The Alice Perry Engineering *Digest*

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FROM THE HEAD OF SCHOOL

Welcome to the School of Engineering newsletter!

This edition celebrates the incredible achievements of our research community, including recent publications, prestigious awards, new funding successes, and active participation by School members in key conferences and engineering recruitment and partnerships events.

Stay informed and inspired by the advances led by our School members who work to shape the future of engineering education, innovation and discovery.

We welcome stories from all members of the school—see the links below to share your updates!

Scientists study the world as it is,
Engineers create the world that never has been.

Theodore von Kármán

Laoise McNamara

HEAD OF SCHOOL
SCHOOL OF ENGINEERING

Databases for Data-Centric Geotechnics: School of Engineering contribution

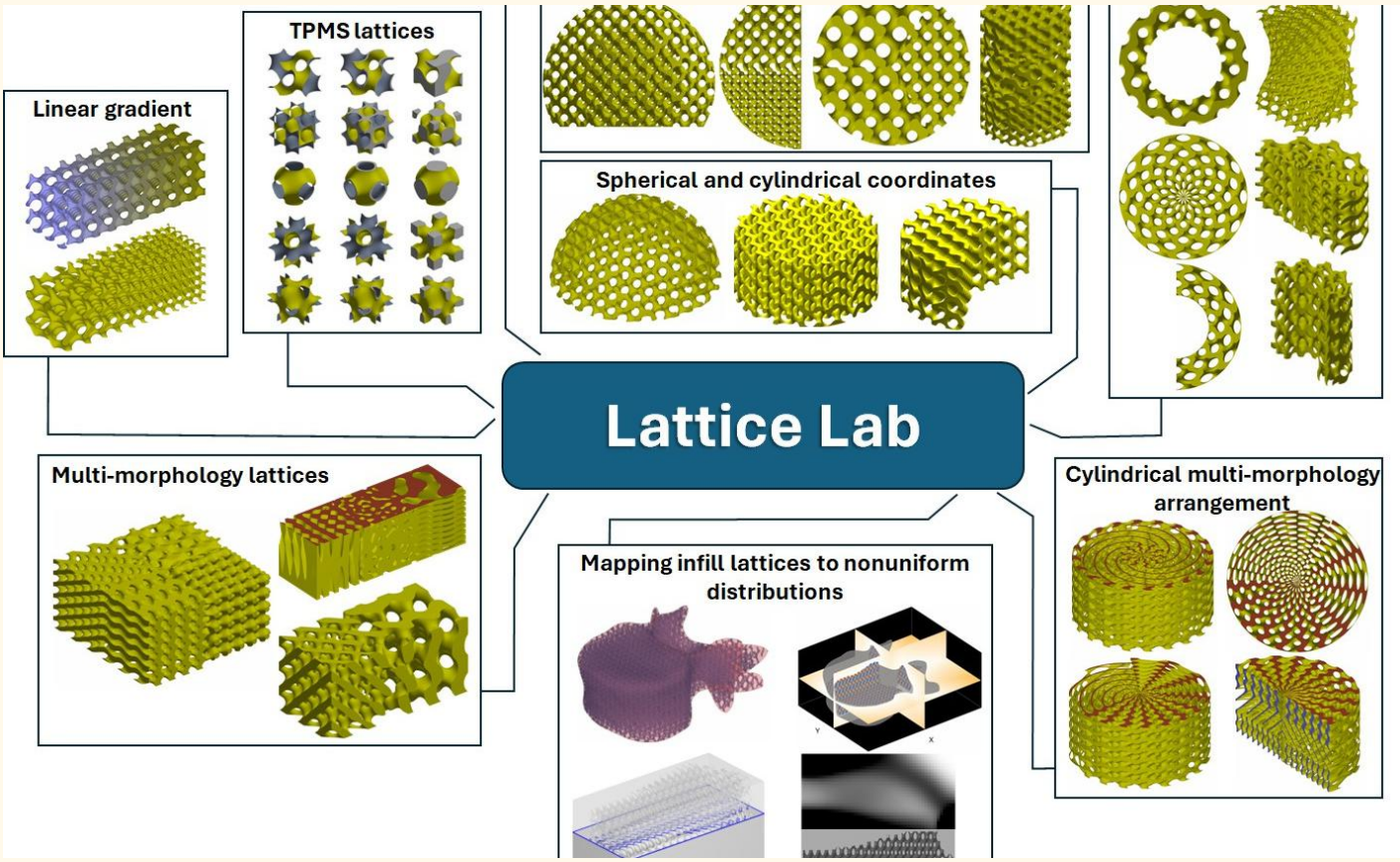
BRYAN MC CABE

