

ATU Research Showcase

Meet ATU's Health-Tech Leaders

Shaping the Future of Healthcare Through Technology and Research at ATU



Ollscoil
Teicneolaíochta
an Atlantaigh

Atlantic
Technological
University

November 2025



This booklet was compiled and designed by the ATU Research Coordinator Team, Dr James Britton & Dr Shane Conway, and funded through RISE@ATU.



Dr James Britton



Dr Shane Conway

November 2025

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To mark Research Ireland's Science Week 2025 (9–16 November), the Research Coordinator team at Atlantic Technological University (ATU), funded through RISE@ATU, has produced the second edition of the ATU Research Showcase Series, highlighting the work of ATU researchers transforming healthcare through technology and innovation.

From optimising biopharmaceutical production to developing artificial intelligence platforms for novel diagnostics, and from advanced manufacturing of medical devices to digital therapeutics that enhance wellbeing among vulnerable populations, this edition illustrates how ATU research is delivering real-world impact for patients, practitioners, and communities across the west and north-west of Ireland, and beyond. It showcases interdisciplinary research, innovation and collaboration across ATU's faculties and Research Centres.

As the technological university for the west and north-west, ATU grounds this innovation in regional and national priorities. Through alignment with Ireland's National Smart Specialisation Strategy (S3) for Innovation 2022–2027, ATU contributes to sectoral strengths and potential opportunities in Life Sciences, MedTech, and Medical Devices, while also driving emerging opportunities in Advanced Manufacturing, Engineering, ICT, and Digital Services, reinforcing our role as a key innovation partner.

This booklet presents a sample of 12 researchers whose profiles reflect the breadth of ATU's growing expertise in health-tech research and innovation. Their selection spans multiple campuses and faculties, demonstrating the university's interdisciplinary strengths and collaborative ethos, while reinforcing Ireland's position as a global leader in health innovation.

Many other colleagues across ATU are also making significant contributions to this field, and their work is equally valued. These profiles are intended to highlight a cross-section of ATU's strengths in this area, rather than provide an exhaustive list.

Profiled ATU Researchers

Dr Marion McAfee - <i>Utilising Computational Modelling to Improve Medical Device & Medicine Production</i>	p.6
Dr Lisa Ryan - <i>Understanding Nutrition and Bioactive Compounds to Improve Health & Performance</i>	p.8
Dr Michael McCann - <i>Powering Health Technology with High Performance Computing and Data Analytics</i>	p.10
Faizan Munawar - <i>Data-Driven Modelling & Digital Twins for Health</i>	p.12
Dr Anushree Dwivedi - <i>Engineering Solutions to Ischemic Stroke to Improve Patient Outcomes</i>	p.14
Dr Aoife Hill - <i>Mathematical Modelling of Novel Materials for Health</i>	p.16
Dr Jamie Roche - <i>Advancing Artificial Intelligence to Tackle Real World Problems</i>	p.18
Dr Kenneth Monaghan - <i>Advancing Remote Neurorehabilitation through Innovative Digital Therapies</i>	p.20
Dr Saritha Unnikrishnan - <i>Building Transparent and Uncertainty-Aware AI for Cancer Diagnosis</i>	p.22
Dr Karla Muñoz Esquivel - <i>Tech for Digital Skills and Wellbeing Enhancement of Social and Healthcare Staff</i>	p.24
Dr Richéal Burns - <i>Health Economic Evaluation of Innovative Interventions and Policy</i>	p.26
Dr Konrad Mulrennan - <i>Engineering for Advanced Manufacturing and Digital Health</i>	p.28



ATU Campus Locations

Meet ATU's Health

Shaping the Future of Healthcare Through

Dr Marion
McAfee



Taighd
Research

Dr Michael
McCann



Dr Anushree
Dwivedi



Dr Jamie
Roche



Dr Saritha
Unnikrishnan



Dr Richéal
Burns



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Health-Tech Leaders

Through Technology and Research at ATU

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Dr Lisa
Ryan



Faizan
Munawar



Dr Aoife
Hill



Dr Kenneth
Monaghan



Dr Karla
Muñoz
Esquivel



Dr Konrad
Mulrennan

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Showcase

Dr Marion McAfee

*Utilising Computational Modelling to Improve
Medical Device & Medicine Production*



ATU Sligo

Dr Marion McAfee is a Senior Lecturer in Systems and Control Engineering in ATU Sligo. Her research interests are in sensing, modelling and control in applications encompassing advanced manufacturing, medical devices, and autonomous systems. She develops novel instrumentation, modelling and control solutions for polymer and biomaterial processing to improve product quality, enhance process efficiency and reduce waste.

