



COLLEGE OF
ENGINEERING AND ARCHITECTURE

Spring/Summer Newsletter

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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

x.com/UCD_Mech_Eng

[UCD Mechanical and Materials Engineering | LinkedIn](#)

Editorial Message

Welcome to the Inaugural Issue of the UCD School of Mechanical and Materials Engineering Newsletter!

We are thrilled to launch this new platform dedicated to keeping you updated on the latest happenings, achievements, and opportunities within our School. Our goal with this seasonal newsletter is to highlight the exciting news from the School, celebrate the remarkable contributions of our members, and strengthen our sense of community.

We strongly encourage you participate by sharing your achievements, news, and providing feedback to make this newsletter a better reflection of our school community

Warm regards,

The Communications Committee

School of Mechanical and Materials Engineering (SMME)
University College Dublin

UCD SMME Communications Committee Members



Fiona Freeman



Javad Zeinali



Anton Van Beek

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What made the Headlines!



EIRSAT1

Ireland's Biggest Satellite Alive and Kicking (EIRSAT1)

Ireland's first satellite, EIRSAT1, spent its first St. Patrick's Day in space this quarter (photo left). In its first 100 days, it has travelled over 65 million km and orbited the Earth 1,524 times.

Traveling at an altitude of around 500 km, it takes 95 minutes to orbit the Earth and passes within the line of sight of mission control here at UCD seven times a day.

David McKeown said the satellite is sending back data that will be useful to the scientists on the ground conducting experiments.

LaNua Medical wins Big Ideas, will represent Ireland in US world cup

LaNua Medical, Eoin O'Cearbhaill's company, wins Big Ideas Award at Enterprise Ireland's Start-Up Day 2024.

Dr Cormac Farrelly (see left), founder and chief medical officer of LaNua, told [SiliconRepublic.com](https://www.siliconrepublic.com) at the event yesterday that the company plans to spin out of UCD in the coming months and raise more funding to scale its business in the US market.



Fengzhou Fang

The 73rd CIRP General Assembly

The 73rd CIRP General Assembly was successfully held from August 18th to 24th, 2024, in the coastal city of Thessaloniki, Greece.

The General Assembly officially opened with the Presidential Address titled "A New Era of Transformational Development in Manufacturing" by the CIRP President, **Fengzhou Fang**. In his address, which is regarded as one of the highlights of this annual manufacturing event, he reflected

on CIRP's history and legacy, reported on the organisation's progress over the past year, and explored future trends and new paradigms in manufacturing advancement.

New Funding within the School

David MacManus (pictured on the right) receives the prestigious ERC Start Award worth €1.5 million to help bridge the sex gap that exists when it comes to modelling traumatic brain injuries.

“We currently lack female and geriatric specific computer models. This limits our understanding of TBI biomechanics and the efficacy of protective, diagnostic, and therapeutic technologies for these demographics,” he said.

David MacManus and his team will develop the first sex specific computer models of the brain that incorporate sex specific neuroanatomy and material damage properties of brain tissue, its blood vessels and cells.



David MacManus

Lizbeth Goodman's SMARTlab's collaboration with the An Saol Foundation has led to the establishment of a new joint research centre, supported by significant government funding, to advance rehabilitation research and provide respite for families. The interactive game lab for severe acquired brain injury, designed by SMARTlab's Brandon Blacoe and UCD MME student Conor Duffy, is also being expanded to international sites in New York and Philadelphia.

Ali Saberi Mehr was awarded an SFI National Challenge Award for his RESR project.

Vikram Pakrashi was awarded an SFI Frontiers for the Future Project to investigate the potential of biopiezoelectric as monitors of built infrastructure.

Di Nguyen was awarded an EIT Manufacturing grant for the project Energy Optimisation Solution (EPSILON).



Fiona Freeman

A UCD-led space project entitled National Space Subsystems and Payloads Initiative (NSSPI) has secured over **€7.9 million** in funding, the largest single amount awarded to a project by the Government in this latest DTIF funding round. **David McKeown**, the NSSPI project-lead said, “The project is a fantastic example of how university led research can naturally support the development of disruptive technologies by Irish space companies.”



New PhD Graduates:

Seevani Bali, Rohit Chawala, and Cian Warby from Vikram Pakrashi's group have successfully defended their PhDs. Seevani and Rohit are pictured on the left at their graduation ceremony.

