

Faculty of Engineering and Technology

January 2024

FET RESEARCH NEWSLETTER

EXTERNAL RESEARCH GRANTS SECURED (THRESHOLD: £10K)

(ARI) £1.3m overall allocated to **Prof. Rob Crain**, **Dr Marie Martig** and **Prof. Ian McCarthy** who were each awarded an STFC Astronomy Small Award which supports theory and new technology research, 2023 – 2026.

(DSRC) £114k 1 year extension funding to LJMU, Prof. Claire Stewart and **Dr Sandra Ortega-Martotell** for the BBSRC project ‘Ageing Research

Translation (ART) of healthy ageing network.’ 2024 – 2025

€175k 9 months funding to LJMU, Prof. Mark Cronin and **Dr Ivan Olier-Caparroso** for the project ‘Grouping of hydrocarbon molecules for PBT/VPVB assessment of UVCB substances’ funded by CONCAWE Environmental Group, 2024

AWARDS/PRIZES/KEYNOTE ADDRESSES (AT RECOGNISED INTERNATIONAL CONFERENCES)

(PROTECT) **Dr Hoshang Kolivand** delivered a keynote talk on ‘Current and Future Challenges of AI in Mixed Reality’ at the 4th Asia Service Sciences and Software Engineering Conference, Aizu-Wakamatsu, Japan, 27th October 2023.

(RCEEE) **Dr Karl O. Jones** was invited to present a keynote address on ‘Audio and Video Forensics’ at the International Research Conference of SLTC 2023, Sri Lanka, 14th-15th December 2023

EXTERNAL COLLABORATION

(ARI) **Prof. Rob Crain** gave a plenary talk at the annual science conference of the UK’s national supercomputing facility for fundamental physics, DiRAC.

(Conservation AI) The work done by Conservation AI was presented at the AI Summit which took place in Bletchley on the 1st – 2nd November. The event was attended by tech companies, as well as politicians from around the globe, including a Speech by the UK Prime Minister and a virtual opening address by King Charles III.

(DSRC) **Dr Ivo Siekmann** was appointed as the Recorder for the Mathematics section for the British Festival Science. This is a science outreach event organised by the British Science Association. The Recorder’s job is to nominate the section president for Mathematics who will give a public talk at the British Science Festival.

(FET) To mark the close and successful delivery of the LCR4 Holistic and CW4.0 project the team hosted a celebratory dinner at the Palm House, Sefton Park to showcase the impact of the projects. More than 100 industry partners were welcomed along with key

stakeholders from across the region. There were digital demonstrations along with the awards presentations from Professor Keith George.

(LOOM) **Dr Musa Bashir** will be working with Bibby Marine, along with a host of other partners as part of project to launch the first large electric ships.

The project has received a £20m boost from Innovate UK and will be the first large vessels running with zero emission. You can read more about the project, and Musa's role [here](#)

NOTABLE PUBLICATIONS

(ARI) McLeod, A.F., Klaassen, P.D., Reiter, M. **Henshaw, J.**, Kuiper, R. and Ginsburg, A. (2023) 'A probable Keplerian disk feeding an optically revealed massive young star, *Nature*, [DOI](#) This article has garnered nearly 300 press pieces, and you can read more about the subject [here](#)

(DSRC) **Ortega-Martotell, S., Bellfield, R.,** Harrison, S., Dyke, D., Williams, N. and **Olier, I.** (2023) 'Mapping the global free expression landscape using machine learning' *SN Applied Sciences*, [DOI](#)

(LOOM) Gurevin, B., Gulturk, F., Yildoz, M., Pehlovan, I., **Nguyen, T.T.**, Caliskan, F., Boru, B. and Yildiz, M.Z. (2023) 'A Novel GUI Design for Comparison of ROS-based Mobile Robot Local Planners' *IEEE Access*, [DOI](#)

(PROTECT) **Albeedan, M., Kolivand, H.,** Hammady, R. and Saba, T. (2023) 'Seamless Crime Scene Reconstruction in Mixed Reality for Investigation Training: A design and Evaluation Study, *IEEE Transactions on Learning Technologies*, [DOI](#)

OTHER ITEMS

(DSRC) **Dr Ivo Siekmann, Dr Sandra Ortega-Martorell** and **James Baker** were awarded a curriculum enhancement internship for the project 'towards a decolonised mathematics curriculum for a globalised world.'