Associate Professor Bryan McCabe and Dr. Kevin Flynn contributed Chapter 7 to Databases for Data-Centric Geotechnics, a two-volume book set edited by Kok-Kwang Phoon (Singapore University of Technology and Design) and Chong Tang (Dalian University of Technology, China. Their chapter in book 2 is based on their experiences of instrumenting and interpreting several driven cast-in-situ (DCIS) pile load tests and developing an extensive DCIS pile database during Kevin's PhD research.

LatticeWorks

MAHTAB VAFAEEFAAR

A new study introduces LatticeWorks, an open-source MATLAB toolbox for for nonuniform, gradient and multi-morphology lattice generation, and analysis. It was designed for generating and analyzing lattice structures. The tool facilitates the exploration of nonuniform, functionally graded designs.



Estrogen Deficiency alters Vascularization and Mineralization dynamics

SYEDA MASOOMA NAQVI

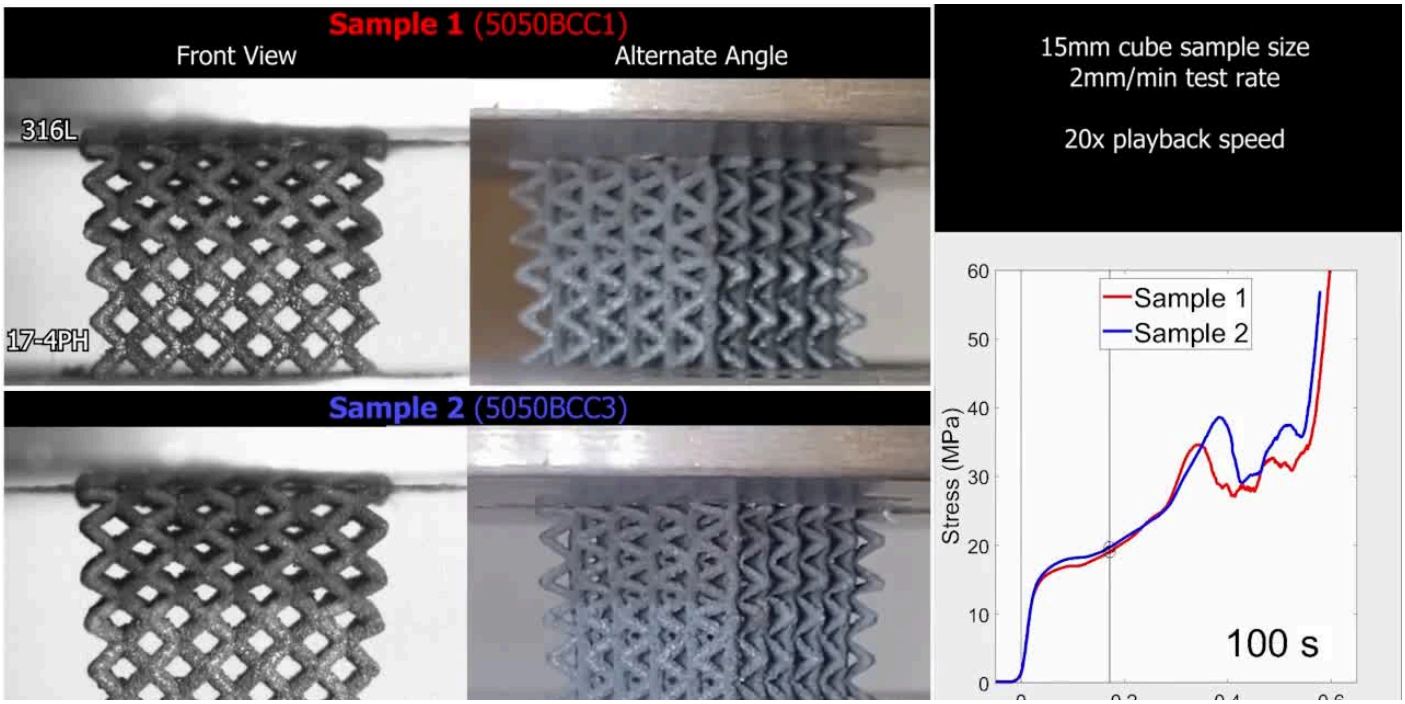
PhD student Munam Bukhari, supervised by Professor Laoise McNamara, published a study on a novel bone model for studying osteoporosis.