Matt Glowatz, Hongsuk Yoon, and Mohsen Mahjoobnia have all submitted their PhDs and passed their vivas in the Thematic PhD in Inclusive Design and Creative Technology Innovation. They will attend the next conferral ceremony.

Matt Nagle from Aisling Ní Annaidh's group also passed his viva over the summer.

Public Engagements

David McKeown was featured on RTE's Series 2 of Big Life Fix. David applied his engineering skills to Mary Ita's rollator walker, allowing Mary to run competitively with her Parkinson's.

Congratulations to I-Form team members Sampreet Rangaswamy, Shahrzad Sajjadivand, **Mert Celikin**, Alessandra Mileo, and David Kinahan for their involvement in the Pint of Science festival last week (Mert Celikin in his element in the photo on the right).

Fiona Freeman and **David MacManus** took part in Engineers Ireland STEPS Engineering Your Future (STEPS EYF), which is designed to inspire Transition Year students to study engineering.



Mert Celikin



I-Form partnered with Stryker to enhance STEM and manufacturing education in Limerick's primary schools. Over three days, teachers from six local schools received interactive training at Stryker's facility, focusing on integrating 3D printing into their classrooms. This initiative is part of the 'Manufacturing a Healthy Future' program, which has now completed three years of boosting STEM education across Europe.

Program Highlights:

- Trained 212 teachers and engaged 4,500 students across five countries.
- In Ireland alone, 67 teachers and 1,300 pupils have participated.

To know more, visit [I-Form webpage](#)



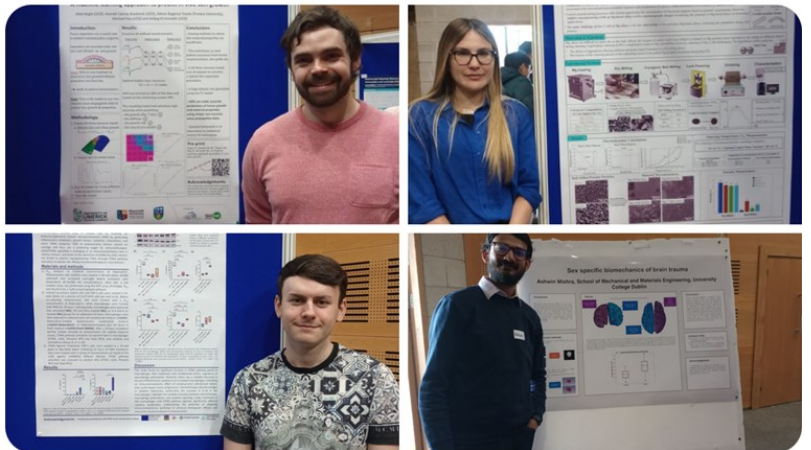
Nan Zhang

Awards:

- The recipient of the 2024 NovaUCD Invention of the Year Award is **Nan Zhang**.
- Maternitec, **Niamh Nowlan's** company was a finalised in Venture Launch Accelerator Programme.
- **Anton Van Beek** won the Best Paper Award at IDETC 2024 in Washington, D.C. for his work titled: "Gaussian Processes for Non-Differentiable Functions with Jumps."
- Michael Connolly supervised by **Malachy O'Rourke** won the prize for best PhD research in Mechanical Engineering at the Sir Bernard Crossland Symposium.

Conferences

- PhD students and postdocs from the school presented their work at the STEM Symposium hosted by the College of Science and the College of Engineering and Architecture (four PhD students at their posters pictured right).
- **Di Nguyen** presented her SFI-funded ReAPT work at the Transport Research Arena (TRA).



- Multiple members of the UCD Mechanics group, including **Aasifa Rounak**, presented their work at the European Nonlinear Dynamics Conference (ENOC) in Delft, Netherlands.



- **Aisling Ni Annaidh** (pictured left) presented her group's work at the European Society for Biomechanics in Edinburgh.
- **Fiona Freeman** presented her group's work in the "Preclinical Models" panel at the MIB Agents Factors conference in Cleveland, Ohio.
- **Kevin Nolan** and **Vikram Pakrashi** (pictured below) attended the 26th International Conference of Theoretical and Applied Mechanics (ICTAM 2024) in Daegu, Korea.

Aisling Ni Annaidh

- **Aisling Ni Annaidh** co-chaired a session on skin biomechanics at the 19th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering in Vancouver, Canada.
- **Fiona Freeman** presented her group's work at the 7th Tissue Engineering and Regenerative Medicine International Society (TERMIS) World Congress in Seattle, Washington.