Dr Ivo Siekmann was invited to a workshop on 'parameter identifiability in mathematical biology' at the MATRIX research institute in Australia.

(FET) The LJMU Research and Knowledge Exchange Conference, hosted by FET, took place on the 18th December and was extremely well received by all those in attendance. The 3 keynote speakers (Prof. Janet Hemingway, Sir Michael Bibby and Naomi Matthews) were a particular highlight of the day. Thank you to everyone in the faculty who helped make it such a memorable day. The Vice Chancellors Awards for Excellence took place as well, with the faculty winners being as follows:

VC Award for Excellence in Research – **Dr Musa Bashir**. Congratulations to Musa who also won the University award.

VC Award for Excellence in Knowledge Exchange – **Prof. Trung Thanh Nguyen**

VC Award for Excellence in Research and Knowledge Exchange Support – Lucy Lamb, **Liz Hoare** and **Tracy Branagan**

VC Award for Excellence in the Promotion of EDI in Research and Knowledge Exchange – **Dr Robyn Pyne**

VC Award for Excellence in the Promotion of Sustainability in Research and Knowledge Exchange – **Low Carbon Eco-Innovatory Project Team**. Congratulations to the team who also won the University award.

VC Award for Excellence post-Graduate Research Supervisor – **Dr Renske Smit**

VC Award for Excellence – Rising Star – **Dr Shiqi Fan**

[VC Award for Excellence – Impact Story](#) – **Prof. Trung Thanh Nguyen**. Congratulations to Thanh who also won the University award. You can read more about the ceremony, and can view a full list of the University winners [here](#)

LJMU Chancellor Nisha Katona recently visited FET to hear about the latest research going on. She met ‘Spot’ the dog and visited the maritime simulator and spoke with students about the experience within FET.

FET was represented at the Mersey Maritime Industry Awards, which are sponsored by LJMU. **Prof. Ndy Ekere** and **Prof. Mike Riley** were part of a delegation along with the Vice Chancellor Mark Power, who presented the Net Zero Award. You can read more about the event, and see the full list of FET attendees [here](#).

The next Inaugural Professorial Lecture will be taking place on the 17th January 2024 for **Prof. Patryk Kot**. The talk will be on ‘breaking boundaries with microwave sensors: enabling diverse applications in health, heritage and beyond’ and colleagues are advised to save the date in their diaries. More information will be circulated in due course.

Dr Martin Sharp hosted an IET meeting at Byrom St on the 6th December. The event was on ‘high performance computing, simulation and modelling at LJMU’ and was well received by all those who attended.

(LOOM) **Dr Alan Bury** has been awarded the prestigious Merchant Navy Medal for Meritorious Service for his contribution to maritime education over the past 20 years. The medal is the highest honour within the maritime sector, you can read more about this [here](#).

Dr Edward Shaw hosted a KTP and Impact Awareness Event on the 8th November, with the aim of increasing awareness of KTP opportunities and increasing confidence for industrial engagement.

(PROTECT) **Dr Hoshang Kolivand** has been appointed as external examiner for undergraduate courses in the School of Computing at the University of Portsmouth for a period of 6 years.

Jago Reed-Jones was awarded Silver Prize in Audio Engineering Society (AES) Student matlab hackathon, which was part of the 155th AES Convention, New York.

(RCEEE) **Dr Sebastian Chandler-Crnigoj** was successful in securing PhD funding from FORRI through their TDP bid.

Faculty of Engineering and Technology

March 2024

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(EEE) £33k awarded to **Dr Princy Johnson** for the AKT project with Yuken-Europe, Innovate UK.

(LCEI) £1.7m allocated to LJMU as lead partner of Low Carbon Eco-Innovatory, **Lesley Lambert (PI)**, a partnership between LJMU and University of Liverpool, from a total £2.9m, funded by the UK Shared Prosperity Fund (UKSPF) with the Liverpool City Region Combined Authority as the lead (LCRA), 2023-2025.