Dr McAfee is also Co-Director of the ATU Centre for Mathematical Modelling & Intelligent Systems for Health and Environment (MISHE) and a Co-Lead for the first ATU Postgraduate Research Training Programme MOCHAS (Modelling and Computation for health &

Dr Marion McAfee

Utilising Computational Modelling to Improve Medical Device & Medicine Production

society). She is also a lead supervisor in the TU RISE funded Postgraduate Research and Training Programme (P RTP) in Innovation in Digital Manufacturing and Design (IDMD) where her student is developing advanced manufacturing solutions for development of smart drug delivery implants, using stimuli-responsive materials which respond to the healing process. This will allow for improved therapeutic efficiency, quality and sustainability.

Marion is a Principal Investigator (PI) in the Research Ireland Frontiers for the Future PROCEED 3D project. PROCEED 3D aims to develop 3D printing technologies for personalised drug delivery devices at the point of care. Marions research group in ATU are working on improving the 3D printing process for medical devices using computational modelling and the development of personalised 3D printed ureteral stents. She is also a PI in Research Ireland funded advanced manufacturing research centre I-Form.



Dr Lisa Ryan

*Understanding Nutrition and Bioactive Compounds
to Improve Health & Performance*



ATU Galway

Dr Lisa Ryan, Head of School of Health, Sport Science & Nutrition at ATU Galway is an expert in nutrition and bioactive compounds and their effects on exercise, performance and sport related injury.

Dr Ryan is a leading researcher on concussion management in sport, with a particular interest in sex-based differences in concussion presentation and management. In 2018, Dr Ryan co-founded the Irish Concussion Research Centre (ICRC) which aims to develop education and awareness programmes to offer a better understanding of concussion and to improve concussion management and recovery in sport. Lisa is also a Principal Investigator in the Medical & Engineering Technology (MET) Centre.

Dr Lisa Ryan

*Understanding Nutrition and Bioactive Compounds
to Improve Health & Performance*

Dr Ryan has attracted considerable research income in the area of phytochemicals and functional foods. To date, she has worked with over 50 industry partners including small discrete projects and larger clinical trials and has also attracted research funding from funding agencies such as the Medical Research Council (MRC, UK), The Nuffield Trust (UK), The Wellcome Trust (UK), DAFM (Ireland) and EU funding calls. In 2015, Lisa was awarded the prestigious Agrifood Fellowship in Australia to investigate the potential of marine polyphenols as anti-diabetic agents. Currently, Dr Ryan is lead Principal Investigator (PI) on five European Projects and three nationally funded projects in the areas of sport science, nutrition and women's health.

Dr Ryan is also a highly experienced PhD supervisor having guided 17 students through to completion of their doctoral studies. Currently Lisa's research group consists of 12 PhD students, two Postdoctoral researchers and five research assistants. She is also a Principal Investigator (PI) on the TU RISE funded THRIVE Postgraduate Research & Training Programme (PRTP).



Dr Michael McCann

Powering Health Technology with High Performance Computing and Data Analytics



ATU Donegal

Dr Michael McCann, Senior Lecturer for Research Development and Academic Director of the JANUS Research Centre for Artificial Intelligence (AI), High Performance Computing (HPC) and Emerging Technologies at ATU, and Co-Investigator at the Insight Centre for Data Analytics, has secured over €8 million in direct ATU research and innovation funding as part of multi-partner programmes with a combined value exceeding €45 million. His work spans AI infrastructure, data-driven healthcare and regional digital innovation.

Michael is ATU lead on ONEHEALTH (€9.85 m), building a cross-border AI ecosystem for health, agrifood and environmental innovation. He is also ATU co-lead on iMPROVE (€10 m), which

Dr Michael McCann

Powering Health Technology with High Performance Computing and Data Analytics

integrates pharmacogenomics and person-centred medication review to reduce adverse drug events across Ireland, Northern Ireland & Scotland, and on PEACETIME (€9.84 m), a digital-health programme addressing obesity and diabetes through AI-enabled community interventions.