The biomimetic approach replicated a bone developmental process, known as endochondral ossification, by combining bone and vascular cells within a biomaterial. The result is a laboratory model that can mimic the cell activity and properties of bone tissue in the body.

The model was utilized to investigate how blood vessels influence changes in bone tissue composition during osteoporosis. The findings from this study provide valuable insights into osteoporosis and may contribute to the development of effective treatments.

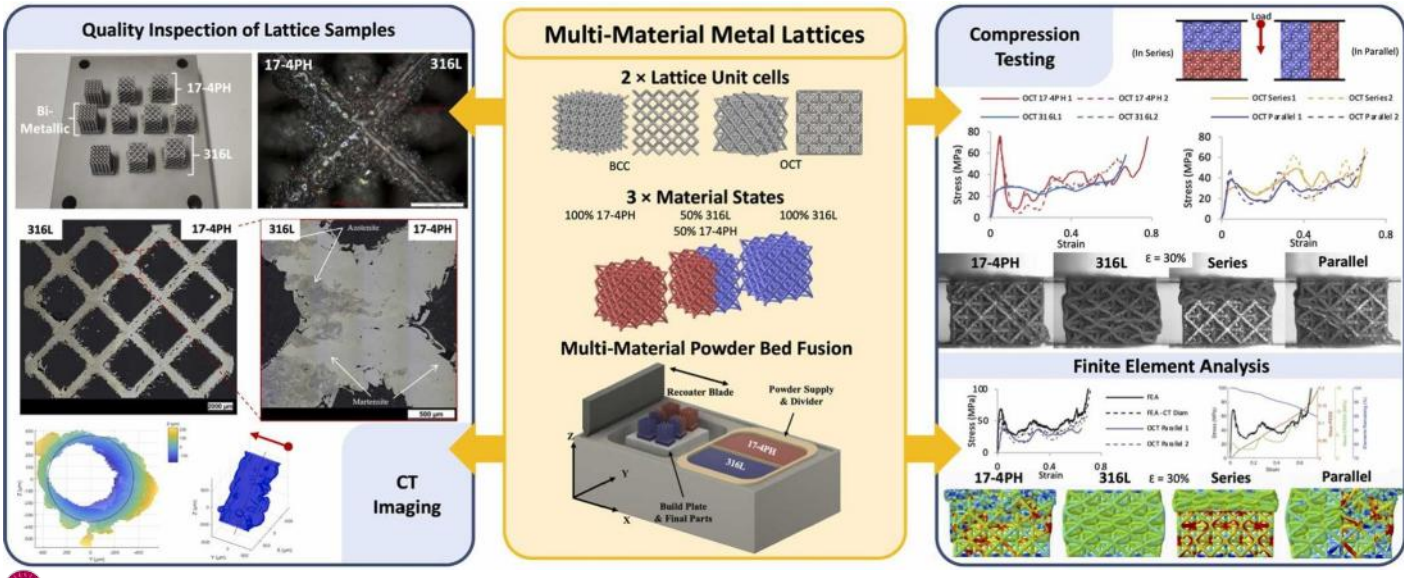
Mechanical Engineering PhD student Brian McDonnell publishes research following Erasmus visit

NOEL HARRISON



Brian McDonnell, a PhD student in Mechanical Engineering supervised by Dr Noel Harrison and Dr Eimear O'Hara, published a study based on research conducted during a 3-month Erasmus research visit to Politecnico di Bari, Italy in 2023 under the mentorship of Dr Sabina Luisa Campanelli.