(LOOM) £398k awarded to LJMU, Mobile Energy Storage Unit with Swappable Second-Life Battery (METTLE), **Dr Musa Bashir (PI)**, **Prof. Ndy Ekere**, **Prof. Jin Wang**, **Prof. Zaili Yang**, **Dr Christian Matthews** and **Dr Hiren Kotadia**. LJMU as a consortium

partner for the grant of £1.8m, UKRI-Innovate UK, 2024-2026.

€237k allocated to LJMU, DROMS-FOWT, development of a real-time opportunistic maintenance strategy for floating offshore wind turbines, **Prof. Jin Wang (PI)**, **Dr Musa Bashir**, **Dr Michaela Gkantou**, **Dr Sean Loughney**, **Prof. Zaili Yang**, EU Horizon Europe, 2024-2026.

£10k awarded to LJMU, Enabling Cost-effective and low carbon blue-green mobility, **Prof. Jin Wang (PI)**, **Prof. Trung Thanh Nguyen**, **Dr Edward Shaw**, **Prof. Zaili Yang**, **Dr Musa Bashir**, **Dr Milad Armin**, **Dr Eddie Blanco Davis**, British Academy, 2024.

AWARDS/PRIZES/KEYNOTE ADDRESSES (AT RECOGNISED INTERNATIONAL CONFERENCES)

(BEST) **Dr Tina Marolt Cebasek** delivered a keynote on 'bridging the innovation gap in construction with application of machine learning for selection of telescope clamshell enclosure' at the Annual International Research Symposium, Colombo, 15th February 2024.

(PROTECT) **Dr Gabriela Czanner** delivered a keynote speech on 'ophthalmology research for better healthcare in the era of AI and modern statistics: experience and visions for the future' at the 1st Retina Summit, Zvolen, Slovakia, 9th-10th February 2024.

Dr Hoshang Kolivand delivered a keynote talk on 'Tomorrow's of Augmented Reality with AI' at the 13th International Conference on Software and Computer Applications (ICSCA 2024), Bali, 1st-3rd February 2024.

Dr Hoshang Kolivand delivered a keynote on 'Impact of AI on Leadership' at the 9th Impact Leadership Conference for leaders of industries, Manchester, 17th February 2024.

IMPORTANT ITEMS FOR POSTGRADUATE RESEARCHERS INCLUDING PHD COMPLETIONS AND RESEARCH INITIATIVES AT FET

(FET) The annual Faculty PGR Research Conference will be taking place on the 15th May at Byrom St. More details will be circulated in due course, colleagues are encouraged to make a note of the date and attend where possible.

(LOOM) PhD candidate **Xinrui Liang** has been awarded a €10K prize from the Bureau of International Containers (BIC) Fund, recognizing her research on

advancing intermodal transportations safety, security, standardization and sustainability. Awarded for her promising research on international container cargo theft risk, Xinrui's work underscores BIC's commitment to innovation. The BIC award is very competitive as it only awards one winner every year in the world.

INTRODUCTION TO NEWLY APPOINTED RESEARCH ACTIVE MEMBERS

(DSRC) **Ryan A.A. Bellfield** joined the Data Science Research Centre as a Research Associate on Trustworthy AI to work with the EU Horizon Project 'ARISTTTLES'. Ryan did a PhD in developing machine learning with application in cardiovascular

research and is awaiting his viva. His research interest is in the development and implementation of machine learning models to a variety of different research areas. He is keen on collaborating with others in areas of mutual interest.

EXTERNAL COLLABORATION

(ARI) **Dr Gavin Lamb** has been invited to give the SPIMAX seminar on his recent research on the 28th February at the Department of Physics and Astronomy, University of Oxford.

(PROTECT) **Dr Wasiq Khan's** innovate-funded initiative with EdenFiftyOne Ltd is showcasing its capabilities to multiple schools across the UK. Teacher feedback has specifically recognized the

innovative features that enhance accessibility and interactivity, allowing users to engage with tutors' knowledge, experience, sector-specialism and teaching style from any location at any time, and without constraints. Presently they are collaboratively undertaking an impact case study involving a broader spectrum of schools in the UK.