Kevin Nolan, Vikram Pakrashi

10th Transport Research Arena – Ireland:

- N. MacAuley, A. Brennan, H. Irving, K. Ruane, V. Jaksic, A. Malekjafarian, A. Rounak, K. Nolan and V. Pakrashi, "Non-Contact Measurements of Wind Turbine Blades Repurposed as Pedestrian Bridges".
- C. Bowe, E. O'Brien, M. Arslan Khan, D. McCrum, V. Pakrashi. "Field validation of damage detection in a railway bridge in Ireland using sensor redeployment".
- E. Alexandra Micu, C. Bowe, V. Pakrashi, A. Malekjafarian, E. O'Brien. "Using accelerometers on an in-service train to detect bridge damage and repair".

New Publications

- S. Baishthakur, V. Pakrashi, S. Bhattacharya and B. Fitzgerald. "Impact of sources of damping on the fragility estimates of wind turbine towers". ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems Part B: Mechanical Engineering, 2024.
- S.W. Verbruggen, C.L. Freeman and F.E. Freeman. "Utilizing 3D Models to Unravel the Dynamics of Myeloma Plasma Cells Escape from the Bone Marrow Microenvironment", Cancers, 2024.
- M. Nagle, H. Conroy Broderick, C. Vedel, M. Destrade, M. Fop, A. Ní Annaidh. "A Gaussian Process Approach for Rapid Evaluation of Skin Tension" Acta Biomaterialia, 2024.
- A. Azadi, E.D. O'Cearbhaill, M. Celikin. "The Effect of Powder Size and Morphology on the Sinterability of Bioresorbable Mg-Sr/Ca Alloys", The Minerals, Metals & Materials Series, 2024.
- H. O'Connor, G. Singh, A. Kumar, R. Paetzold, M. Celikin, E.D. O'Cearbhaill. "Fused filament fabrication using stainless steel 316L-polymer blend: Analysis and optimization for green density and surface roughness", Polymer Composites, 2024.
- B. Naab, S Ramachandran, W. Mirihanage, M. Celikin. "Fatigue prediction through quantification of critical defects and crack growth behaviour in additively manufactured Ti-6Al-4V alloy", Materials Science and Engineering: A, 2024.
- J.C. JO'Donoghue and F.E. Freeman "Make it STING: Nanotechnological approaches for activating cGAS/STING as an immunomodulatory node in osteosarcoma" Frontiers in Immunology, 2024.
- L. E. Chaney, A. van Beek, J. R. Downing, J. Zhang, H. Zhang, J. Hui, E. A. Sorensen et al. "Bayesian Optimization of Environmentally Sustainable Graphene Inks Produced by Wet Jet Milling." Small (2024).
- A. Saberi Mehr, A. D. Phillips, M. P. Brandon, M. T. Pryce, J. G. Carton, "Recent challenges and development of technical and technoeconomic aspects for hydrogen storage, insights at different scales; A state of art review", International Journal of Hydrogen Energy, 2024
- P. Esmati, T. Flint, F. Akyel, S. Olschok, U. Reisgen, P. Cardiff, N. O. Larrosa, N. Grilli, "Simulating chemical mixing and molten pool shape in dissimilar welds using thermal fluid dynamics", International Journal of Heat and Mass Transfer, 2024
- S. Bali, Ž. Tuković, P. Cardiff et al. "A finite volume adaptation of beam-to-beam contact interactions implemented for geometrically exact Simo–Reissner beams", Computational Mechanics, 2024.
- D. Armfield, S. Boxwell, L. McNamara, S. Cook, S. Conway, M. Celikin, P. Cardiff, "Effect of bioprosthetic leaflet anisotropy on stent dynamics of Transcatheter Aortic Valve Replacement devices", Journal of the Mechanical Behavior of Biomedical Materials, 2024
- V. Pakrashi, Contribution to European Commission DG-MOVE Report on Decarbonisation: https://transport.ec.europa.eu/document/982f3916-d1e7-427a-93cd-4e8ccfdff6c_en
- L. Muralidharan, P. Cardiff, R. Flavin, A. Ivanković "Patient-specific modelling of contact characteristics in the ankle joint following triple arthrodesis in valgus, neutral and varus hindfoot positions", The Foot, 2024.



College of Engineering and Architecture

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

