs and have developed the first Smart Product Engineering course in the country which complements our existing Electronic Engineering course.

Neil O'Sullivan, who led the hardware team at Google in Silicon Valley that developed Chromecast as well as the first and second-generation Google Home Smart Speaker devices, told MTU that he was excited to see the new Smart Product Engineering programme.

"It is a very timely development given recent tech industry advances and few other institutions seem to be offering courses so relevant to this expanding and transformational technology space," he said.

The Global Smart Product and Electronics Industry

The electronics and smart product industry has been shaped by rising consumer demand for sustainability, automation, and convenience which

fuels innovation, with trends such as smart homes, energy-efficient solutions, connected devices, and wearable technology dominating the market.

The industry is driven by rapid technological advancements in areas like artificial intelligence, the Internet of Things (IoT), and 5G connectivity, enabling smarter and more integrated systems.

Electronic and Smart Product Engineers must be able to innovate, solve problems and collaborate. They use these key skills to develop innovative solutions to environmental and societal problems such as smart insulin pens and glucose monitors to transform the lives of diabetics.

Some of the leading companies in Integrated Circuit design operate in the Cork region and have built strong relationships with MTU's Electronic Engineering and Smart Product Engineering programmes

40 Years of Cork Electronic Industry Association

This year, the Cork Electronic Industry Association (CEIA) celebrates 40 years of serving its members in the southwestern region. CEIA is an industry led, non-profit association representing High-Tech Companies in the Cork region.

CEIA collaborates with both Regional and National agencies (e.g. Enterprise Ireland, Munster

Technological University) to ensure a sophisticated technological infrastructure is in place to enable the local High-Tech industry to grow and prosper.

The number of jobs in the Technology sector has increased by 99.7% over the period 2011-2020 providing excellent opportunities for local and international engineering graduates.

CEIA currently represents over 50 companies across the Manufacturing, Supply Chain and Technology Development sector in the Southern region of Ireland. It provides business networking and best practice sharing opportunities and interfaces between the Technology Sector, Education and Government Support Agencies.

At the heart of all smart devices are Integrated Circuits for data processing, wireless connectivity and hardware to support artificial intelligence. Some of the leading companies in Integrated Circuit design operate in the Cork region and have built strong relationships with MTU's Electronic Engineering and Smart Product Engineering programmes for Work Placement and Graduate Careers.

Familiar names

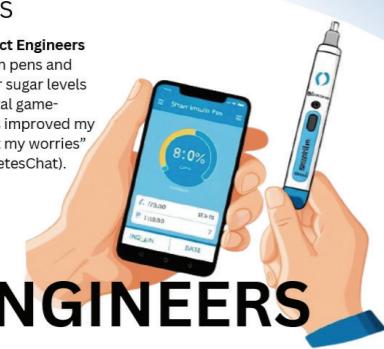
Some of these names may be familiar from Sports Sponsorships, such as Qualcomm/Snapdragon, others perhaps less so but are still prominent in the wider industry, for example, Infineon, Analog Devices, and Cadence. The Medical Device industry has a strong presence in Cork with Stryker and Boston Scientific being two significant examples.

Medical devices have always incorporated electronic sensor and control units but with the advent of the Internet of Things, many systems are being redesigned to incorporate wireless and new medical applications mean new product designs.

This has led to a strong demand for Electronic and Smart Product Engineering Graduates.

SOLVE PROBLEMS

Electronic and Smart Product Engineers helped develop smart insulin pens and glucose monitors to monitor sugar levels and manage diabetes. "A total game-changer, the technology has improved my quality of life and helped lift my worries" (Tom Dean, founder of DiabetesChat).



ENGINEERS

ARE TEAM-PLAYERS

To develop "game changing" solutions like smart insulin pens **Electronic and Smart Product Engineers** need to work with other engineers, software developers, medical experts, patients, marketing and financial experts along with regulatory bodies.

Electronic and Smart Product Engineers use their skills to develop innovative solutions to environmental and societal problems.

INNOVATE

Electronic and Smart Product Engineers actively seek out problems that are in need of a solution. For example, in a medical devices company engineers may interview or observe surgeons or patients. For example, engagement with diabetes patients would reveal how they have to carefully regulate their diet and how patients may feel self-conscious having to administer insulin doses.