NOTABLE PUBLICATIONS

(ARI) **Healy-Kalesh, M., Darnley, M., Harvey, E.** and **Newsam A.** (2024) 'Discovery of a nova super-remnant cavity surrounding RS Ophiuchi' *Royal Astronomical Society Letters*, [DOI](#)

(DSRC) Ugan, G., Pons-Escoda, A., Ulinic, D., Arús, C., **Ortega-Martorell, S., Olier, I.**, Vellido, A., Majós, C. and Julià-Sapé, M., (2024) Early pseudo progression and progression lesions in glioblastoma patients are both metabolically heterogeneous. *NMR in Biomedicine*, [DOI](#)

(LOOM) Ma, F., Kang, Z., Chen, C., Sun, J., Xu, X.B and **Wang, J.** (2024) ‘Identifying ships from radar blips like humans using a customized neural network.’ *IEEE Intelligent Transportation Systems Transactions*, [DOI](#)

(PROTECT) **Alatrany, A., Khan W., Hussain A., Kolivand H. and Al-Jumeily, D.** (2024) ‘An explainable machine learning approach for Alzheimer’s Disease classification.’ *Nature Scientific Reports*, [DOI](#)

OTHER ITEMS

(ARI) **Prof. Iain Steele** has been appointed to the Science Board of the UKRO Science and Technologies Research Council (STFC) for a period of 4 years from January 2024. Its purpose is to provide STFC with a strategic scientific overview and assessment of, and science advice on, all the programmes STFC supports.

(BEST) **Prof. Patryk Kot** delivered his inaugural Professorial lecture on the 17th January. The talk was on ‘breaking boundaries with microwave sensors: enabling diverse applications in health, heritage and beyond’ and was very well received by all those who attended.

Prof. Mike Riley launched his new book ‘Design for Dementia: Living Well at Home’ published by Routledge. The book present practical designed guidance backed up by more than 15 years of research by experienced designers and engineers.

Dr Yangming Gao and **Prof. Patryk Kot** have developed self-sensing asphalt which has the potential to revolutionize the upkeep of Britain’s highways. The research was conducted in collaboration with colleagues at the Wuhan Institute of Technology, and you can read more about it [here](#).

(Conservation AI) The team have acquired three powerful NVIDIA DGX deep learning systems, which will push the boundaries of AI modelling. This is part of an ongoing collaboration with NVIDIA, the world leader in AI. You can read more about the new systems [here](#).

(DSRC) **Dr Ivo Siekmann** is currently guest editor for two special issues; Mathematical Bioscience and Engineering “[Dynamical Systems – the language of Mathematical Biology?](#)” and MDPI Mathematics “[Stochastic Models in Biology, Vol, 2](#)”.

Dr Sandra Ortega kicked off her £10m TARGET project in Liverpool with the other 19 partners from the Consortium. The partners will develop personalized machine-learning models to support treatment for people at risk of stroke due to atrial fibrillation. You can read more about the project [here](#).

(EEE) **Dr Princy Johnson** was elected Chair of IEEE UK&I Women in Engineering affinity group, January 2024.

Dr Princy Johnson’s KTP project GuardianAI, with CAL International Ltd has been graded ‘Outstanding’ by Innovate UK.

(LOOM) **Dr Anna Kaparaki**, along with colleagues from the school of Engineering as well as the Vice-Chancellor, attended the first Women’s International Shipping and Trading Association (WISTA), hosted by Mersey Maritime. Anna also worked closely with the event organisers to promote attendance.

(PROTECT) **Dr Gabriela Czanner** was an expert delegate (sponsored by the Slovak Government) at the UNESCO Global Forum on the ethics of AI, 5th – 6th February, Ljubljana, Slovakia.

Faculty of Engineering and Technology

May 2024

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(BEST) £10k awarded to LJMU, Strengthening Infrastructure Resilience: A Digital Twin-Driven, Multiscale Multi-Sensing Monitoring Approach for Intelligent Disaster Prevention, **Dr Maria Ferentinou, Prof. Paul Fergus, Dr Dursun Onur**, British Academy, 2024.