Brian worked on novel additive manufacturing design, simulation and manufacturing challenges involving a specially adapted metal 3D printer in Bari, capable of printing with two different alloys in the same part. The outcome of this collaboration was published open access in the top journal for additive manufacturing (IF 10.3)



Machine Learning and AI for Groundwater Resource Assessmentin HELIYON

APOORVA BAMAL

A new study, 'Harnessing machine learning for assessing climate change influences on groundwater resources: A comprehensive review' is published in HELIYON.

This study explores the complex relationship between climate change and groundwater dynamics, providing a comprehensive analysis of how shifting climate patterns influence groundwater resources.

It also details a range of tools and techniques used to assess these impacts, focusing on the role of Machine Learning (ML) and Artificial Intelligence (AI) in improving predictive modeling.

Green public procurement in construction: A systematic review is published

PATRICK MCGETRICK

Mohammed Zajeer Ahmed has published a much-needed review of green public procurement (GPP) in construction, aligning with the publication of a recent national action plan on GPP in Ireland.

The paper highlights GPP as a key policy tool for driving environmental sustainability and examines how fiscal regulations, such as carbon taxes and subsidies, influence its adoption. It also explores the benefits of a systems-based approach to GPP implementation and underscores the need for the construction industry to integrate GPP with lifecycle assessment (LCA), lifecycle costing (LCC), and building information modeling (BIM).

Additionally, the study emphasizes the importance of pilot projects to assess and quantify GPP's real-world impact.

Civil Engineering PhD student wins award at CERI2024

PATRICK MCGETRICK

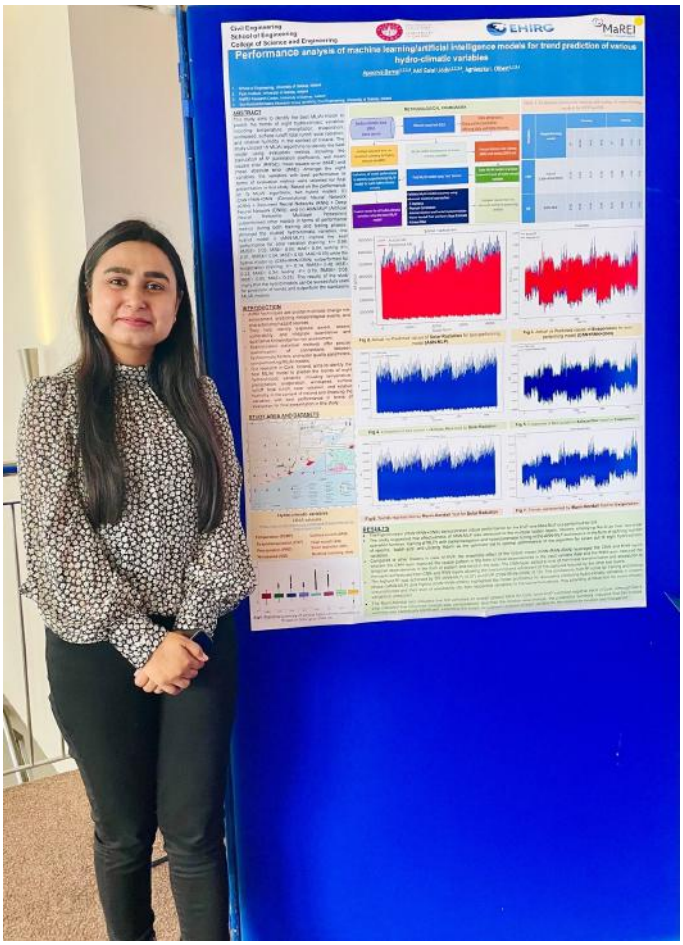
Rimjhim Kashyap, a PhD student on the MODCONS project with the Timber Engineering Research Group in Civil Engineering, won the Best Student Paper award in the Structures stream at the Civil Engineering Research in Ireland Conference (CERI2024).