He also serves as Lead PI for the Data2Sustain European Digital Innovation Hub, supporting SMEs in their adoption of AI and sustainability technologies, and Lead PI for the THRIVE Postgraduate Research Training Programme (P RTP), developing advanced skills in AI engineering and data science applied to the impact of social media on student wellbeing.

Central to this portfolio is the development of new HPC and data ingestion infrastructure at ATU, providing researchers and industry partners with secure, scalable compute and data pipelines for AI model training, simulation and digital-twin development. This investment is enabling a step-change in ATU's research capacity and underpinning cross-disciplinary collaboration across health, agri-tech and sustainability domains.

Through these initiatives, Dr McCann is strengthening ATU's leadership in applied AI and HPC, advancing cross-border research collaboration and ensuring that digital innovation delivers real-world impact for communities and the regional economy.

Faizan Munawar

Data-Driven Modelling & Digital Twins for Health



ATU Sligo

Faizan Munawar is a Staff Researcher in the Department of Mechatronic Engineering at ATU Sligo. During his PhD, his research focused on data-driven modelling and analysis of glycaemic variability in Type 1 diabetes using machine learning techniques.

Prior to this, he explored the application of machine learning for broader healthcare challenges, including computer-aided diagnosis using Generative Adversarial Networks (GANs).

Faizan has published articles exploring the use of GANs for analysis of chest X-rays for respiratory disease and on the development of new methods of monitoring glycaemic variability for improved personal diabetes management.

Faizan Munawar

Data-Driven Modelling & Digital Twins for Health

Faizan is currently working on the development of a digital twin framework for powder granulation and drying processes in pharmaceutical manufacturing. This research aims to enable real-time process monitoring, intelligent control, and predictive maintenance to improve product quality and operational efficiency in advanced manufacturing environments.



Dr Anushree Dwivedi

*Engineering Solutions to Ischemic Stroke to
Improve Patient Outcomes*



ATU Galway

Dr Anushree Dwivedi is a Lecturer in the Department of Mechanical and Industrial Engineering and Principal Investigator in the Medical and Engineering Technology Research Centre (MET centre) at ATU Galway. Dr Dwivedi is a Biomedical Engineer who works to understand the mechanisms of ischemic stroke with an aim of developing novel devices and improved treatments for stroke patients using artificial intelligence. She has been involved in European projects, collaborating with leading Neurosurgeons and academics to develop in silico clinical trials for acute ischemic stroke. Currently, Dr Dwivedi is involved in the supervision of several PhD and Masters students in ATU.

Prior to joining ATU Anushree, completed her

Dr Anushree Dwivedi

*Engineering Solutions to Ischemic Stroke to
Improve Patient Outcomes*

PhD in the University of Limerick funded by the Irish Research Council, where she investigated the factors involved in the metastasis of breast cancer to bone and the development of germanium nanowires for use in targeted drug delivery or tissue repair.

Dr Anushree is also an avid campaigner for women in STEM, spearheading the ATU Women in STEM (WiSTEM) society which empowers women to pursue careers in STEM disciplines. In 2024, Dr Dwivedi was instrumental in the expansion of the Johnson & Johnson Women in STEM2D (WiSTEM2D) program which supports women to start their career in STEM through mentoring, site tours, workshops and bursaries.

Dr Anushree is also the holder of US patents for 7 Medical Devices and has submitted a further 3 patent applications for consideration in the US, China, EU and South Korea. These patents describe devices to assist in the detection and removal of clots from blood vessels among other inventions. Dr Dwivedi is a solution focused academic whose inventions have the potential to improve the lives of millions.



Dr Aoife Hill

*Mathematical Modelling of Novel Materials
for Health*



ATU Donegal

Dr Aoife Hill, Lecturer in Computing at ATU Donegal and Principal Investigator in the ATU research centre MISHE (Mathematical Modelling & Intelligent Systems for Health & Environment), is a mathematician with an interest in mathematical modelling of novel materials.

Dr Hill completed her PhD in the University of Galway under the supervision of Dr William Ronan where she explored the characteristics of biodegrading polymers, using statistical equations to predict their properties and define suitable compounds for use as medical implants.

