2022

SURE 2022 Undergraduate Science Conference Booklet

SURE Network

The Education Awards 2019
WINNER
Best Academic Partnership

5th Annual Conference

SURE

Science Undergraduate Research Experience

14th October 2022

Sharing Discovery

SETU Oilscoil Teicneolaíochta an Oirdheiscirt
South East Technological University

TU DUBLIN Ollscoil Teicneolaíochta Bhaile Átha Cliath
Technological University Dublin

T&L NATIONAL FORUM
FOR THE ENHANCEMENT OF TEACHING AND LEARNING IN HIGHER EDUCATION

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Welcome from the SURE Network

As chair of the SURE Network, it is an honour to welcome scientists from around Ireland to the fifth series of the SURE Network's undergraduate research conference. Having faced what is hopefully the worst of the Covid-19 public health crisis, we are delighted to be able to return to a live face-to-face (F2F) live conference format this year.

The SURE Network conference has three primary objectives in relation to undergraduate research. 1. To introduce final year undergraduate students to the exciting and diverse range of research topics which can be pursued through STEM across Ireland, 2. To advise students on how to pursue a postgraduate research career and 3. To provide students with the opportunity to experience a 'real' and fully immersive research conference, the first of perhaps many in their future careers. This year we hope to meet all three objectives in one single step through two conferences taking place on the 14th October 2022 in The South East Technological University (SETU) – Carlow campus and Technological University (TU-Dublin) Grangegorman campus. On behalf of us all, I wish to thank the Local Organising committees from each of these SURE Network partners, chaired by Dr. Gemma Kinsella in TU-Dublin and Dr. Carloalberto Petti in SETU- Carlow. Without their hard work and the support of the 2022 National Conference coordinating (NCC) committee, co-chaired by Dr. Claire Lennon (SETU-Waterford) and Dr. James Walshe (TU Dublin) there would simply be no conference so Bula bus!

Likewise, I wish to also thank the National Programme Conference (NPC) committee, chaired by Dr Laurence Fitzhenry (SETU-Waterford) for their hard work, time and expertise. As can be seen from the committee memberships, the NPC consists of expert members from all around Ireland, working together to interact with student presenters, collate student abstracts and manage the extensive double blinded national review process. I also wish to thank the SURE Network Digital badge and team based learning (TBL) committee, chaired by Dr Anne-Maire O'Brien (TUS-Athlone) who organize the annual pre-conference oral presenter training workshop through TBL, co-ordinate the live audience digital voting and award the digital badges for each of our four conference prises each year. Details of all previous prise winners may be found on the SURE Network website. A special thank you this year also goes to Dr James Walshe and Dr Sinead Currivan of TU Dublin for organizing and co-ordinating a pre-conference poster workshop for all conference participants; as well as Dr Cormac Quigley of ATU Galway for once again hosting the conference posters in the virtual poster sharing platform Gathertown. Gathertown posters can be viewed under the conference 2022 tab on the SURE Network website.

Lastly, I wish to thank our sponsors at the National Forum for the Enhancement of Teaching and Learning in Higher Education (NFTL) as well as the deans of the faculty of science in TUS-Athlone, ATU-Galway, ATU-Sligo, TU Dublin and SETU - Carlow for their generosity in supporting the conference this year.

I, as I am sure you do, look forward to an exciting day of research from all around Ireland, my first F2F research conference in quite some time!

Have a great conference everybody

Therese Montgomery

Therese Montgomery, SURE Network Chairperson

A note from the Local Organizing Committees

South East Technological University Carlow

The committee wishes to express their gratitude to the Head of Faculty, Dr David Dowling and the Head of Department of Applied Science, Dr David Phelan for their support to the conference. A special thank goes to Mrs Mary Bates for her invaluable help in planning the conference. The committee is indebted with the Keynotes for their willingness to be messengers and inspiration for a lifelong learning commitment to Science. The committee wishes to express their gratitude to Dr Therese Montgomery, Dr Claire Lennon, Dr Laurence Fitzhenry, Dr Anne Marie O' Brien and Dr James Walshe to facilitate the planning of the conference. Lastly, we wish to thank all the supervisors and students whose participation makes this conference possible.

Dr Carloalberto Petti, *On behalf of the SETU Carlow Local SURE Organising Committee*

Technological University Dublin

I would like to sincerely thank the members of the Local SURE Organising Committee from TU Dublin, for all the hard work they have put into organising the conference. We would like to extend our gratitude to the keynote speakers who will bring innovative ideas and inspiration to the students and help develop a love of science and research which extends throughout their careers. We would particularly like to thank all the students and their supervisors from across Ireland for their contributions which has resulted in a very interesting and varied session.

Dr Gemma Kinsella, *On behalf of the TU Dublin Local SURE Organising Committe*

SURE Network Members

Therese Montgomery, (Chair of the SURE Network), Atlantic Technological University – Galway.

Claire Lennon, South East Technological University Waterford

Laurence Fitzhenry, South East Technological University Waterford

Tracey Coady, South East Technological University Waterford

Carloalberto Petti, South East Technological University Carlow

Ariane Perez-Gavilan, South East Technological University Carlow

Anne Marie O'Brien, Technological University of the Shannon -Athlone

Anne Friel, Technological University of the Shannon -Athlone

Cathy Brougham, Technological University of the Shannon -Athlone

Gemma Kinsella, Technological University Dublin

James Walshe, Technological University Dublin

Carla Surlis, Technological University Dublin

Ciarán O'Leary, Technological University Dublin

Barry Ryan, Technological University Dublin

Julie Dunne, Technological University Dublin

Emma Caraher, Technological University Dublin

Gordon Cooke, Technological University Dublin

Cormac Quigley, Atlantic Technological University -Galway

Karen Finn, Atlantic Technological University -Galway

Orla Slattery, Atlantic Technological University -Galway

Lisa Ryan, Atlantic Technological University -Galway

Hugh McGlynn, Munster Technological University-Cork

Eileen O'Leary, Munster Technological University -Cork

Janette Walton, Munster Technological University

Tanya Beletskaya, Technological University of the Shannon -Limerick.

Josephine Treacy, Technological University of the Shannon -Limerick

Sinead Loughran, Dundalk Institute of Technology

Valerie McCarthy, Dundalk Institute of Technology

Arjan van Rossum, Dundalk Institute of Technology

Annamarie Rogers, Dundalk Institute of Technology

Enda Finn, Dundalk Institute of Technology

Martin McHugh, Dundalk Institute of Technology

Andrea Kealy, Dundalk Institute of technology

Eva Campion, Atlantic Technological University – Sligo.

Geraldine Dowling, Atlantic Technological University - Sligo

Laura Keaver, Atlantic Technological University - Sligo

Fiona McArdle, Atlantic Technological University - Sligo

Margaret McCallig, Atlantic Technological University -Sligo

Nicolas Touzet, Atlantic Technological University Technological University -Sligo

Sharon Barret, Atlantic Technological University - Sligo

SURE Network Conference 2022 Committees

SURE2022 National Conference Committee

Claire Lennon (Co-Chair), South East Technological University Waterford

James Walshe (Co-Chair), Technological University Dublin

Gemma Kinsella, Technological University Dublin

Carloalberto Petti, South East Technological University Carlow

SURE2022 National Programme Committee

Laurence Fitzhenry (Chair), South-East Technological University Waterford

Carla Surlis, Technological University Dublin

Ariane Perez-Gavilan, South East Technological University Carlow

Sinead Currivan Technological University Dublin

SURE2022 South East Technological University Carlow, Local Organising Committee

Ariane Perez-Gavilan

Carloalberto Petti

Clare Lodge

SURE2022 Technological University Dublin Local Organising Committee

Denise Cornally

Sinead Currivan

Cormac Breen

Hugh Gallagher

Svetlana Hensman

Brian Keenan

Gemma Kinsella

Sarah Rawe

Carla Surlis

James Walshe

SURE2022 Network Conference - programme overview:

9.15-9.55	Registration
9.55	**Session Chair SETU Carlow:** Dr Carloalberto Petti **Session Chair TU Dublin**: Dr Gemma Kinsella Welcome by SURE 2022 Local Organising Committees
10.00	Opening by Dr Therese Montgomery, Chair of the SURE Network (streamed)
10.05-10.15	**SETU Carlow:** Address by Dr David Denieffe, Vice President for Academic Affairs, SETU **TU Dublin** Address by Dr. Mary Meaney, Registrar and Deputy President, TU Dublin
10.15-10.40	**Keynote 1 SETU Carlow**: Professor Michael Seery, Open University. **Keynote 1 TU Dublin:** Derek Kenny, Associate Director Takeda Pharmaceuticals
10.40-12.45	Undergraduate Research Oral Presentation Session
12.45-12.50	Audience Voting for Best Oral Presentation
12.50-14.00	*Lunch and poster review, audience voting for best poster*
14.00-14.10	**Updates from the SURE Network** 1. Learn from SUREbyts- Dr Ciaran O'Leary 2. Publish in SURE-J (SURE undergraduate research journal) - Dr Anne Friel
14.10-14.30	**Session Chair SETU Carlow:** Dr Ariane Perez-Gavilan **Session Chair TU Dublin:** Dr Cormac Breen **Keynote 2 SETU Carlow:** Dr Richard Lally, Research Scientist, Alltech **Keynote 2 TU Dublin:** Dr Noor Abdulhussain, Scientist at VSL National Metrology Institute