Her award-winning paper, 'Experimental and Numerical Analysis of CLT-to-CLT Connections in a Multi-Storey Modular Building Using Irish Timber,' secured her a travel bursary to attend an international conference.

Poster award at the College of Science and Engineering Research and Innovation Day 2024

APOORVA BAMAL

Apoorva Bamal, a Civil Engineering PhD student, secured 2nd place in the Decisive Data poster competition at the College of Science and Engineering Research and Innovation Day 2024.



SPOTLIGHT ON BINI 2025

L-R: Vatsal Kumar, Munam Bukhari, Rachel Cahalane, Syeda Masooma Naqvi, Laoise McNamara, Sarah Nano, Sam Boxwell, Mustafa Khabooshani

The 30th Annual Conference of the RAMI Section of Bioengineering (BINI 2025) gave a platform to the remarkable achievements of many of University of Galway's researchers across multiple disciplines, highlighting the institution's contributions to biomedical engineering research.

A major highlight was the Engineers Ireland Biomedical Research Paper competition. Out of only four senior students selected across Ireland for their outstanding contributions to bioengineering research, two were from the University of Galway: PhD students Ankita Pramanick and Irish Senthilkumar. Pramanick, supervised by Dr. Andrew Daly, won the prestigious award for her research on 4D bioprinting of shape-morphing heart tissue, winning the Engineers Ireland Medal and an honorarium of €1,500.

The university's excellence was recognized across multiple research tracks, with several individuals receiving awards. Joseph Tannian won in the Early Researcher - Medical Devices category, Sarah Nano won in the Mechanobiology category, and Lesley Trask was a Runner-Up in the Medical Devices category. Nano, a joint PhD student between the University of Galway and the University of Notre Dame, received the Best Presentation award in Biomaterials/Regenerative Medicine for her research on cancer-related osteoblasts.

The Mechanobiology and Medical Devices Group made a significant impact with their research presentations. Dr. Syeda Masooma Naqvi, Munam Bukhari, and Mostafa Khabooshani showcased novel bone models advancing osteoporosis research. Dr. Rachel Cahalane presented work on prosthetic heart valve degeneration, while Sam Boxwell demonstrated patient-specific computational models of prosthetic valves. Dr. Vatsal Kumar shared research on tumour growth inhibition, reflecting the diverse and innovative research emerging from the university.

L-R: Sarah Nano, Laoise McNamara

L-R: Shane Loughlin, Ankita Pramanick, John Mulvihill

Johnson & Johnson WiSTEM2D Scholarships awarded to School of Engineering students

MARY DEMPSEY, MAEVE DUFFY

Congratulations to our 2nd year undergraduate students who were among the awardees of the Johnson & Johnson WiSTEM2D Scholarships this year: (in order of photograph from top to bottom) Mechanical Engineering student Martha Kavanagh, Electrical & Electronic Engineering student Miah O'Leary, and Civil Engineering student Emer Finucane.

The aim of the WiSTEM2D programme is to inspire and support more women to pursue a career in STEM after university and increase female representation in the STEM2D workforce. As well as a bursary, recipients of this award are supported with mentoring, site visits, and workshops.

Michael Gilvary, Head of R&D, Neurovascular and General Manager, J&J MedTech Galway, and Dinion Carton, Auditor of WiSTEM, University of Galway, presented the awards. Photos courtesy of Conor McCabe

School of Engineering Away Day, December 2024

SEAI National Energy RD&D Funding for TidalHealth Project

POUYAN GHABEZI

A collaborative project between the University of Galway, ÉireComposites, and Ocean Renewable Power Company Ireland (ORPC) has secured €750,000 in SEAI funding.

TidalHealth will develop and implement a real-time health monitoring system for a 6- 6-meter full-scale helical tidal foil ensuring the long-term efficiency, structural integrity, durability, and reliability of tidal turbine foils.

