



COLLEGE OF
ENGINEERING AND ARCHITECTURE

Autumn/Winter Newsletter

September 2024 – February 2025

SCHOOL OF MECHANICAL AND MATERIALS ENGINEERING



UCD School of Mechanical & Materials Engineering
Engineering & Materials Science Centre,
University College Dublin, Belfield, Dublin 4, Ireland.

Tel.: +353 1 716 1884

Email: mme@ucd.ie

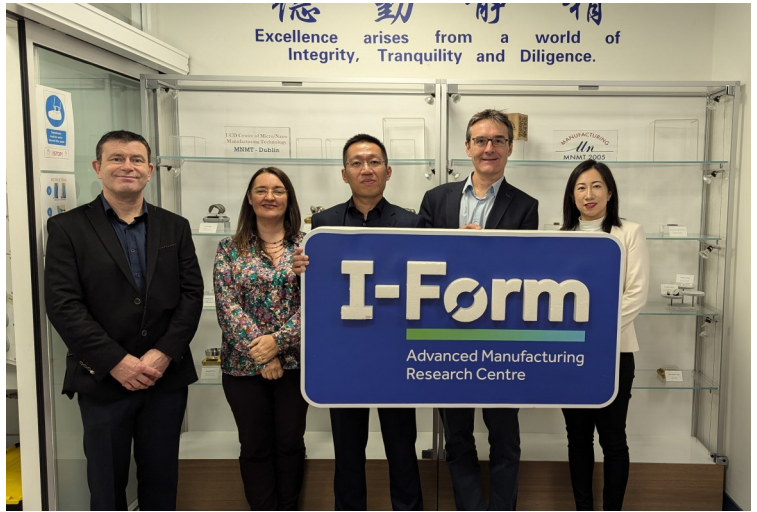
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What made the Headlines!

Salt Medical Partners with UCD's Jufan Zhang

Salt Medical, a leading Irish-based medical device contract development and manufacturing organisation (CDMO) based in Galway, Ireland, is delighted to announce a new partnership with **Jufan Zhang**, who is a Principal Investigator at UCD Centre of Micro/Nano Manufacturing Technology (MNMT-Dublin) and also a Funded Investigator at I-Form, the Research Ireland Centre for Advanced Manufacturing.



UCD Hosts ESIS TC4 Fall 2024 Meeting on Fracture Standards



On September 26th and 27th the School hosted the Fall 2024 Meeting of a Standardisation Committee called ESIS TC4—this is a technical committee of the European Structural Integrity Society whose aim is the development of standard experimental procedures for the determination

of the fracture properties of Polymers, Composites and Adhesives (<https://sites.google.com/structuralintegrity.eu/tc04>). A special thanks to Neal Murphy.



2024 Autumn Panel Discussion: Generative AI

The Autumn Panel Discussion hosted by the UCD Engineering Graduates Association (EGA) took place on Tuesday, November 19, 2024, at ESB's Headquarters. The event explored several pressing topics at the intersection of engineering and artificial intelligence. The discussion featured case studies that highlight the successful integration of AI into real-world engineering processes, offering practical examples of its applications. The panel, including **Javad Zeinali**, addressed the essential skills that engineers need to effectively incorporate AI into their workflows, providing guidance on upskilling for the future.

New Funding within the School

Frontier's for the Future Programme

Two academics from SMME were among the 11 UCD research projects have been funded under the Research Ireland Frontiers for the Future Programme:

Vikram Pakrashi: Energy Harvesting for Monitoring Built Infrastructure: HarMonI

Fiona Freeman: Conjugated STING-agonist nanoparticles as novel therapeutic add-on to enhance the therapeutic response of chemotherapy for the treatment of osteosarcoma.



Aisling Ní Annaidh Secures ERC Consolidator Grant (BreastRecon)



Congratulations to **Aisling Ní Annaidh** on securing a prestigious ERC Consolidator Grant for her project, BreastRecon.

Breast cancer affects 13% of women worldwide, and while breast reconstruction is a crucial part of post-mastectomy treatment, the widely used two-stage implant-based approach often leads to complications and low patient satisfaction. A key challenge lies in predicting and evaluating tissue growth during reconstruction. BreastRecon aims to revolutionize patient-specific breast reconstruction by developing a novel acousto-elastic method to non-invasively assess biomechanical properties of growing tissue. This breakthrough will enable better surgical planning and optimized reconstruction protocols, ultimately improving patient outcomes.

Aisling explains, "This project will provide valuable insights into tissue growth and remodelling, leading to a disruptive advancement in reconstructive surgery."

Di Nguyen Secures EIT Manufacturing Funding for EPSILON Project

Congratulations to **Di Nguyen** on securing new funding for EPSILON, a project supported by EIT Manufacturing. EPSILON focuses on developing a cutting-edge, data-driven solution to accurately predict manufacturing energy consumption and renewable energy yields. With rising energy costs and increasing sustainability demands, the project aims to help manufacturers optimize operations, reduce costs, and maximize renewable energy usage while minimizing downtime risks. By integrating predictive analytics and dynamic pricing strategies, EPSILON will also support CO₂ savings reporting, reinforcing the shift toward more sustainable manufacturing practices.