14.30	Presentation of Conference prizes at each site: SURE 2022 Network Award for Best Scientific Poster SURE2022 Audience award for Best Scientific Poster SURE 2022 Network Award for Best Oral Presentation SURE2022 Audience award for Best Science Communicator Dr David Phelan, Head of Department of Science, SETU Carlow will present the awards at SETU Carlow Dr Ciarán O'Leary, Head of Learning Development, Faculty of Computing, Digital and Data, TU Dublin will present the awards at TU Dublin
14.50-15.20	**Postgraduate Opportunities Workshop** **Session Chair: SETU Carlow:** Dr Thomae Kakouli-Duarte **Session Chair: TU Dublin:** Prof. Mary McNamara **Postgraduate Panel SETU Carlow:** Megan O'Dwyer, Hilkiah Ako, Demi Ryan **Postgraduate Panel TU Dublin:** Jessica Perez, Jennifer Murphy, Hani Khaled Alkhatib, Róża Paterek, Rasaq Abolore, Gemma Lyon, Xinyi Zha
15.20	Conference ending

SURE2022 Network Detailed Conference Schedule

Student Oral Presentation Session SETU Carlow

10.40-12.45	Student Oral Presentations SETU Carlow	
10.40	Weng Yan Chan	1.1. Development of a PCR-based Assay for the Detection of Mycoplasma Contamination in Cell Cultures, South East Technological University Waterford. **Supervisor** Edel McNeela
10.50	Justyna Twardoch	1.2 Developing an in vitro epithelial cell migration model, Technological University of the Shannon- Athlone. **Supervisor** Natasha McCormack
11.00	Jia Wei Siow	1.3 Acute effects of blood flow restriction during warm up on sports performance in GAA athletes, South East Technological University-Carlow. **Supervisor** Jennifer Wallace
11.10	Karina Honorato	1.4. Heterogeneous Pd-catalyzed green synthesis of fungicide (Boscalid), Technological University of the Shannon-Limerick. **Supervisor** Shaheen M. Sarkar
11.20	Niamh Fogarty	1.5. The Menstrual Cycle: Communication between Competitive Female Track and Field Athletes and their Coaches, Technological University of the Shannon-Athlone. **Supervisor** Ciarán Ó Catháin
11.30	Natasha Cunningham	1.6. MiRNA regulation of adipose derived stem cells in breast cancer, Technological University of the Shannon-Athlone. **Supervisor** Cathy L. Brougham
11.40	Ben Murphy	1.7. Potential for using *S. boulardii* in the production of probiotic beer, South East Technological University-Carlow. **Supervisor** Kieran Germaine
11.50	Jennifer Whelan	1.8. Novel nutraceutical delivery system for management of inflammatory bowel disease Technological University of the Shannon-Athlone. **Supervisor**s Patricia Heavey and Clement Higginbotham
12.00	Rachael O'Connor	1.9. COVID-19; How Ireland's Adolescent's Self-Esteem Has Been Affected, South East Technological University Carlow. **Supervisor** Clare Lodge

Student Oral Presentation Session TU Dublin

10.40-12.45	Student Oral Presentations TU Dublin	
10.40	Margaret McGuigan	1.1. Laid-back breastfeeding: Knowledge, Attitudes, and Practices of Midwives and Student Midwives in Ireland, Dundalk Institute of Technology. **Supervisor** Patricia Larkin
10.50	Nada Akl	1.2 Formulation The Effect of Breastfeeding On Weight Status In Children And Adolescents (1-17 Years) Living In Ireland, Technological University Dublin. **Supervisors** John Kearney and Daniel Hazley.
11.00	Martyna Senecka	1.3 SARS-COV-2 disease severity according to Vaccination status and vitamin D deficiency amongst hospitalised Covid-19 patients, Technological University Dublin. **Supervisors** Modar Youssef, A Al Lawait, S.I. Shah, M Abdulsalam, A Qadeer, Daniel McCarthy, John Foul.
11.10	Valeria De Santo	1.4 DNA barcoding as a tool for species identification of commercial tuna products concerning seafood mislabelling, Atlantic Technological University. **Supervisor** Luca Mirimin
11.20	Colette Collins	1.5 Exploring the relationship between the menstrual cycle and markers of physical performance in intercounty Ladies Gaelic Football players, Atlantic Technological University. Supervisor Siobhan Leahy
11.30	Rachael Carey	1.6 The use of forensic alternate light sources for the location and identification of temporary (stick-on) tattoos in identifying unknown individuals, Atlantic Technological University – Sligo. **Supervisor** John Cassella
11.40	Niamh Lawlor	1.7 A qualitative analysis of women's postnatal experiences of breastfeeding supports within the maternity unit or during homebirth in Ireland, Technological University Dublin. **Supervisor** Liz O'Sullivan
11.50	Emer O'Sullivan	1.8 The association between diet quality and sleep quality in Irish undergraduate students, Technological University Dublin. **Supervisor** Mairead Stack
12.00	Brian Jordan	1.9 An investigation into polyphenolic variation within forage crops in Ireland, Technological University Dublin. **Supervisor** Nissreen Abu Ghannam
12.10	Angel Oliveira Lira	1.10 Modelling of oxides and polymer based anti-reflective layers for Si-based PV cell using AFORSHET, Technological University Dublin**. Supervisors** George Amarandei, John Doran

Student Poster Presentation Session SETU Carlow

12.45-14.00	Student Poster Presentations SETU Carlow	
1.1	Gergely Antal	Developing Precision Medicine models for Rare and Metastatic Cancers, South East Technological University-Carlow. **Supervisor** Jai Prakash Mehta
1.2	Shannen Cowman Kehoe	Novel Nutraceutical Delivery System for the Management of Inflammatory Bowel Disease, Technological University of the Shannon .**Supervisors** Patricia Heavey & Clement Higginbotham
1.3	Jake Delaney	Detection of the Causative Bacterial Agents of Ovine Footrot and Contagious Ovine Digital Dermatitis in Sheep and the Effect of Vaccination with 'Footvax' on their Prevalence, South East Technological University-Waterford. **Supervisor** Nabla Kennedy
1.4	Niamh Doyle	Are all C18 columns the same?, South East Technological University-Waterford. **Supervisor** Richie Ryan
1.5	Molly Duggan	Wearable Fitness Technology (WFT) and the Influence on Individuals Perceptions of Energy Expenditure (EE) During Aerobic Exercise, South East Technological University-Carlow. **Supervisor** Brian O' Rourke
1.6	Michaela Fitzgerald	Plants as a source of cosmeceuticals. Evaluation of antioxidants, anti-tyrosinase and antimicrobial activities, Technological University of the Shannon Midwest. **Supervisor** Tanya Beletskaya
1.7	Jessy Fong	Green Tea Wound Dressing, South East Technological University –Waterford. **Supervisor** Shiau Pin Tan
1.8	Eoghan Fox	The effect of agricultural intensification on groundwater quality, South East Technological University – Waterford. **Supervisor** Michael Breen
1.9	Peter Hempenstall	The acute effects of talocrural mwm's compared to soft-tissue application of the plantarfascia on ankle dorsiflexion rom in male GAA athletes with chronic lateral ankle sprain, South East Technological University-Carlow. **Supervisor** Brian O'Rourke
1.10	Myles McCarthy	Impact of Varied Fermentation Times on New-make Whisky from Terroir Malt, South East Technological University – Carlow. **Supervisor** Damien Brady
1.11	Kym O'Brien	Covid-19; The Effect on Junior Cycle Students' Physical Activity Participation, South East Technological University – Carlow **Supervisor** Clare Lodge
1.12	Lucy O'Mahoney	Effects of Glatiramer Acetate on Gene Expression Patterns of Inflammatory Cytokines, South East Technological University – Waterford. **Supervisor** Sweta Rani