FOSTER SUSTAINABILITY

By designing smart insulin pens to be reusable, Electronic and Smart Product Engineers are positively impacting the environment. Integrating smart pens with glucose monitors can minimise resource inefficiency by administering exactly the right dose of insulin.

Career Opportunities for MTU Engineers

STRYKER Corporation is a leading global medical technologies company that specialises in developing and manufacturing medical devices, instruments, and equipment.

Both the Electronic Engineering programme and Smart Product Engineering programme have a work placement opportunity as part of the third year of each programme.

This year three third year Smart Product students will join Stryker's Global R&D Innovation Centre which features state-of-the-art prototyping and test facilities and a simulated operating room.

Combining skills

Using the combination of technical, creative design and business skills developed in their programme the interns will join Stryker teams that are strategically focused on the development of new technologies and products to make improvements in patient safety and outcomes around the world.

Dr Liam Moore who coordinates the Smart Product Engineering programme in MTU welcomed the placements with Stryker stating that the "profile of our Smart Product graduates along with the project experience they gain from the programme fits well with the skills requirements that the regional medical technology sector requires".

Demand for Electronic and Smart Product Engineers

The Department of Enterprise, Trade & Employment identify Electronics Engineers including ICT Professionals as one of the sectors currently experiencing skills shortages within Ireland.

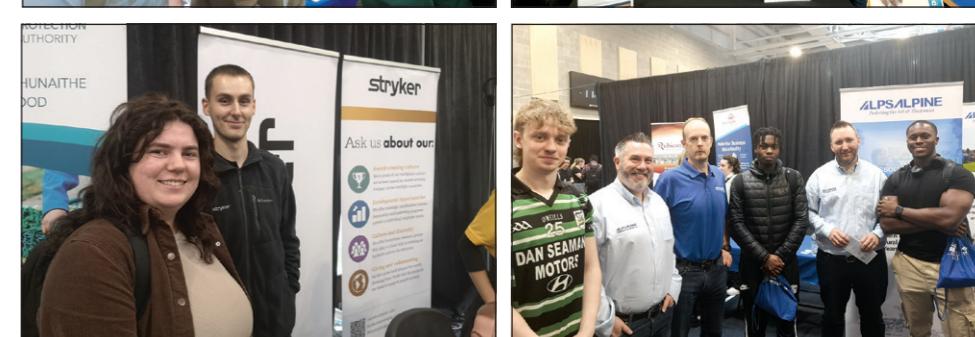
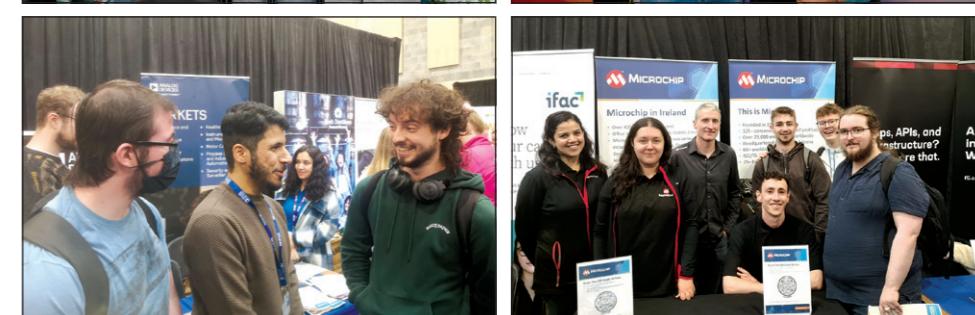
This means that there is huge demand for our engineering graduates locally, nationally and internationally.

For example, Stryker in Cork are currently advertising to recruit 24 engineers. Analog Devices are looking to recruit 20 engineers while Cadence are looking to recruit 13 engineers.

So, the future is looking bright and prosperous for our electronic and smart product graduates!



MTU Smart Product Engineering students and staff on a site visit to Stryker in 2024



MTU Electronic and Smart Product Engineering students and graduates at MTUs Career Fair in 2024 along with a selection of companies that are actively looking to recruit new electronic and smart product engineers.

MTU Women in Science Technology Engineering and Mathematics (STEM)

The O Meara twins' contribution in Cadence

THE Department of Electrical and Electronic Engineering are delighted to celebrate the unique and remarkable achievement of identical twin sisters Nicola and Siobhan O Meara, who have graduated with degrees in Electronic Engineering in 2024.