£47k awarded to LJMU, Innovation and Digitalisation pathways for a more affordable housing in Sub-Saharan Africa, **Dr Maria Ferentinou, Dr Michael Farragher, Dr Christaline Wijekoon**, Royal Academy of Engineering, 2024.

£50k allocated to LJMU, Capacity Building in Built Environment Sustainability Research (CAPABLE), **Dr Anupa Manewa (PI), Dr Mohan Siriwardena (Co-I)**. LJMU is the lead partner, total grant is £190k, British Council UKIERI, 2024 – 2026.

(EEE) £112k allocated to LJMU, Quantum-secure cryptography for resource-constrained IoT devices, **Prof. Jian Zhang (PI) and Prof. Wei Zhang**, Innovate UK, 2024 – 2025.

(LOOM) £47k allocated to LJMU, Liverpool/Belfast Shipping Corridor, **Prof. Trung Thanh Nguyen (PI), Prof. Jin Wang, Prof. Zaili Yang, Prof. Mike Riley, Dr Robyn Pyne, Dr Dimitrios Paraskevadakis**. LJMU as the consortium partner for the grant of £500K funded by UKRI via the Connected Places Catapult, 2024.

£345k awarded to LJMU, Development of a HIGH Capacity FLEXible Energy Storage System for Mini-Grid Application in Sub-Sahara Africa (High ESS), **Dr Musa Bashir (PI), Prof. Jin Wang, Prof. Ndy Ekere, Dr Christian Matthews, Dr Hiren Kotadia, Prof. Zaili Yang**. LJMU as a consortium partner for the grant of £1.1m UKRI-Innovate UK, 2024-2026.

AWARDS/PRIZES/KEYNOTE ADDRESSES (AT RECOGNISED INTERNATIONAL CONFERENCES)

(BEST) **Prof. Monower Sadique** delivered a keynote at the Cementitious Materials International Trade and Technical Congress on 'LJMU developed self-activated geopolymer', Casablanca, 18th – 19th April 2024.

(EEE) **Emeritus Prof. Emil Levi** delivered a keynote at the 25th IEEE International Conference on Industrial Technology titled 'Electric Vehicle Battery Charging using Plug-In Solutions', Bristol, 25th – 27th March 2024.

Dr Karl O. Jones delivered a keynote at the International Research Conference of SLTC titled

'Audio and Video Forensics: A New Area for Research and Teaching', Colombo, 15th December 2023.

(PROTECT) **Dr Hoshang Kolivand** delivered a keynote at the 9th Global Webinar on Applied Science, Engineering and Technology titled 'AI in Today's and Future of Mixed Reality, USA, 5th March 2024

Dr Hoshang Kolivand delivered a plenary speech at the 4th Unicaf University Graduate Conference titled 'breaking boundaries with AI in current and future of Augmented and virtual reality', Cyprus, 15th April 2024.

RESEARCH IMPACT GENERATING ACTIVITIES

(LOOM) **Prof. Trung Thanh Nguyen** and **Mr. Ali Mokhtari Moghadam** have delivered an analysis of air quality in the Wirral utilizing air quality sensor data in the area. The outcome of the analysis will help the Wirral Council to better understand the air quality in

the region and carry out appropriate action to improve air quality. The analysis will be included in the Wirral Council's Annual Status Report.

IMPORTANT ITEMS FOR POSTGRADUATE RESEARCHERS INCLUDING PHD COMPLETIONS AND RESEARCH INITIATIVES AT FET

(FET) The annual Faculty Postgraduate Research Conference will be taking place on the 15th May in the Adaptive Learning Zone, Byrom St. The final programme for the day will be circulated shortly and colleagues are encouraged to attend where possible.

(ARI) **Beth Garton** has been awarded a bursary of £1k from the Association of British Spectroscopists. This is in relation to her research and will be used towards a poster presentation at the SPIE Astronomical Telescopes and Instrumentation Conference in Yokohama, Japan.