1.13	Niamh Padden	The Effect of Surface and Footwear on Speed During Low Intensity Running, South East Technological University – Carlow. **Supervisor** Peter Francis
1.14	Connor Place	Analysis of Peat Carbon Sequestration Potential in Horticulture Crops, South East Technological University – Carlow. **Supervisor** Carloalberto Petti
1.15	Jessica Schmidt	Assessing Shoulder Function in Non-Injured Female Rugby Players, South East Technological University – Carlow. **Supervisor** Peter Francis
1.16	Debbie Umukoro	Analysis of Honey, Plant Seed Extracts and Natural Plant Butters for Skin Repair, Technological University of the Shannon –Midlands Midwest. **Supervisor** Natasha McCormack

Student Poster Presentation Session TU Dublin

12.45-14.00	Student Poster Presentations TU Dublin	
1.1	Eoghan Martin	Cognito – Trust-Based Social Network with Spam Detection, Technological University Dublin. **Supervisor** Jack O'Neill
1.2	Marietta Lakatos	Comparison of Bioactivity of Hemp Seed Oils and Tea Tree Oil, Technological University Dublin. **Supervisors** Julie Dunne, Samuel Obengapori, and Furong Tian
1.3	Sarah Hannan	Transitioning to Sustainable Healthy Diets in Malta: Key Foods and Consumer Challenges, Technological University Dublin & University of Malta. **Supervisors** John Kearney and Claire Copperstone
1.4	Megan Byrne	Formulation of Cinnamon Oil Loaded Nano-carriers for Food Packaging Applications, Technological University Dublin. **Supervisor** Swarna Jaiswal
1.5	Cian O'Keeffe Tighe	Replication Study: Acute Enhancement of Jump Performance, Muscle Strength, and Power in Resistance-Trained Men After Consumption of Caffeinated Chewing Gum, Technological University Dublin. **Supervisors** Jennifer Murphy and Joe Warne
1.6	Tegan O'Donnell	The Use of Pollen as an Indicator of Atmospheric Pollution, Atlantic Technological University Sligo. **Supervisor** Paul Hamilton
1.7	Alix Mooney	What does healthy and sustainable eating mean to students? Technological University Dublin. **Supervisors** Daniel Hazley and John Kearney
1.8	Gemma Johnston	An Investigation into the Prevalence & Usage of Caffeine Supplementation in Elite Female Powerlifting Athletes, Technological University Dublin. **Supervisor** Richard Kelly
1.9	Laura Oates	The Potential of Microalgae in Creating a more Environmentally Sustainable Pharmaceutical Industry: A Thematic Analysis of the Literature, Atlantic Technological University Sligo. **Supervisor** Geraldine Duignan
1.10	Kate Kavanagh	The Use of and User Experience of Data at Senior Level Gaelic Games, Technological University Dublin, Technological University Dublin. **Supervisor** Kieran Collin
1.11	Karla McKiernan	Forensic Identification of Individuals: The novel use of Tattoo Location and Identification using Alternate Light Sources, Atlantic Technological University Sligo. **Supervisor** John P Cassella
1.12	Szymon Pietka	Magnus Effect Wind Turbines: Computational and Experimental Models, Technological University Dublin. **Supervisors** Aaron Mac Raighne and Derek Kearney
1.13	Charlane Beatrice Zambrano	Rational Design, Synthesis, and Characterisation of novel metallo-antimicrobials, Technological University Dublin. **Supervisor** Ziga Ude

1.14	Sally Webb	Use of genetic markers for forensic fingerprinting and anthropological purposes: VNTRs, mtDNA, amelogenin and Alu markers, Atlantic Technological University Galway. **Supervisor** Benoit Houeix
1.15	Shannon Spain	The impact of stress on food choice amongst third level students in the Republic of Ireland during the covid-19 pandemic, Atlantic Technological University & Michigan State University. **Supervisors** Robin Tucker, Chen Du, and Laura Keaver
1.16	Shaina Fernandes	Determination of the presence of saliva using fluorimetery, Atlantic Technological University Galway. **Supervisor** John Keary
1.17	Aedín Caverly	Physical Activity and Obesogenic Risk Factors in Competitive Athletes and Non-Competitive Athletes, Technological University Dublin. **Supervisor** Oscar McCananey
1.18	Rebecca McNamara	Development of a protocol to identify unknowns in forensic science from mass spectral data on DrugsData.org, Atlantic Technological University Sligo and Trinity College Dublin. **Supervisors** Pierce Kavanagh and Geraldine Dowling
1.9	Oisin Nolan	Healthy diet perceptions of irish crossfit coaches a qualitative investigation, Technological University Dublin. **Supervisors** Daneil Hazley and John Kearney
1.20	Harry Reynolds	Potential utilization of Wildflower Pollen as an Environmental indicator for Atmospheric pollution, Atlantic Technological University Sligo. **Supervisor** Paul Hamilton
1.21	Roisin O Mahony	The Rise of the Machines: Will Artificial Intelligence Algorithms Replace the Human in Forensic Drug Chemistry? The use if structure elucidation tools and mass spectral libraries, Atlantic Technological University Sligo and Trinity College Dublin. **Supervisors** Pierce Kavanagh and Geraldine Dowling
1.22	Nicole Murray	Titanium Alloys for Biomedical Applications, Technological University Dublin. **Supervisors** Anne Hopper and Susan Warren
1.23	Siobhan Lynam	An exploration of Cultural competence and awareness in a sample of mental health professionals partaking in a professional meeting entitled “The Race for Mental Health", Dublin City University. **Supervisors** Lorraine Boran and Ray O’ Neil
1.24	Laura Regan	Detection of Recently Handled Materials in Latent Fingerprints using FTIR, Technological University Dublin. **Supervisor** Reeta Joshi
1.25	Flora Mwale	The Role of pKa on Physiochemical Properties Of Antibiotics and Antivirals, Technological University Dublin. **Supervisor** Maeve Scott
1.26	Aishling Keane	Adolescent Females Awareness of Peak Bone Mass – An Investigation into Bone Health Knowledge, Dairy Consumption and Factors Influencing Consumption, Atlantic Technological University Galway. **Supervisor** Paul Conroy

1.27	Tara Mc Cormack	The Impact of Algae-Based Omega Supplements On The Mental Health Of Irish Vegans, A Pilot Randomised Control Trial Study, Atlantic Technological University Galway. **Supervisor** Paul Conroy
1.28	Eimear Harte and Kayleigh Heron	Analysis Of The Level Of Nutrition Education Within Healthcare Professionals' Third Level Education Programmes In Ireland, Atlantic Technological University Galway. **Supervisors** Gemma McMonagle, Laura Keaver, and Lisa Ryan

SURE2022 Keynote Profiles

Keynote Speaker 1 SETU Carlow

Professor Michael Seery:

Michael Seery is a Professor of Chemistry Education and is currently at the Open University. His research interests include learning in laboratories and digital education. Royal Society of Chemistry Nyholm Prize for his work in chemistry education and a UK National Teaching Fellowship for his work in digital education. He is former Editor in Chief of the Royal Society of Chemistry journal Chemistry Education Research and Practice, and blogs about education and technology on his website: www.michaelseery.com

Keynote Speaker 2 SETU Carlow

Dr Richard Lally:

Dr. Richard Lally is a Research Scientist with Alltech. Dr Lally completed his undergraduate degree in the Institute of Technology Carlow where he studied Biosciences with Biopharmaceuticals. Following his undergraduate he completed a PhD program in the Institute of Technology, Carlow where he examined the use of plant symbiotic bacteria in sustainable crop production. Since then he has completed a postdoctoral position working in Alltech's Nutrigenomic Centre, in Nicholasville Kentucky. His Post-Doc focused on the investigation of crop protection products in the management of diseases in citrus and other specialty crops. He is currently based in Alltech's European bioscience center, in Dunboyne. His research aims to solve issues surrounding crop yield losses from pathogens, inadequate nutrient use, and abiotic stress.

SURE2022 Keynote Profiles

Keynote Speaker 1 TU Dublin

Derek Kenny:

Derek's undergraduate was in Pharmaceutical Sciences in the former IT Tallaght, where he also received an MSc. in Pharmaceutical Manufacturing and PAT. Recently he has completed the TCD H.Dip in Pharmaceutical Manufacturing Technology. Over the course of his career, Derek has covered the full range of the pharmaceutical industry. From R&D (formulation / method development, clinical trials and product registration), production (technical services, QC testing, QA batch review), through to frontline wholesale (warehousing, distribution and validation for in-home patient care). He has acted as RP for a procure/ supply WDA, been listed on multiple narcotics licenses, and is QP eligible. His current role has responsibility for products in all stages of their lifecycle, managing HA communications and Market Actions globally. Derek is very happily married, with 4 kids, 2 cats, a dog and a gecko named Schrodinger.

Derek's talk will be titled: "*The Irish Pharmaceutical Industry, what I learned so far"*.