Dr Hill's research focuses on optimising material design to support their use in healthcare settings, with a particular focus on the impact of changes

Dr Aoife Hill

Mathematical Modelling of Novel Materials for Health

that occur during the lifecycle of degrading medical implants. Implants that degrade safely in the body once they have fulfilled their purpose limits the need for repeat surgeries, putting less strain on patients and freeing up healthcare resources. As these materials degrade, they also offer a solution to plastic pollution and help reduce landfill waste. In this way, Dr Hill's work will lead us to a more optimised and sustainable healthcare system in the future.



Dr Jamie Roche

Advancing Artificial Intelligence to Tackle Real World Problems



ATU Sligo

Dr Jamie Roche is a Lecturer in Robotics and Automation in the Department of Mechatronic Engineering at ATU Sligo's School of Engineering and Design and a visiting researcher at Loughborough University London. Dr Roche is a Principal Investigator in the Precision Engineering Materials and Manufacturing (PEM), Wireless Sensor and Applied Research (WiSAR), and the Mathematical Modelling and Intelligent Systems for Health and Environment (MISHE) research centres at ATU.

Jamie holds a PhD, for which he was awarded the Wolfson studentship by Loughborough University, and a M.Sc. in digital technologies from Loughborough University London. Before coming to ATU, Jamie was a Research Fellow

Dr Jamie Roche

Advancing Artificial Intelligence to Tackle Real World Problems

at Loughborough University London, working on the Multimodal Imitation Learning in Multi-Agent Environments (MIMlC) project funded by the EPSRC, supported by Chelsea Football Club and Toyota. This project aimed to “teach” an A.I agent how to behave in complex environments and has applications in driverless cars, assistive robots and other areas.

Dr Roche is an expert in using robotics, automation, artificial intelligence and process instrumentation for applications in health, agriculture, industry and beyond. His research interests are in the utilisation of machine learning (A.I) in sensor data fusion, free space detection, human activity recognition, social scene understanding, modelling of multi-agent systems with application to intelligent mobility, path planning and sports analytics. Recent studies by Dr Roche include the use of machine learning to develop a novel diagnostic test to screen patients for neurodegenerative diseases such as dementia and Alzheimer’s disease.



Dr Kenneth Monaghan

*Advancing Remote Neurorehabilitation through
Innovative Digital Therapies*



ATU Sligo

Dr Kenneth Monaghan is Lecturer in Health Science at ATU Sligo and Director of 'Neuroplasticity Research Group' in ATU's Health and Biomedical Research Centre (HEAL). He leads pioneering research at the interface of telemedicine, digital health technology, web-based platform systems, stroke rehabilitation and sports medicine.

As ATU's lead in the 'Mechatronic Remote Physiotherapy System (MRPS)' project, co-funded by Science Foundation Ireland (SFI) Acceleration for Research Commercialisation fund and co-led with the University of Galway, Dr Monaghan is developing remote web-based platform systems to enable neurology and orthopaedic patients to rehabilitate successfully in their own homes

Dr Kenneth Monaghan

Advancing Remote Neurorehabilitation through Innovative Digital Therapies

under the supervision of an Allied Healthcare Professional. This work addresses three critical challenges for patients requiring adequate rehabilitation simultaneously; distance, transport and accessibility to healthcare which result in many rural and urban patients being unable to easily access clinical rehabilitation.

By advancing telerehabilitation as the remote rehabilitation service of the future, Kenneth's research embodies the principles of STEM and ATU's contribution towards public engagement and research impact. His leadership positions ATU at the forefront of next generation telemedicine, advancing Ireland's clinical health pathways while contributing to global efforts to improve rehabilitation post neurology and orthopaedic injury.



Dr Saritha Unnikrishnan

*Building Transparent and Uncertainty-Aware AI
for Cancer Diagnosis*



ATU Sligo

Dr Saritha Unnikrishnan is a Lecturer in Computing at ATU Sligo and a Principal Investigator in AI-driven Computer Vision in four strategic research centres at ATU; the Health & Biomedical centre (HEAL), the Mathematical Modelling & Intelligent Systems for Health & Environment centre (MISHE), the Precision Engineering materials and manufacturing centre (PEM) and the JANUS centre for AI, HPC and emerging Technologies.