The twins join a growing number of women using their innovative ideas, hard work and technical expertise to shape the future of technology and infrastructure.

Both sisters commented that at secondary school an engineering career path seemed out of reach and even early college years were a little overwhelming with doubts about succeeding in such a challenging field.

Both expressed gratitude to their MTU lecturers who went out of their way to encourage and support them throughout their journey, with Nicola reflecting that: "by the time I completed my degree, I was not only sure of my capabilities but deeply committed to continuing my journey in STEM".

She added: "Looking back, I realise that the self-doubt I once felt was a natural part of the process, and that pushing through it opened doors to a world of possibilities. I'm proud of how far I've come".

Successful placement

Both sisters had successful placement in Cadence, a prominent American company specializing in electronic design automation (EDA) software and engineering services, during their third year of their course and are now part of the graduate programme with the company.

Since 2020, Cadence has grown its international HQ to over 250 employees in Cork and has plans to expand that even further over the coming years. The Cork office contributes to research and design in key areas like Artificial Intelligence in design automation, 5G mobile technology, automotive electronics, and high-performance computing.

Siobhan's workplace mentor, Pedram Razavi, described



Siobhan's journey from intern to valued team member in just a year as inspirational, demonstrating her commitment and growth.

"Her passion and dedication are exactly what the tech world needs. As an application engineer, Siobhan effectively supports customers with their technical issues, solving complex and challenging problems in a very friendly and professional atmosphere, while building trust and lasting relationships.

"All young graduates should remember that their potential is limitless. By embracing challenges and being fearless in their pursuits, they have a vital role in shaping the future of technology.

"Cadence are excited to see more talented graduates like Nicola and Siobhan joining us and making a significant impact and we have huge expectations from them for the future."

Aine McCarthy, Principal Applications Engineer, Analog Devices



I GRADUATED with a Degree in Electronic Engineering and then went on to complete a Masters in Electronic Engineering.

I've been working in Analog Devices in Cork for just under 20 years and have had many roles within the company.

Those roles include hands on lab-based work that involved characterisation of silicon to ensure it meets the specified and required performance, to customer engagement roles where I work closely with customers to understand their end application and help to support their design-in journey, as well as gathering requirements for next generation products.

There are endless opportunities in the world of electronics. The courses available at MTU are key enablers for students in this space.

They ensure students develop many skills that are vital to a career in this space, from team projects to individual work, critical thinking, problem solving and hands-on lab-based work; all providing key skill sets vital to a career in STEM.

This is something that I certainly can vouch for having been a past student as well as being in the fortunate position to have hired students for internships and graduate roles.

MTU Introduces first Smart Product Degree in Ireland

CONSISTENT with its tradition of timely development of programmes reflecting expanding and transformational tech industry advances, MTU launched its Smart Product course in 2021.

In the course students dive into product development from day one, engaging in a hands-on, project-centred learning environment. The curriculum is designed to tap into and expand students' creativity, innovation, and problem-solving skills through challenging, semester-long projects.

These projects cover dynamic fields such as medical technology and consumer electronics, providing students with real-world contexts and applications. Practical, hands-on learning is at the core of the course, allowing students to directly apply concepts as they acquire them.

Additionally, students gain exposure to the industry through site visits to leading companies and potential employers, bridging the gap between classroom learning and the professional world. These real-world experiences provide opportunities for students to envisage the engineering professional that they are becoming.

The course content mirrors the interdisciplinary demands of modern product design and management, integrating product engineering with design principles and business processes. Through topics like design thinking and business strategy, students develop the ability to tackle business challenges and craft effective solutions.

Meanwhile, technical subjects such as software development, cloud computing, and CAD equip students with the essential skills to engineer cutting-edge products that are both functional and user-friendly. This blend of creative, analytical, and technical training prepares students to create innovative products that succeed in today's market.

Again, these projects include some form of electronic hardware, software and enclosure as well as net connectivity, sending data to and from the cloud (and to a phone or computer). Through organising the course around collaborative projects students develop important skills related to teamwork. As importantly, students are afforded opportunities to learn with and from each other.

This capacity to work with others and understand diverse perspectives

is recognised as one of the core competencies required to tackle global issues like sustainability.