Keynote Speaker 2 TU Dublin

Dr Noor Abdulhussain:

Noor Abdulhussain obtained her M.Sc. degree in 2017 from the University of Amsterdam. After that, she successfully completed her PhD project within ERC STAMP (Separation Technology for A Million Peaks) project at the University of Amsterdam. Her work mainly focused on functionality assessments of 3D-printed devices for application to multi-dimensional separations. At the HPLC2019 conference she was decorated with the best poster award, and was invited to give a lecture at the Emerging Separations Technologies symposium (Chromatographic Society, London, UK). Also, in 2019 LC-GC identified her as one of the Rising Stars in Chromatography. Currently, she is working as a scientist at VSL National Metrology Institute, focusing on gas analysis and is part of the metCCUS project.

Besides her scientific work in January 2021, she founded the SistersinScience_NL Instagram platform together with two of her colleagues. Here, they show a glimpse of their work on social media and debunk stereotypes of chemists and other scientists. This initiative got recognized by NWO and awarded with Diversity Initiative award 2021. In October 2022, they will be rewarded with Van Marumpenning 2022 for our contribution to the visibility of chemistry from the Royal Netherlands Chemical Society.

Noor's talk will be titled "*Your career beyond your PhD"*

SURE2022 Postgraduate Opportunities Workshop
Speaker Profiles SETU Carlow

Session Chair SETU Carlow: Dr Thomaé Kakouli-Duarte

Dr Thomaé Kakouli-Duarte is the Director of enviroCORE, SETU's centre of research and enterprise in bio-environmental science, a biosciences lecturer and a word recognised expert in environmental nematology. She currently teaches cell biology and supervises 4th year biosciences research projects at undergraduate level. Her research interests lie in the areas of agro-environmental science, specifically, biological control of insect pests using entomopathogenic nematodes, the development of DNA-based diagnostics of quarantine insect pests, bumblebee molecular ecology and conservation, sustainable plant parasitic nematode management and the application of nematodes and their assemblages as indicators or environmental change. She is heavily involved in postgraduate (L9 and L10) teaching and research supervision, collaboration with industry as well as with national and international colleagues, community outreach and science promotion and communication.

SETU Carlow: Megan O'Dwyer

My name is Megan O'Dwyer and I am currently undertaking a research masters in SETU Carlow. I have had a great interest in science from an early age, particularly biology. I completed my undergraduate degree in Bioscience and biopharmaceuticals in SETU Carlow and carried out a 3-month internship in Teagasc crop science department, as part of the course. After graduating, I started an internship position in Envirocore research centre at SETU Carlow and I am now carrying out a research master's there. My masters is funded by AllTech and I am examining the effects of a product called ACS-5075 on plant growth promoting bacteria and soil health.

SETU Waterford: Hilkiah Ako

In 2019, I completed a BS c (H) in pharmaceutical Science in WIT. I developed a keen interest in conducting research in independent projects in year 3 and 4 of the programme where I was able to propose solutions, expand my critical thinking and problem solving skills. The projects entailed formulation of pharmaceutical products and characterisation. I was given the opportunity to present my work at the SURE conference in the 2018 edition which sparked my passion for research and explore it further. I am currently undertaking a PhD in the PMBRC at SETU. My research focuses on fabricating dissolving microneedle arrays using a 3D printer for transdermal delivery.

SETU Carlow: Demy Ryan

In 2018 I graduated from IT Carlow with a BSc in Biosciences with Biopharmaceuticals. From there, I went on to do a Masters by Research, in the field of Environmental Microbiology. I really enjoyed the research, so I decided to further my studies and transfer to a PhD. My project mainly focuses on the response of soil microbiomes to utilisation of sustainable fertiliser alternatives, as part of a circular nutrient economy. I have published my research in peer-review journals, and I am currently preparing my PhD thesis for submission.

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SURE2022 Postgraduate Opportunities Workshop
Speaker Profiles TU Dublin

Session Chair TU Dublin: Prof Mary McNamara

Professor Mary McNamara graduated with an honours degree from the Royal Society of Chemistry and a PhD in Physical Inorganic Chemistry from University College Dublin and is a former member (2012-2018) of the steering committee of the Council of Doctoral Education of the European Universities Association (EUA CDE). She is also a fellow of the Royal Society of Chemistry and an active researcher in the development of novel drug delivery systems. In Ireland, Professor McNamara is a member of the standing National Forum on Research Integrity which guarantees the continual development and adoption of good practice and provides a strengthened approach to ensuring research integrity in Ireland. She is also a member of the National Advisory Forum for Ireland's National Framework for Doctoral Education and the Working Group designing the Irish Survey of Student Engagement which was piloted with graduate research students in 2018. In addition to this, Mary manages graduate research programmes at TU Dublin and with the graduate research school team, administers the academic guidelines and regulations of the Institute in relation to postgraduate research awards in TU Dublin. She is the guarantor of graduate research quality assurance and also works with schools and colleges in the development of structured PhD programmes.

TU Dublin (City Centre) Jessica Perez

Jessica Perez is a fourth-year postgraduate student at the Technological University Dublin (TU Dublin) and a member of the Tissue Engineering Research Group (TERG) in RCSI University of Medicine and Health Sciences in Dublin, Ireland. She is doing her Ph.D in biomedical engineering, and her project is developing a tissue engineered heart valve for paediatric applications. She is supervised by Dr. Claire Brougham in TU Dublin and co-supervised by Prof. Fergal O'Brien from RCSI. Prior to this, Jessica attended the University of Arkansas in Fayetteville, Arkansas, USA. She received her BSc in Biomedical Engineering and MS in Biomedical Engineering supervised by Dr. Kartik Balachandran. Her undergraduate project investigated how serotonin and angiotensin affect the aortic valve using an *in-vivo* mouse model, and her master's project further investigated the angiotensin pathway using porcine aortic valve leaflet tissue.

TU Dublin (Tallaght) Jennifer Murphy

Jenny is currently undertaking a PhD at Technological University Dublin, Tallaght, in the area of research methods in sports and exercise science. Her project focuses on the replicability of published sports and exercise science research. She is coordinating a worldwide, collaborative replication project as part of the Sports Science Replication Centre which is the first of its kind in the field. Jenny has a keen interest in how research is conducted in the field of sports science and her affinity for research quality and methodologies has progressively increased throughout her education. She has a long-term interest in improving the quality and rigor of research in sports science

TU Dublin (City Centre) Hani Khaled Alkhatib

Hani is a mechanical engineer with a Master of Science in Energy degree from Heriot Watt university worked in the buildings field at a construction and consulting company in UAE. Done various projects in the building energy field such as: Protecting FPC from overheating using coating; Cleaning PV using Innovative Technology System (Funded by USAID); Design a CPV to provide cooling in UAE; Validity of using Different heating systems in JU building in Jordan. Hani is part of MaREI/ERBE cohort (Research area number seven), his PhD research is about controlling adaptive building façades and has four publications related to the topic: (i) Deployment and control of adaptive building facades for energy generation, thermal insulation, ventilation and daylighting: A review (Published). (ii) Comparison of Control Parameters for Roller Blinds (Under-review) (iii) Evaluation of a Novel Dynamic Insulation System Using Roller Blind (In preparation) and (iv) Electrochromic glazing simulated as Blinds (In preparation).

TU Dublin (Tallaght) Róża Paterek

Róża is currently undertaking a PhD on a part time basis at Technological University Dublin, Tallaght campus, in the area of biodiagnostics and is in the first year of her studies. At the same time as working toward her PhD, Róża's is simultaneously working as a full-time research assistant at MiCRA Biodiagnostics which is part of the CASH-Synergy Centre in Tallaght. Prior to this, Róża had successfully graduated with a 1st class honours in DNA & Forensic Analysis from Technological University Dublin, Tallaght campus. In addition, as part of her final year project Róża completed a research project involving the analysis of inks using scanning electron microscopy, among other techniques, the results of which were presented at the SURE 2021 conference.

TU Dublin (City Centre) Rasaq Abolore

Mr Rasaq Abolore graduated from the School of Food Science and Environmental Health, TU Dublin, Ireland with a MSc in Food Safety Management in 2020 and was awarded the best student in the research project for his master thesis. He received a TU Dublin Researcher Award in 2021 and secured the funding for his PhD. Rasaq is currently working towards the development of a novel biorefinery concept for the complete valorisation of distillery waste. His current research area includes pre-treatment, saccharification and fermentation of biomass, bioethanol, and bioproduct production, characterisation of lignocellulose biomass and intermediate products/value-added products, and process life cycle assessment and economic feasibility of the developed process.