Dr Unnikrishnan undertook her PhD in ATU where she explored machine learning and image processing techniques for pharmaceutical applications in collaboration with GSK. Her current research addresses some of the pressing challenges in healthcare and energy-intensive industries by leveraging the power of AI and

Dr Saritha Unnikrishnan

*Building Transparent and Uncertainty-Aware AI
for Cancer Diagnosis*

at the same time addressing some of the well-known AI challenges such as lack of transparency and generalisability. She leads a team of 12 PhD researchers funded under TU RISE by the ERDF and HEA from 2024-2028.

Currently, Dr Unnikrishnan and her team of researchers develop explainable and uncertainty-aware Artificial Intelligence frameworks for use in diagnostics such as breast cancer screening, pre-surgical tumour sizing and the identification of advanced MRI biomarkers of malignant brain tumours. While AI is a promising tool for the analysis of complex patient data such as medical images, to be accepted for use by medical professionals, the methods of diagnosis by AI systems must be explainable and transparent. Dr Unnikrishnan's research accelerates trust in AI systems for use in medical settings, which will aid their acceptance and uptake in this context, leading to a better outcome for patients. She has led major enterprise funded research and commercialisation projects, securing over €2 million in funding from national and international funders. Her work is actively used by industry, such as an AI-enabled computer vision solution currently licensed to a multinational company.



Dr Karla Muñoz Esquivel

*Tech for Digital Skills and Wellbeing Enhancement
of Social and Healthcare Staff*



ATU Donegal

Dr Karla Muñoz Esquivel is a Lecturer in Computing at ATU Donegal, and a Principal Investigator and researcher at WiSAR and MISHE research centres at ATU. Her work focuses on the areas of connected health, e-Health, and Artificial Intelligence.

Dr Muñoz Esquivel is enthusiastic about working on projects which use technology to create social impact and help to change people's lives.

She is co-leading investigator and researcher in two Interreg EU Northern Periphery Arctic (NPA) projects: RemoTED and Tech2Heal. RemoTED (2025-2028) aims to train health and social care professionals in remote areas to enhance digital skills and support the use of technology

Dr Karla Muñoz Esquivel

*Tech for Digital Skills and Wellbeing Enhancement
of Social and Healthcare Staff*

for enhanced service delivery. Tech2Heal (2024-2027) aims to attain an enhanced understanding of the well-being of vulnerable populations of workers in sparsely populated areas, who are prone to retire early, owed to poor well-being. This will be done by monitoring well-being with technologies, measuring using validated/custom questionnaires and conducting interviews.



Dr Richéal Burns

Health Economic Evaluation of Innovative Interventions and Policy



ATU Sligo

Dr Richéal Burns, Co-founder and Director of the Health and Biomedical (HEAL) Research Centre, and Lecturer in Health Information Technology at ATU Sligo, is an expert health economist, analysing and applying economic principles for assessing value-added strategies for healthcare systems to improve outcomes for patients.

Dr Burns's work spans several clinical areas including prostate cancer, brain tumours, inflammatory bowel disease, transplantation research, mental health, health literacy and autism, with over 40 peer-reviewed publications across these areas. Her approach combines applied health economics, clinical trials evaluation, patient and public involvement (PPI) techniques and burden of illness analysis.

Dr Richéal Burns

Health Economic Evaluation of Innovative Interventions and Policy

Richéal is an ATU Principal Investigator (PI) in two Peace Plus projects (PEACETIME & IMPROVE) and a 'strand lead' for a Peace Plus project led by Catalyst in Northern Ireland (ONEHEALTH) representing over €30 million in funding, enhancing healthcare delivery and outcomes for those in the border region.

Dr Burns leads the health economics for PEACETIME which investigates interventions for those living with obesity across the Northwest. She is also work package lead for data analytics and lead health economist on IMPROVE which aims to understand how genomics can impact patients' response to medication (pharmacogenomics). Richéal collaborates on the ONEHEALTH project which supports integrating AI applications in innovative industries for improving healthcare provision. Dr Burns also has an active portfolio funded by the European Digital Innovation Hub's Data2Sustain project, supporting the HSE with digital innovation solutions for improved service, supply and efficiency.

Dr Burns is involved in two ATU Postgraduate Research and Training Programmes (PRTP's); THRIVE (funded under TU RISE) & MOCHAS supervising 3 PhD students in areas such as pharmacogenomics testing in primary care for multimorbidity, determinants of vaccination hesitancy and screening uptake, and the use of advanced modelling techniques for health process innovations.