Public Engagements

I-Form and Stryker Won Primary Education Award at STEM South West Awards

I-Form and Stryker have been awarded the Primary Education Award at the inaugural STEM South West Awards in Cork. Their joint program, "Manufacturing a Healthy Future," aims to spark early interest in STEM by providing 3D printing training for teachers, hands-on experience for students, and 3D printers for schools. This initiative is helping to inspire the next generation of engineers and innovators through excitement, fun, and learning. To know more about the initiative - <https://www.i-form.ie/communityengagement/schools/primaryschools/manufacturingahealthyfuture/>



Di Nguyen becomes President-Elect of the INFORMS's Forum for Women

Congratulations to **Di Nguyen**, who has been elected as the 2025 President-Elect of the INFORMS Forum for Women in Operations Research and Management Sciences.

INFORMS is the world's largest association for professionals and students in operations research, AI, analytics, and data science. This prestigious leadership role highlights Di's dedication to advancing women in these fields and fostering a more inclusive professional community.

Awards:

Two graduates of the School of Mechanical & Materials Engineering were honoured recently by UCD:

Dr. Clíodhna Lyons (pictured right) (BE & PhD in Mechanical Engineering) received the 2024 UCD Alumni Award in Engineering. Dr. Lyons is currently Vice President for Product & Service Planning at Nissan Europe.

Mr. Paddy Hayes (BE & MEngSc in Mechanical Engineering) received the 2024 Distinguished Graduate Award from the UCD Engineering Graduates Association. Mr. Hayes is currently CEO of ESB Group.



Three PhD students—**Jordan O'Donoghue**, **Cagri Yenigun**, and **Dylan Armfield**—each won prizes in their respective categories at the Bioengineering in Ireland Conference.

This year's conference, organized by members of the School, (pictured left) was a great success despite the Red Weather Warning. Congratulations to all involved, and a special thanks to **Niamh Nowlan**, who served as Conference Chair.

New Publications

- Chen, Y., Prasad, V., Yasar, M., Murphy, N., Ivankovic, A. Enhancing interfacial performance and fracture toughness of carbon fibre reinforced thermoplastic composites, *Composites Part A*, 187:108434, <https://doi.org/10.1016/j.compositesa.2024.108434>, 2024.
- Scarselli, G., Prasad, V., Quan, D., Maffezzoli, A., Murphy, N., Ivankovic, A. Interlaminar fracture properties of UV and plasma-treated glass fiber epoxy composites, *Polymer Composites*, <https://doi.org/10.1002/pc.29079>, 2024.
- Yasar, M., Sanay, B., Duffy, C., Thai, M., Murphy, N., Ivankovic, A. A study of epoxy based polymer composites: Tailoring mechanical and piezoelectric characteristics, *Polymer Composites*, <https://doi.org/10.1002/pc.29320>, 2024.
- Binsfeld, L., Bonato, R., Pagliaro, Z., Murphy, N., Ivankovic, A. Direct Mixed-Mode I&II Partitioning in beam-like geometries using Digital Image Correlation and the decomposed J-integral, *Engineering Fracture Mechanics*, In Press. 2024.
- Hui, Janan, Haoyang You, Anton Van Beek, Jinrui Zhang, Arash Elahi, Julia R. Downing, Lindsay E. Chaney et al. "Biorenewable Exfoliation of Electronic-Grade Printable Graphene Using Carboxylated Cellulose Nanocrystals." *ACS Applied Materials & Interfaces*, 2024.
- van Beek, Anton. "Gaussian Processes for Non-Differentiable Functions With Jump Discontinuities." In *International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, American Society of Mechanical Engineers, 2024.
- Chaney, Lindsay E., Anton van Beek, Julia R. Downing, Jinrui Zhang, Hengrui Zhang, Janan Hui, E. Alexander Sorensen et al. "Bayesian Optimization of Environmentally Sustainable Graphene Inks Produced by Wet Jet Milling." *Small*, 2024.
- W. Shu, S. Kilroy, A. Ní Annaidh, E. O'Cearbhaill. "Multiphysics Modelling on the Impact of Skin Deformation and Strain on Microneedle-Based Transdermal Therapeutic Delivery", *Acta Biomaterialia*, 2024.
- E. Marino, M. Gkantou, A. Malekjafarian, S. Bali, C. Baniotopoulos, J. van Beeck, R.P. Borg, N. Bruschi, P. Cardiff, E. Chatzi, I. Čudina, F. Dinu. "Offshore renewable energies: A review towards Floating Modular Energy Islands—Monitoring, Loads, Modelling and Control", *Ocean Engineering*, 2024.
- S. Levie, P. Cardiff. "Accelerated segregated finite volume solvers for linear elastostatics using machine learning", *Advances in Engineering Software*, 2024.
- S. Boughou, I. Batistić, A. Omar, P. Cardiff, D.J. Inman, R. Boukharfane. "Investigation on aeroelasticity of morphing wing through dynamic response and virtual structural damping", *Journal of Applied Physics*, 2024.

New PhD Graduates:

A huge congratulations to **Conor Shaw, Flavia de Andrade Pereira, and Divyanshu Sood** (pictured right), three PhD students under supervision of **James O'Donnell**, who recently defended their theses.

Others who defended this quarter include **Abdur Rahman Al Azad, Akshaya Jagannath, Xinhui Wang, Hongsuk Yoon, Matthias Glowatz, Ciaran Lennon, Cian Warby, Ryan Paetzold, Abhay Pant, Wenbin Sun, and Tianyu Guan**. Congratulations to each and every one of you!





College of Engineering and Architecture

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University College Dublin, Belfield, Dublin 4, Ireland.

Tel.: +353 1 716 1884

Email: mme@ucd.ie