TU Dublin (City Centre) Gemma Lyons

Gemma Lyons is a 2nd year postgraduate student at TU Dublin and is currently involved in working alongside one of the leading Frech companies (Gourmey) operating in the space of cultivating meat through the application of cellular agriculture techniques. Prior to this, Gemma had successfully completed both a BSc in Food Science and Agriculture at the University College Dublin and an MSc in Food Science, Business and Technology under the Erasmus Mundus masters initiative. The Erasmus initiative to work at a consortium of three sperate European universities; KU Leuven in Belgium, Universidade Católica Porto in Portugal, and Hochschule Anhalt in Germany.

TU Dublin (City Centre) Xinyi Zhao

Xinyi Zhao is a 2nd year postgraduate student at TU Dublin and is currently involved in working on synthesizing and optimising the physicochemical properties of a wide array of different nanomaterials to aid in the delivery and/or enhancement of therapeutic treatments.

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The SURE Network would like to thank **The National Forum for the Enhancement of Teaching and Learning in Higher Education** for kindly sponsoring the conference**.** The National Forum for the Enhancement of Teaching and Learning in Higher Education is the national body responsible for leading and advising on the enhancement of teaching and learning in Irish higher education.

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We are delighted that Ernie Ghiglione supported this year's conference by affording us with free licences and technical support for the "Creating effective presentations workshop" that was offered to all oral presenters and delivered remotely using Team-Based learning (TBL) via Lams.

SURE2022 Book of Abstracts

SURE 2022
South East Technological University Carlow

Oral and Poster Presentations

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Oral and Poster Presentations

SURE 2022 Oral Presentations | SETU Carlow Conference

1.1 Development of a PCR-based Assay for the Detection of Mycoplasma Contamination in Cell Cultures by Weng Yan Chan (South East Technological UniversityWaterford) Supervisor Edel McNeela

Mycoplasma contamination of cell cultures occurs frequently throughout the world and can cause a variety of undesirable effects on cell lines' behaviour. Infection with Mycoplasma is usually concealed, and it is therefore imperative to carry out early and periodical screening of cell lines. There are several PCR-based Mycoplasma detection kits available commercially that offer shorter testing times in contrast to compendial culture methods. However, they are expensive and so there is a need for efficient and cost-effective nucleic acid-based methodologies with comparable sensitivity, specificity and robustness. The goal of this study was to develop an in-house PCR-based assay to diagnose Mycoplasma contamination in cell cultures. Five mammalian cell lines were firstly evaluated by four different techniques: direct DNA staining by DAPI, real-time PCR using a commercial kit, conventional PCR and touchdown-PCR using published primers. Two in-house conventional PCR assays were then developed using universal primer pairs that were designed to target highly conserved regions on the 16S rRNA gene of multiple Mycoplasma species. All the cell lines tested negative for Mycoplasma using direct DNA staining, real-time PCR and touchdown-PCR methods. Furthermore, no cross-reactivity to human and murine gDNA was detected in the touchdown-PCR assay. Amplicon bands of expected size were obtained in all the end-point PCR assays using both published and designed primers, and importantly DNA sequencing confirmed that an in-house PCR assay developed in this study was able to amplify Mycoplasma gDNA. Thus, the newly developed assay has the potential to be used for Mycoplasma detection in research laboratories.

1.2 Developing an in vitro epithelial cell migration model by Justyna Twardoch (Technological University of the Shannon - Athlone) Supervisor Natasha McCormack

Chronic degenerative disorders are one of the most highly debilitating conditions worldwide. Despite this, extraordinarily little in vitro models exist that simulate the pathophysiology of these conditions to assess the effects of therapeutics on regeneration. This project delved into the initial stages of development of an in vitro epithelial cell migration model using Chinese Hamster Ovary (CHO) and HepG2 cell lines. The MTT and the scrape load gap junction assays were performed to assess cytotoxicity of treatments prior to migration assays. The scratch assay was used a precursor model to the proposed wound closure model to investigate the effects of a series of treatments on cell restitution. Data generated by Afrin et al. (2018) was used to assess the expression of proteins associated with the epithelial-mesenchymal transition (EMT), such as E-cadherin and vimentin in manuka honey treated cells. The serum containing media (SCM), serum free media (SFM), and 20% honey-SFM treatments induced the lowest cytotoxicity and high rates of migration through EMT induction while 5µg/ml mitomycin c, 20% honey-phosphate buffer saline (PBS) and 30% hydrogen peroxide induced the highest cytotoxicity and exhibited the lowest rates of migration with limited EMT induction in both cell lines. Results were congruent in most assays. Data by Afrin et al. (2018) exhibited a dose-dependent inhibition of EMT in manuka honey treated cells by upregulating E-cadherin and downregulating proteins associated with the mesenchymal phenotype. It was concluded that the development of novel models is a multifactorial process which requires thorough optimisation for optimal result interpretation.

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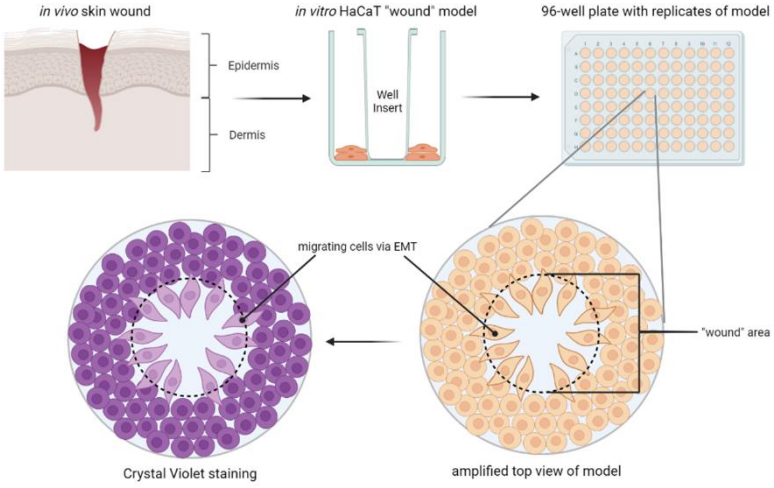


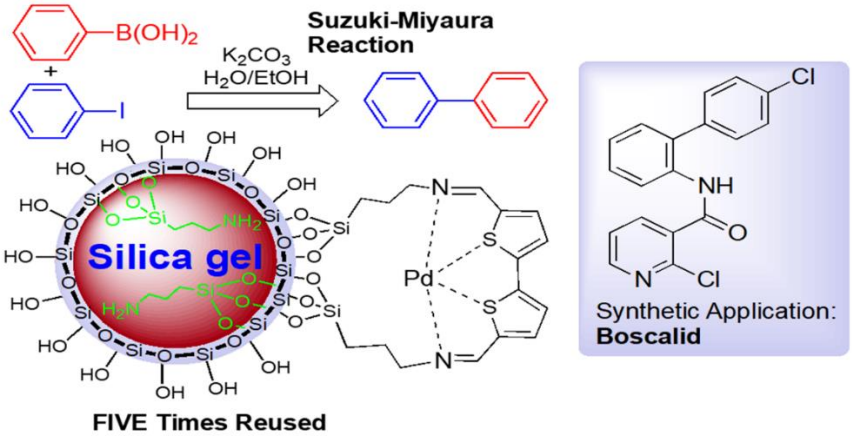
1.3 Acute effects of blood flow restriction during warm up on sports performance in GAA athletes by Jia Wei Siow (South East Technological University-Carlow) Supervisor Jennifer Wallace

Blood flow restriction (BFR) has been commonly used as an adjunct to resistance training, yet evidence is lacking regarding its acute effect on sports performance. This study aimed to determine the acute effects of BFR during warm-up in GAA athletes through subjective (muscle soreness, physical fatigue, perceived effect on agility performance) and objective (505 agility test) variables. Similar study reported vertical jump performance was improved from BFR trial (Doma et al., 2020). Twenty collegiate GAA players (males, n=14; females, n=6; age = 21.25 ± 1.21years; height = 176.57 ± 6.51m; weight = 78.40 ± 11.34kg) participated in this study. In a randomized repeated-measures cross-over design, a 505 agility test was carried out following either BFR or SHAM BFR (no cuff pressure applied) warm-up protocol. Both protocols were carried out using the GAA-15 warm-up. A participant self-rated questionnaire was completed after each session to record the subjective variables. Results revealed that time to complete the 505 agility test was significantly less after BFR condition than after the SHAM. No significant differences were found in either athletes' perception of physical fatigue or their perceived effect on agility performance. The reported muscle soreness was significantly worse after BFR condition, while the reported rate of perceived exertion value was significantly higher in the BFR trial. Findings would suggest that BFR may be used during GAA-15 warm-up to improve subsequent agility performance. However, the significantly greater reported muscle soreness and RPE would suggest that further investigation is warranted into the effects on fatigue over a longer time period.