Dr Konrad Mulrennan

*Engineering for Advanced Manufacturing and
Digital Health*



ATU Sligo

Dr Konrad Mulrennan is a Lecturer in Mechatronic Engineering at ATU Sligo and Associate Director of the Health and Biomedical (HEAL) Research Centre. He is a Principal Investigator in both the Centre for Mathematical Modelling and Intelligent Systems for Health and Environment (MISHE) and the Precision Engineering and Manufacturing (PEM) Research Centres. His research focuses on applying artificial intelligence and data-driven methods to challenges in health and manufacturing.

Dr Mulrennan is an alumnus of ATU, having completed his PhD in ATU Sligo (then IT Sligo), developing soft sensors for industrial processes. Following this Konrad collaborated with pharmaceutical firm GlaxoSmithKline (GSK) to

Dr Konrad Mulrennan

*Engineering for Advanced Manufacturing and
Digital Health*

develop predictive models for energy demand in pharmaceutical manufacturing.

At present Dr Mulrennan's research spans sensors, robotics, digital transformation, digital health and biomedical technology. Konrad supervises PhD students in areas like health technology, manufacturing and artificial intelligence.

He has led the development of technologies aimed at improving outcomes for individuals with chronic conditions, including diabetes, through regional and international collaborations. To do this he works at the interface of engineering and clinical application of technology, utilising biomedical sensor technology and machine learning to improve patient outcomes.

Konrad also coordinates the EIT Health i-Days programme at ATU Sligo, fostering innovation and entrepreneurship in health across Europe in a hack-a-thon type challenge competition that encourages students to tackle real-life health challenges over two days.



RISE@ATU: Powering Health-Tech Innovation through Funded Postgraduate Research Training Programmes

RISE@ATU is a transformative four-year research initiative designed to align with Ireland's Smart Specialisation Strategy, linking academic research with regional enterprise. Aligned with ATU's 2024 – 2028 strategic plan for engaged research with impact, RISE@ATU aims to build robust research networks, drive interdisciplinary collaboration, foster entrepreneurship, and provide resources that stimulate innovation.

Core to RISE@ATU is the development of a new generation of talent with skills for our changing world. This is done through thematically focused Postgraduate Research Training Programmes (PRTPs), Each offering 12 PhD scholarships. The individual PhD projects have been developed in partnership with Ireland's Northern and Western regional enterprises. Of these the THRIVE, MATX, IDMD and IDEAS have significant focuses on health care and health related technologies.

The THRIVE (Translational Health Research, Innovation, preVention & Equity) P RTP is focused on research and innovation in the health technology sector, driving forward Ireland's national priorities in the Healthy Ireland Strategic Action Plan and the National Framework for Chronic Disease Management. THRIVE represents a transformative force in Irish healthcare research and innovation, empowering future leaders to drive proactive, person-centric approaches to health and wellbeing. By integrating research, education, and preventative measures, THRIVE holds the potential to contribute to revolutionary healthcare delivery and ultimately enhance quality of life for all.

The MATX (MedAgriTech AI eXcellence) P RTP meanwhile aims to integrate artificial intelligence (AI) into Smart Specialisation Strategy (S3) priority areas of AgriFood, Advanced Manufacturing and MedTech. MATX focuses on a range of research questions investigating textual, visual and tactile information for improving the quality

RISE@ATU: Powering Health-Tech Innovation through Funded Postgraduate Research Training Programmes

of life (e.g., rehabilitation robotics, self-powered wearables for e-health), decision-making (e.g., medical diagnosis systems), predictive analytics (e.g., digital twins), automatic knowledge extraction and pattern recognition from data.

The IDMD (Innovation in Digital Manufacturing & Design) P RTP focuses on advanced manufacturing, material science, engineering, computer science and process design to increase industrial productivity, sustainability and ultimately improve living standards. Health related projects in the IDMD P RTP include development of 3D printed medical implants, novel drip-feed delivery systems and the use of digital twins for biopharmaceutical manufacturing,

Finally, IDEAS (Innovation, Digitalisation, Enterprise and Society) focuses on emerging digital technologies and determining how they can be used to create value for society and enterprise. Some health-related projects include the use of blockchain to ensure supply chain security & transparency in MedTech SMEs and using digital technologies for mitigating social exclusion of older people.



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