Tidal Health will also incorporate optical fibre (Fibre Bragg grating) sensors including strain and temperature sensors through distributed and quasi-distributed sensing systems embedded into a designed tidal foil.

Multi-Million EU Consortium Funding Success with the BRIGHTskills Project

EOGHAN DUNNE

Research Fellow Eoghan Dunne is a co-PI on the recently funded EU Consortium BRIGHTskills Project.

This project will tackle the skills gaps in the Health Industrial Ecosystem by developing a comprehensive Health Industry Skills Strategy, needs-based training courses, and a skills observatory supporting foresight studies and labour market forecasting.

Dr Natalie Walsh and Andrea Fassbender will work with Eoghan on this exciting new European Project. Consortium partners include Boston Scientific and EIT Health, among others.

RIAQ Project to Improve Air Quality Through Retrofitting

MAGDALENA HAJDUKIEWICZ

A collaboration between the School of Natural Sciences and the School of Engineering, funded by the EU Interreg NPA, focuses on improving energy efficiency and indoor air quality in retrofitted buildings across Ireland, Finland, Sweden, and Iceland.

The RIAQ Project aims to tackle the critical challenge of enhancing building energy efficiency through energy retrofitting in the Northern Periphery and Arctic region while improving indoor air quality (IAQ), hygrothermal performance, and occupant well-being.

RIAQ is a collaborative project with partners in Finland (University of Oulu & the Finnish Institute for Health and Welfare), Sweden (Umeå University), Iceland (University of Iceland) and Ireland (University of Galway).

SEAI Grant for Industrial Heating Research

MAEVE DUFFY

Prof Maeve Duffy and Niall Ó Brolcháin (Insight) are collaborators with Flexible Power Solutions on a successful SEAI RD&D grant on high-temperature industrial heating, using electric boilers, thermal storage and would-be wasted indigenous green electricity.

The grant will fund a postdoctoral researcher to develop technoeconomic models of electric heating in industry to determine its potential for meeting Ireland's carbon emissions targets.

Sustainable procurement practices at University of Galway

DANUKA ANGIPURA

In collaboration with the University of Galway's Procurement and Contracts Office (PCO), a case study was conducted to examine how structured sustainable procurement practices can support public sector organizations to adopt Green Public Procurement (GPP) principles.

This study is part of the GAPS project, led by Professor Jamie Goggins at the University of Galway.

Forest Carbon Balance and Timber Construction Research Funded by the Department of Agriculture, Food, and the Marine

PATRICK MCGETRICK

The CARBFORVAL project, led by Dr. Patrick McGetrick with the TERG Research Group, will assess the carbon footprint of Irish forest products used in construction.

The 12-month project will assess the full lifecycle from the forest to the sawmill, from the sawmill to the construction site, and through the entire building lifecycle to the end of its service life and deconstruction or reuse.

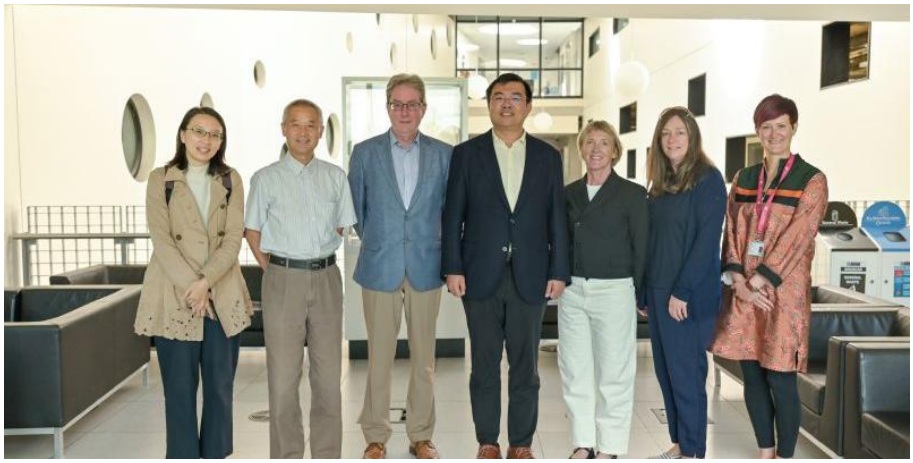
Asad Wadood to represent Ireland at EYGEC 2025

BRYAN MCCABE

Second-year PhD candidate Asad Wadood was one of two delegates selected at a recent Engineers Ireland Geotechnical Society event to represent Ireland at the 29th European Young Geotechnical Engineers Conference (EYGEC) in Rijeka, Croatia, in September 2025.