1.4 Heterogeneous Pd-catalyzed green synthesis of fungicide (Boscalid) by Karina Honorato (Technological University of the Shannon-Limerick) Supervisor Shaheen M. Sarkar

Boscalid is a new pesticide belonging to the oxathiin fungicide class. It has a novel mode of action and is effective against infections that are resistant to existing fungicides, such as sterol inhibitors, dicarboximides, benzimidazoles, anilinopyrimidines, phenylamides and strobilurins. As a result, a silica gel Schiff base Pd(0) catalyst was successfully designed to enable green production of the highly desired Boscalid. The Suzuki-Miyaura reaction was used to make the essential intermediate component of Boscalid. The cross-coupling reaction was carried out at 80°C in an aqueous solution of ethanol (2:1) in the presence of 5mol% of silica gel supported Pd(0) catalyst to provide the corresponding 2-amino-4-chlorobiphenyl with 77% yield. The intermediate 2-amino-4-chlorobiphenyl was treated with 2-chloronicotinoyl chloride to give the Boscalid in 68% yield. The catalyst was easily recovered from the reaction mixture and recycled five times with iodobenzene and phenylboronic acid under standard reaction conditions to the corresponding biphenyl with no notable drop in biphenyl production. IR, GC/MS, 1H NMR, and melting point investigations were used to describe Boscalid and all of its derivatives.

Initial biological activity study of Boscalid was further accomplished by disc diffusion method using different concentrations of Boscalid (5 to 150 µg, 1 and 2 mg) against C. *tropicalis* and *F. solani*. Based on previous results, Agar well diffusion method was conducted using 5 mg and a visual inhibition zone was identified within 48h for *F. solani.* No inhibitory effect was observed on C. *tropicalis*.s.



1.5 The Menstrual Cycle: Communication between Competitive Female Track and Field Athletes and their Coaches by Niamh Fogarty (Technological University of the Shannon-Athlone) Supervisor Ciarán Ó Catháin

Despite the menstrual cycle (MC) potentially influencing performance, [1–3] current evidence reveals a lack of communication between female athletes and their coaches regarding this topic.[4–7] With that, this study aimed to investigate the degree of MC-related communication that occurs between competitive female track and field athletes and their coaches. Methods: Data were collected via professional networks and social media platforms, with an online questionnaire that was specifically designed and validated using a modified Delphi approach. Data were statistically analysed using IBM SPSS (v.27, Inc, Chicago, IL.), with thematic analysis used to analyse qualitative data. Results: Of the 126 responses, only 40% of competitive female track and field athletes (n=50) spoke to their head coach about their MC. Thematic analysis revealed a gender and knowledge barrier associated with the discussion of the MC, with performance and health listed as key reasons for discussion. Female athletes were less likely to discuss their MC if their coach was male ($X^2(1) = 3.924$, p=0.048). International level athletes (n= 42) were more likely to discuss their MC with their head coach compared to national level athletes (n=86) ($X^2(1) = 9.487$, p=0.002). Discussions did not appear to be influenced by athlete age (Mdn = 22.12 y, U = 1539, p= 0.063), hormonal contraceptive status ($X^2(1) = 0.008$, p=0.930) or time spent with coach (Mdn = 42 months, U= 1688, p=0.289). Conclusion: Communication around the MC is still limited within a track and field setting. Future research should assess the impact of education-based interventions on communication around this topic, specifically in a sporting environment.

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1.6 MiRNA regulation of adipose derived stem cells in breast cancer by Natasha Cunningham (Technological University of the Shannon-Athlone) Supervisor Cathy L. Brougham.

Introduction: Mesenchymal stem cells (MSCs) are adult stem cells capable of self-renewal and multilineage differentiation (Scioli et al. 2019). Adipose-derived stem cells (ADSCs), sourced from various tissues within the human body are becoming a prime alternative stem cell source. They are viewed as a double-edged sword in diseases such as breast cancer, as potential contributors of metastasis, therefore, the link between the tumour microenvironment, and stem cell-initiated tumour growth needs to be clarified (Schweizer et al. 2015).

Aim: To investigate miRNA regulation of ADSCs and Breast Cancer.
Methods: The proliferation of three breast cancer cell lines; MDA-MB-231, SK-BR-3, and T47D, were studied to demonstrate the effect of ADSC conditioned media (CM) on the subtypes. Six miRNAs (miR-21, miR-133, miR-222, miR-146, miR-221, and miR-A) and three cytokines (TGF-β, RANTES, TNF- α) were analysed using RQ-PCR and ELISA, respectively. Statistical analysis was performed using Minitab 20.1.0.

Findings: Following co-culture of ADSC CM, miR-21, miR-222 T47D, and both miR-146 and miR-221 SK-BR-3 cell lines were significantly up-regulated. MiR-133 expression in co-cultures displayed significant downregulation, as well as cell lines MDA-MB-231 and SK-BR-3 expressing miR-222. Significant down-regulation was observed in all cytokine expressions ($p<0.05$).

Discussion: This research has the potential to provide targets for novel treatment therapies, providing personalised molecular treatment to provide patients with a better prognosis. Oncogenes (miR-21, miR-222, miR-146, miR-221), and tumour suppressor (miR-133) regulation and expression has varying results in BC and ADSC interaction, i.e., oncogene up-regulation lowers patient prognosis, whereas tumour suppressor up-regulation may offer a therapeutic approach

1.7 Potential for using *S. boulardii* in the production of probiotic beer by Ben Murphy (South East Technological University Carlow) Supervisor Kieran Germaine

Beer is the third most consumed beverage on the planet. Health-conscious consumers now seek low calorie, gluten free and non-alcoholic beers. Brewers are seeking alternative products to provide them with a greater market share. Incorporating the use of health promoting probiotic organisms in the brewing process to produce functional beers may help to achieve this. The purpose of this research project was to investigate the potential of using the probiotic yeast *Saccharomyces boulardii* for the production of probiotic beer. *S. boulardii* samples were obtained from Optibac capsules. Biolog yeast identification plates and DNA extraction was used to identify the exact strain of yeast. Dual fermentations using *S. boulardii* and a typical ale yeast were performed to see how *boulardii* compared. It was found that *S. boulardii* performed comparably to an ale yeast but fermentation took slightly longer, alcohol percentage was lower and beer finished with a lower pH. *S. boulardii* produces high amounts of acetic acid which is considered an off taste in beer. Acetic acid concentration of beer fermented at 22 °C, 30 °C and 37 °C was measured to ensure values did not exceed the allowed threshold within beer. Results were found to be 43.54, 48.48 and 53.44 mg/L respectively. Threshold for acetic concentration in beer is ~90 mg/L dependent on beer style. A shelf stability trial was performed. After a two-month period total live and dead cells were counted. Viability of cells was then calculated, 82 % of cells were still viable after the two-month period.

1.8 Novel nutraceutical delivery system for management of inflammatory bowel disease by Jennifer Whelan (Technological University of the Shannon-Athlone) Supervisor Patricia Heavey and Clement Higginbotham

Inflammatory bowel disease (IBD) is a type of chronic gastrointestinal inflammatory illness that includes ulcerative colitis and Crohn's disease. IBD causes long-term damage to the structure and function of the intestine. Advances in medications for IBD have been very successful but many can cause unpleasant side effects.

Resveratrol (RES) is a natural polyphenol most known as a bioactive nutraceutical in red wine and its anti-inflammatory role has been extensively researched. However, due to its poor water solubility, high chemical instability, and low oral bioavailability, RES's use as a nutraceutical is currently limited. Smart delivery systems such as hydrogels have the potential to help overcome these challenges. Therefore, this research project aimed to synthesise a poly(ethylene glycol) dimethacrylate (PEGDMA) hydrogel for RES incorporation and monitor its release.

Two concentrations of PEGDMA-750 hydrogels were synthesised through photo-polymerisation; blank 100% (B100), blank 75% (B75) and RES incorporated 100% (R100) and 75% (R75). Estimated 15.625mg/R100 and 13.889mg/R75. These gels were characterised by gel fraction and swelling studies which gave information about the polymerisation efficiency and loading capacity. The release rate of RES from hydrogels was measured through a drug dissolution bath. The temperature was set at 37.5°C and the rotation for the paddles was set at 45rpm to replicate the conditions of the small intestine. The observed amount of RES released after 24 hours for R100 was 2.034mg and 2.214mg for R75.

1.9 COVID-19; How Ireland's Adolescent's Self-Esteem Has Been Affected by Rachael O'Connor (South East Technological University Carlow) Supervisor Clare Lodge

Introduction

Covid-19 restrictions are one of many factors affecting physical and mental well-being of individuals' worldwide (Peterson et al., 2021). Decreased physical activity (PA) has led to poor psychological well-being in adolescents globally (Maugeri et al., 2020). Research on effects of Covid-19 on Irish adolescents is lacking. The objectives of this study were to establish if students' self-esteem (SE) was impacted by Covid-19 and determine if there was a relationship between PA and SE levels.