NOTABLE PUBLICATIONS

(DSRC) **Bellfield, R.A., Ortega-Martorell, S., Lip, G.Y., Oxborough, D. and Olier, I.** (2024) 'Impact of ECG data format on the performance of machine learning models for the prediction of myocardial infarction', *Journal of Electrocardiology*, 84, pp. 17 – 26, [DOI](#).

(LOOM) **Chang, C.H., Wijeratne, I.B., Kontovas, C. and Yang, Z.** (2024) 'COLREG and MASS: Analytical review to identify research trends and gaps in the development of autonomous collision avoidance' *Ocean Engineering*, [DOI](#). This is a major research output from an ESRC funded project

'Maritime Autonomous Ships: A UK-Taiwan joint co-operation in integrating the regulatory framework'.

(PROTECT) **Billichová, M., Coan, L.J., Czanner, S., Kováčová, M., Sharfian, F., Czanner, G.** (2024) 'Comparing the performance of statistical, machine learning, and deep learning algorithms to predict time-to-event: A simulation study for conversion to mild cognitive impairment', *PLoS One*, [DOI](#). This was done via external collaboration with Slovak University of Technology, Faculty of Informatics and Information Technologies.

OTHER ITEMS

(ARI) **Dr Gavin Lamb** was interviewed by the Jodrell Bank Centre for Astrophysics about his research for their first podcast, Jodcast. The episode can be listened to here: <https://www.jodcast.net/archive/202404/> with Dr Lamb's section starting at the 17-minute mark.

(BEST) **Prof. Mike Riley** was one of several LJMU members of staff who received recognition from Club Liverpool for their roles in bringing education and research conferences to the City last year that boosted the local economy by £775k.

The school of Civil Engineering and Built Environment has begun a 2-year collaborative project in India to upskill students in green construction. The collaboration with the College of architecture for Women, IIT Bombay and the Pune Construction Engineering Research Foundation is funded by the UK-India Education and Research Initiative. The project is led by **Dr Anupa Manewa** and **Dr Mohan Siriwardena** and includes workshops, hands-on training sessions and field visits.

(EEE) **Dr Colin Robinson** has been working with the following media companies with forensic audio items; BBC Verify, CBS TV, Reuters and the Washington Post. Analysis carried out by the Advanced Forensic Technology Research Group (AFTeR) for the BBC was able to debunk a Russian video blaming Ukraine for a recent terrorist attack by using a gap in the audio frequency data which indicated that the sound had been edited.

(FET) **Dr Denise Lee** and **Dr Robyn Pyne** were part of seven female Associate Deans who shared their career journeys with local schools as part of this year's International Women's Day celebrations. You can read more about this [here](#).

The Inaugural Professorial lecture for **Prof. Rob Crain** will be taking place on the 15th May at 5:30pm. The talk will be on 'Utilica ex machina: building a computer-aided understanding of the cosmos'. You can register for the event [here](#).

(LOOM) **Dr Eddie Blanco Davis** delivered a faculty seminar on 'Looking at Hydrogen and other alternative fuels across different transportation modes and understanding their role as environmentally sustainable alternatives' at the Centre for Shipping and Logistics, Bergen School of Economics, Norway.

Dr Anna Kaparaki has been named in All About Shipping's List of the '100 Top Women in the Shipping Industry for 2023' for the fifth consecutive year. The list recognizes the contributions of women across all sections of the shipping industry, and Anna was selected from more than 1000 women to feature in the list. You can read more about this [here](#).

Dr Dimitrios Paraskevadakis took part in a UK/USA delegation to explore green shipping corridor exploration. LJMU presented work from hybrid industrial and academic research projects on Intermodal Logistics Gateways and Modal Shift in the global collaboration event.

(UKMUC) Staff from Engineering welcomed visitors from research partners Universiti Malaysia Perlis, UTeM and University of Malaysia to Liverpool as part of the British Council UK-Malaysia University Consortium. The project is looking into the resilience of rail and seaport infrastructure and the group took part in a port tour facilitated by Mersey Maritime and Peel Ports Group.