The transition to university is also known to be a challenging time for first-year students. Collaborative learning enables students to connect with each other and their lectures, develop relationships and foster a sense of belonging all of which are hugely important in enhancing the first-year experience.

Innovative Products Conceived and Designed by Student Teams

The robotic drink delivery system is an example of a first-year student project completed by a small team of aspiring smart product engineers.

The project integrated technical skills developed in semester 1 and semester 2 modules, including mechanical design, electronics, embedded software, and sensors & signals, alongside non-technical modules such as business requirements and design thinking.

This approach enabled students to apply their comprehensive skill set to create a tangible, demonstrable product. The product in this case was a robotic drink delivery system, all aspects of it including the holding mechanism for the drink, the outer case, the internal electronics and sensors as well as the code was designed by the student team.

Other projects showcased by our 3rd year smart product class include a smart mattress for hospital care, and a smart pet feeder for dogs and cats. Both projects start with an idea from the students that gets developed into an actual product that they demonstrate at the end of the semester.

Again, these projects include some form of electronic hardware, software and enclosure as well as net connectivity, sending data to and from the cloud (and to a phone or computer).



In the first year of the course we went to Ireland's smartest building 1 Albert Quay, Cork City visiting Johnson Controls



"What I have liked most about the course is its practical aspects. I enjoy being able to develop an idea into a finished product that can be completed across multiple modules. It is rewarding to put the concepts that we are taught into real-world practice"

James O Connor, 2nd year Smart Product Engineering



"My name is Luca Aerts and I am in my second year of the Smart Product Engineering course. So far, I have found the course and its content very interesting and enjoyable. The modules promote creativity and tie in very well together."



Drink Delivery System developed as a 1st year project

Students gain exposure to the industry through site visits to leading companies and potential employers, bridging the gap between classroom learning and the professional world



Getting Stuck In! Smart Product student trying out Stryker's innovative surgical tools

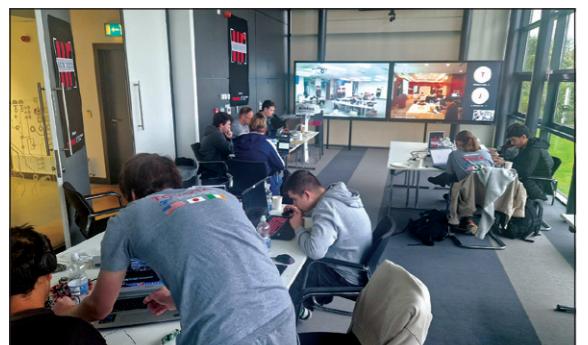


3rd year Sarah Clancy working on her team's smart bed idea in the lab



Liam Butler and Daragh Hughes demonstrating their smart dog feeder

MTU Electronic Engineering students win global Toyota competition!



MTU Electronic Engineering students competing at the global Toyota Hackfesta competition.

MTU students enjoyed recent success taking first and second place in the global Toyota Hackfesta competition. The competition saw two teams selected from regional qualifiers in Europe, Japan and the US compete via a livestream in sync over an intensive weekend in early November 2024.

This is the first time a European university was considered for participation and MTU is the first European university to participate. The cross-discipline winning team consisted of Dylan Bairamgulov and Stepan Chornyi from Electronic Engineering and Alex Ringhoffer from Computer Science.

Reflecting on their success, Dylan said that the Hackfesta was a great way to get involved in Cybersecurity, with interesting challenges and a supportive environment. The event organisation and structure with international teams competing via a live stream was both motivational and engaging.

Toyota organise the two-day Capture The Flag (CTF) event ("Hack Festa") to promote education in automotive security among university students. The term "hacking" is not in itself negative. It also means "to do something ingeniously, to perfect," as in the phrase "life hack."

In the cybersecurity field hacking means testing with a spirit of technological curiosity to improve cybersecurity.

Toyota run these events recognising that today, cars are evolving in unprecedented ways through internet connectivity that improves convenience but at the same time makes it easier for malicious third parties to hack car systems.

Defensive cybersecurity at all levels of the car system from hardware through to connectivity that protects customers from such harm has become more important than ever, not only for Toyota but for the entire auto industry.