Methods

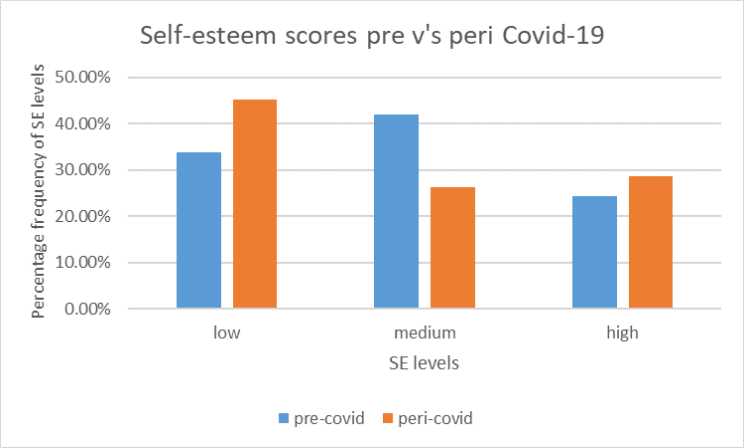
Junior Cycle students (n=133; m=66, f=60, non-binary=7) from 9 second-level schools completed the Rosenburg self-esteem scale online where higher scores (0-40) indicate higher SE. Differences in SE levels pre v's peri Covid-19 were examined using a Mann-Whitney U test. An independent T-test examined differences in SE levels of males v's females. PA levels were obtained through a concurring questionnaire by another student and a Chi-square test determined the relationship between PA and SE peri Covid-19.

Results

Despite decreases in SE levels of students pre (low SE=33.8%) v's peri Covid-19 (low SE=41.9%), no significant difference was found (p=.421). Females (mean=23.67) presented with significantly lower SE than males (mean=29.41) (p<.001). Pre Covid-19 results revealed, 92% of students enjoyed being physically active, with only 83% enjoying it peri Covid-19. Finally, no significant relationship between PA and SE levels were found peri Covid-19 (p=.920).

Discussion

Findings suggest the pandemic may have contributed to decreases in SE of students, despite no significant difference. Further research is required to improve negative psychological effects of the pandemic on Irish JC students. A limitation observed was that the same students were not examined pre v's peri Covid-19 due to only examining 3rd year students..



1.1 Developing Precision Medicine models for Rare and Metastatic Cancers by Gergely Antal (South East Technological University Carlow) Supervisor Jai Prakash Mehta

Cancers are diseases caused by unregulated cell division. Conventional cancer treatments such as chemotherapies are often unsuitable due to low specificity. Cancers which have metastasised often spread to areas where the combination of chemotherapy and surgery could cause the death of the patient. Precision medications are an effective, novel alternative which target specific molecular targets on cancer cells and have become standard practice for many cancers. However, the return of investment in developing precision medicine is often outweighed by the costs, resulting in a shortage of targeted options for rare and metastatic cancers. The repurposing of existing precision medicine has therefore become the forefront of precision oncology to meet demand in a cost-effective manner.

In this study a methodology was developed to find and potentially repurpose targeted therapies for rare and metastatic cancers using bioinformatic tools. The method was successfully used to find potential drug targets in osteosarcoma. By utilising genetic data from 21 osteosarcoma samples, cancer drug databases and network visualisation tools, numerous differentially expressed genes and corresponding therapies were discovered. Genes specifically in the JAK-STAT and PI3K-Akt signalling pathways were significantly over expressed, multiple targeted therapies were found to act on CTLa-4 and CD19 while another precision medicine, while others targeted multiple significantly over-expressed genes simultaneously.

After analysing the mechanisms of action, administration routes and comparison with relevant studies; Ipilimumab and Panitumumab combined with Necitumumab was recommended for further cell line testing. While Blinatumomab was recommended as it was found to target four highly over expressed osteosarcoma genes.

1.2 Novel Nutraceutical Delivery System for the Management of Inflammatory Bowel Disease by Shannen Cowman Kehoe (Technological University of the Shannon) Supervisors Patricia Heavey & Clement Higginbotham

Introduction

Inflammatory Bowel Disease (IBD) is a condition that affects 6.3 million worldwide (Alatab et al. 2017). IBD can be managed pharmaceutical approaches but can lead to unpleasant side effects (Lynch and Hsu, 2021). Recently, interest has focused on anti-inflammatory nutraceuticals which may have the ability to manage IBD by targeting the inflamed area (Karthikeyan et al, 2021). The nutraceutical of interest is curcumin which has been shown in in vitro and animal models to reduce inflammation. However, due to poor bioavailability in humans, therapeutic effects have yet to be observed (Lopresti, 2018). These challenges may be overcome by utilising smart nutrient delivery systems such as hydrogels. Therefore, the aim of this study was to synthesise a polyethylene glycol dimethacrylate (PEGDMA) hydrogel for curcumin incorporation and monitor its release.

Methods

Hydrogels were synthesized by UV polymerisation and characterised by swelling and gel fraction studies prior to curcumin incorporation. Solubility tests were conducted to find a solvent for curcumin as it is hydrophobic. Curcumin incorporation occurred through the initial synthesis of hydrogels and through swelling. Dissolution studies were carried out to monitor curcumin's release.

Results

The incorporation of curcumin was unsuccessful in both approaches. Curcumin addition during initial synthesis resulted in unpolymerized hydrogels. It is hypothesized that curcumin's antioxidant properties may have prevented polymerization from occurring (Priyadarsini et al. 2003) (Abuajah et al. 2015). Incorporation through swelling was not successful as dissolution studies determined that no curcumin was released.

Conclusion

PEGDMA hydrogels may not be suitable delivery systems for curcumin due to curcumins' unsuccessful incorporation. Further studies will be required to determine if encapsulating curcumin in other hydrogel types may have more favourable outcomes.

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1.3 Detection of the Causative Bacterial Agents of Ovine Footrot and Contagious Ovine Digital Dermatitis in Sheep and the Effect of Vaccination with 'Footvax' on their Prevalence by Jake Delaney (South East Technological University-Waterford) Supervisor Nabla Kennedy

Ovine footrot (OF) and contagious ovine digital dermatitis (CODD) are now the most prevalent types of infectious lameness in flocks in Ireland, bringing with them significant economic costs (Winter et al., 2017) as well as severe welfare implications for the infected animals (Bennett et al., 2011). The aim of this research project was multifaceted. A laboratory-based study was completed to determine, through use of molecular methods, the presence of what has been determined to be the cause of ovine OF and CODD, namely *Dichelobacter nodosus* and *Treponema spp*. bacteria, respectively (Duncan et al., 2018, Zanolari et al., 2021). The second aspect of this research project consisted of an observational study, where a flock was vaccinated with the footrot vaccine 'Footvax', produced by MSD. This field-based trial consisted of a vaccinated group of 207 ewes and an unvaccinated group of 10 sheep. Groups were assessed monthly for lameness prevalence and the clinical status of the diseased hoof. Both groups were then compared using statistical analysis to determine the statistical significance between the vaccinated and unvaccinated groups. The administration of the vaccine was found to be statistically significant in the case of CODD infections as the vaccinated group recorded a lower prevalence of the condition than that of the unvaccinated group (an average prevalence of 15% compared to that of 4.71%, P =0.043). However, this was not the case for OF, as although there was a decrease in the prevalence among the vaccinated and unvaccinated groups (15% vs. 5.32%), the statistical analysis yielded a P value of 0.053 which falls just above the threshold of statistically significant.

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1.4 Are all C18 columns the same? by Niamh Doyle (South East Technological University Waterford) Supervisor Richie Ryan

A Reverse Phase HPLC method for the separation of a mixture of β2 agonists was developed and optimised. Most HPLC methods state that a C18 column was used but do not account for the differences between them. Many research papers focus mainly on the mobile phase for discussing changes in selectivity. Differences between stationary phases include presence of silanol groups, ligand length and density of the bonded ligands of the stationary phase.

A scouting gradient was used to develop the initial method and optimal conditions. The % organic of the mobile phase, the organic solvent in the mobile phase and the number of silanol groups present on the stationary phase were investigated. Changes in selectivity were observed from these changes being introduced. The A, B & S* terms of the hydrophobic subtraction model explained, in part, the selectivity changes observed.

Increasing the % organic in the mobile phase results in the ligands of the stationary phase to be highly solvated resulting in different steric interactions between two of the compounds and the stationary phase causing the elution order to change. Changing the organic solvent from acetonitrile to methanol results in a different solvation environment as the two solvents have different properties resulting in different interactions between the organic component and the stationary phase. Changing the column from an endcapped to a non-endcapped column results in more silanol groups present. These silanols are negatively charged resulting in the protonated compounds to be more retained and peak tailing to be more prevalent.