His research, funded by iCRAG Research Ireland Centre for Applied Geosciences in conjunction with Ward and Burke Construction, focuses on pipe-soil-lubricant mechanics in pipe-jacking/microtunnelling, through the incorporation of instrumentation into concrete pipes supplied by Tracey Concrete Ltd.

Supervised by Assistant Prof. Bryan McCabe (University of Galway) and Brian Sheil (Cambridge), Asad is the sixth student from McCabe's Geotechnical Research Group to represent Ireland at this prestigious conference series.



Tsinghua University collaboration

MARY DEMPSEY

A delegation from Tsinghua University visited the School of Engineering, fostering collaboration and cultural exchange, concluding their visit with a night at Trad on the Prom.

Higher Options

MARY DEMPSEY

Minister O'Donovan T.D., Department of Further and Higher Education, Research, Innovation and Science met with student and staff representatives from the School of Engineering at Higher Options.

The Galway Sound Lab Inspires the Next Generation at the BT Young Scientist Exhibition

EOIN KING

The Galway Sound Lab recently wowed students at the BT Young Scientist Event in the RDS, bringing the fascinating world of acoustics to life through hands-on demonstrations.

From visualizing sound localisation with an acoustic camera to exploring wave mechanics with slinkys, loudspeakers, and mesmerising Chladni plate patterns, students discovered the science behind sound in fun and engaging ways.

Our interactive approach captured imaginations, showcasing how sound shapes our world. Together, we're amplifying the impact of acoustics for a more connected, informed, and harmonious world. The Galway Sound Lab is proud to inspire future innovators with the endless possibilities of sound!

Special meeting with Deputy High Commissioner Clements for UNHCR, the UN Refugee Agency

MARY DEMPSEY

Mary Dempsey met with Deputy High Commissioner Clements of UNHCR, the UN Refugee Agency.

Mary highlighted the impact of Ireland's education pathway for refugees, supported by the EU Passworld Project in collaboration with Nasc, the Migrant & Refugee Rights Centre and UNHCR Ireland.

Engineers Week 2025

MAGDALENA HAJDUKIEWICZ

On 1st March , the 'Engineering Our Future: Family Fun Day' took place in the Alice Perry Engineering Building at the University of Galway, where we celebrated Engineering as part of Engineers Week 2025!

The Family Fun Day provided plenty of science and engineering shows, workshops and hands-on activities that will inspired young (and older!!) people and helped them learn about the world around us!

EVENTS

NZEB & Retrofit training rig to visit University of Galway

ORLAITH MCGINLEY

The Mount Lucas NZEB & Retrofitting Training Rig was at the Alice Perry Engineering Building from 1st March until 7th March 2025.

The retrofitting rig visited the university as part of the Galway City Net Zero Cities project, which aims to increase retrofit uptake and retrofit training across Galway City.

As part of the visit, retrofitting training was provided to a range of groups, including secondary school students. There was also be drop-in clinics for University students and staff to come and learn more about retrofitting homes from the Mount Lucas team.

Thank you for reading the first issue of our newsletter!

We hope that you have enjoyed *The Alice Perry Engineering Digest*. In celebrating the achievements and hard work of our colleagues, we hope to support and inspire innovation within our community.

Our next issue will be released in Summer 2025.

Our commitment to impactful research is a core tenet of our ethos. To learn more about our research, check out our publications here.

Keep up to date with us on our social media sites for news about our events and achievements as they happen.

To be a part of our next issue, send your news here!

We value your feedback. If you have any suggestions for future issues, or want to let us know what you enjoyed the most, please get in touch!