Entrepreneurial graduates' device tracks stolen goods across Cork

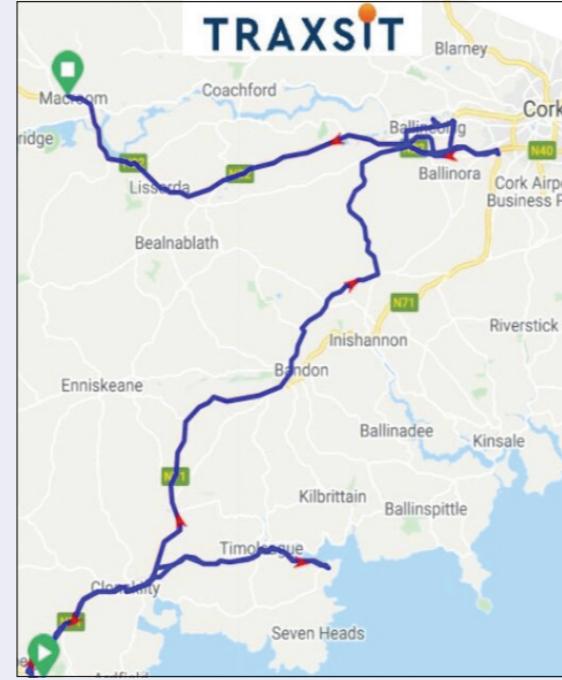


ENTREPRENEURS Luke O'Mahony and Conor Walsh, who graduated from MTUs Electronic Engineering degree have developed an innovative GPS tracking device to help farmers and fleet owners to track equipment.

The idea originated in Conor's fourth year engineering design project. Now the company operate throughout Ireland and have expanded into the UK.

Traxsit technology helped a West Cork business owner track a stolen van that was taken on a 167km joy ride around Cork County.

The owner was able to log onto the Traxsit app and see exactly where the stolen van was and then alert Gardaí who apprehended the thief in Macroom.



New MTU Digital Substation aimed at delivering renewable energy carbon transition goals

MUNSTER Technological University, in collaboration with H&MV Engineering, a leading Irish engineering company that delivers high voltage design, engineering and construction services in various sectors all over the world, and ABB, a global technology leader in electrification and automation, has launched a Digital Substation in the Power Academy Lab of MTU's Bishopstown campus.

The investment of the Digital Substation is part of H&MV's and ABB limited sponsorship, worth more than €200,000, that aims to further develop MTU's training and research capacity for Ireland's developing grid infrastructure.

Essential to meet energy transition goals

The introduction of Digital Substations as part of Ireland's grid infrastructure upgrade is essential for the state to meet its energy transition goals, which targets becoming carbon neutral by mid-century with an interim target of 51% reduction in emissions by 2030 through the Climate Action Plan 2023. (Cap2024).

Ireland's power system has achieved 75% integration of renewable energy sources and plans to increase this to 95% by 2030, highlighting the importance of state-of-the-art grid technologies.

Irish electricity demand is also increasing rapidly with increased population, industry and data centre consumption and the transition to electric heating and transport. Total demand is projected to rise from 33 terawatt hours (TWh) in 2022 to 56 TWh by 2030 and 80TWh in 2050.

To support this growth the electricity grid requires significant upgrades with a growing need for skilled professionals in designing, developing, and operating modern grid systems.

The introduction of the Digital Substation at MTU as part of a joint ABB/H&MV investment positions MTU to upskill industry professionals from all sectors of the power engineering sector, including generation, distribution, transmission, and consumption to design, develop, commission, and operate the grid infrastructure required for the country's future development.

Critical time for digital technologies

Commenting on the investment, Dr Martin Hill, Head of the Department of Electrical and Electronic Engineering said that the industry support came at a critical time as the digital technologies in modern substation design required engineers to span both electronic, communication and electrical engineering domains at a level not previously supported in university programmes.

"This equipment allows students to work in an industry standard environment with the current and future generations of smart grid protection equipment," he said.





MTU

Ollscoil Teicneolaíochta na Mumhan
Munster Technological University

Bachelor of Engineering (Honours)

Smart Product Engineering MT844

Create new products
through studio
based learning



MTU

Ollscoil Teicneolaíochta na Mumhan
Munster Technological University

Bachelor of Engineering (Honours)

Electronic Engineering MT846

Get to the heart of
the technology
underpinning
today's world