1.5 Wearable Fitness Technology (WFT) and The Influence on Individuals Perceptions of Energy Expenditure (EE) During Aerobic Exercise by Molly Duggan (South East Technological University-Carlow) Supervisor Brian O'Rourke

Aim

The aim of this study was to analyse whether WFT when utilised during aerobic exercise sessions is influencing individuals' perception of the EE during aerobic exercise. Many studies have shown the variability of the EE feedback provided by WFT (Kendall, Bellovary and Gothe, 2018). If individuals perceptions, are being influenced by these statistics provided by the WFT, real world health and fitness implications may be impacted such as weight control. A second objective was to note accuracy levels of EE perceptions compared to actual EE and whether individuals using WFT were less accurate than those who do not.

Method

20 male participants took part in this study, 10 who habitually utilised WFT during their exercise sessions (WFT group) and 10 who did not (Control Group). Each participant performed a controlled self-selected, steady-state, exercise session with gas analysis performed concurrently. Each participant PEE was recorded after the cool down.

Results

No statistically significant difference was found between the WFT groups and the control groups Perceived Energy Expenditure (PEE). Between groups the WFT group had a more accurate PEE (10.13% inaccuracy) during the exercise session compared to the control group (22.7% inaccuracy). Within groups the control groups PEE accuracy approached significance (P= 0.059) showing a more accurate perception of those in the WFT group.

Conclusion and Future Research

WFT is not having a significant influence on PEE during aerobic exercise on the population within this study. Future research should be carried out over a longer period with extensive exercise session completed by a larger, mixed gender group of participants.

1.6 Plants as a source of cosmeceuticals. Evaluation of antioxidants, anti-tyrosinase and antimicrobial activities by Michaela Fitzgerald (Technological University of the Shannon Midwest) Supervisor Tanya Beletskaya

Cosmeceuticals are scientifically validated cosmetic products with a functional activity to improve appearance, reduce hyperpigmentation and combat sun damage. There is a widespread interest to identify plant metabolites that can be used as ingredients in cosmeceuticals. Polyphenolic and flavonoid compounds have antioxidant properties and can prevent photodamage. Tyrosinase is an enzyme that plays a role in the biosynthesis of skin pigment melanin. Tyrosinase inhibitors are used as skin whitening agents. Cosmeceuticals should be preserved with natural compounds that are not harsh on the skin but supress the growth of bacteria and fungi. The antioxidant capacity, anti-tyrosinase and anti-microbial activity of five plants (rose flowers, mallow flowers, bearberry leaves, mulberry leaves and licorice root) were evaluated. Antioxidant activities were determined using the Folin-Ciocalteau (FC) assay, the Aluminium chloride (AlCl3) colorimetric method and the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. The antimicrobial activity was tested via disk diffusion using four test organisms (*Escherichia coli, Staphylococcus aureus, Bacillus subtilis, Pseudomonas aeruginosa*). The results revealed that bearberry and rose exhibited the highest total polyphenol content (135.4 ± 9.8 and 54.6 ± 5.0 GAE mg/g DW respectively), total flavonoid content (57.8 ± 0.7 and 97.51 ± 6.0 QE mg/g DW respectively) and antioxidant activity (1435 ± 80.9 and 919.2 ± 66.4 TE µM/g DW respectively). Bearberry and rose also showed minor suppression of *B. subtilis* growth. Only liquorice root showed significant inhibitory activity (33%) against tyrosinase. Based on the findings, bearberry and rose possess good bioactive activity and are recommended for use in cosmetic formulations.
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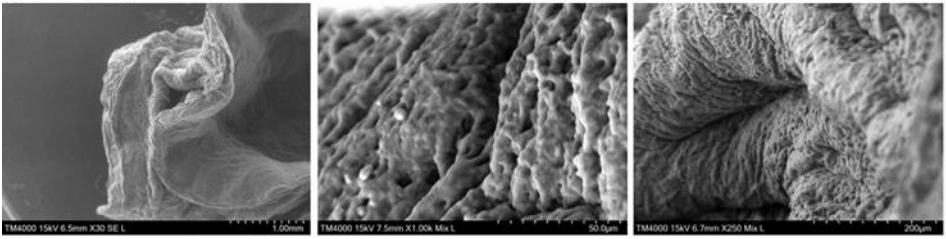
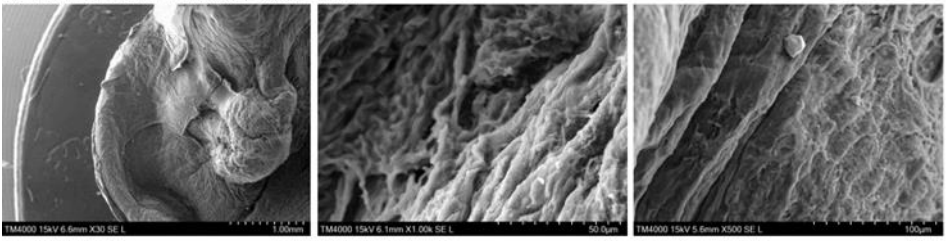
1.7 Green Tea Wound Dressing by Jessy See Cheng Fong (South East Technological University Waterford), Supervisor Shiau Pin Tan

Green Tea (GT) had shown promising antibacterial and antioxidant activities when using in wound dressing (1, 2). The used of GT as a natural source of therapy is gaining popularity as it is biocompatible and eco-friendly to use, i.e., used of GT had no known significant impact to land, air and etc. This study developed a chitosan/polyvinyl alcohol based hydrogel dressing containing GT and its biological effect was evaluated. The in-vitro released profile studies reported both the control hydrogel and the GT hydrogel showed an initial burst released of the bactericidal component in the first half an hour killing about 95% and 98% of the bacterial population respectively. The releasing of GT was related to the 3D crosslinking polymer matrix as revealed in Figure 1 , providing channels to entrap GT. The effectiveness of the GT hydrogel was tested can be lasted for at least two days. The Fourier-transform infrared analysis suggested the extra intermolecular bonding occurring between GT and the polymer blend improved the mechanical properties of the GT hydrogel (0.031 ± 0.0007 MPa) comparing to the control hydrogel (0.0018 ± 0.0003 MPa). Moreover, the addition of GT had shown improvement on the thermal stability of the hydrogel from 266 °C (control hydrogel) to 276 °C (GT hydrogel). A method development on preparing a chitosan microparticles in hydrogel scaffold also conducted to develop a dressing with controlled drug released. The novel hydrogels' potential for smart-release capacity may provide an effective approach for the diabetic chronic wound management.

a) Control Hydrogel Surface



b) Green Tea Extract containing Hydrogel Surface



1.8 The effect of agricultural intensification on groundwater quality by Eoghan Fox (South East Technological University Waterford) Supervisor Michael Breen

This project investigates the effect of agricultural intensification on groundwater quality. Agriculture has been identified as the largest producer of nitrogen emissions in Ireland (MothIversen & Kurt Nielsen, 1998). An observation made by the members of the local water scheme was that the nitrate concentration in recent years was increasing at the local well and so the decision was made to investigate the cause of this as the project. After contacting Barry Dean, the CEO of the NFGWS, all the testing from sites across the country were made available on an excel spreadsheet. This was a desk-based study that used EPA approved historical data collected by the National Federation of Group Water Schemes along with other public access data to find a relationship between nitrate concentrations in groundwater quality and intensification of agricultural production. At first the methods were based around the local water scheme catchment but due to limitations and lack of data the approach had to be scaled up. More information was available on a national scale to be able to compare fluctuations in agricultural fertiliser inputs and national herd population with nitrate concentrations. The results found that there was a relationship between agricultural intensification and groundwater quality in terms of nitrate concentration. It found that nitrate concentration in groundwater is increasing in recent years along with agricultural production and inputs, indicating that current policies to protect water quality are not sufficient.

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1.9 The acute effects of talocrural MWM's compared to soft-tissue application of the plantarfascia on ankle dorsiflexion ROM in male GAA athletes with chronic lateral ankle sprain by Peter Hempenstall (South East Technological University Carlow) Supervisor Brian O'Rourke

Introduction

Previous research has looked at various treatment remedies for improving acute ankle Dorsiflexion Range of Motion (DFROM) post chronic Lateral Ankle Sprain (LAS). Mulligan's Mobilisation with Movement (MWM) appears frequently however, the significance and mechanism remain quite conflicting (Gilbreath et al., 2015). It is known that after a LAS, the Lateral Ligament Complex (LLC) is compromised causing calcaneal inversion, increasing stiffness of plantarfascia (Al-Mohrej & Al-Kenani, 2016, Denegar et al., 2002, Loudon & Bell, 1996). The objective of this study was to explore the effectiveness of MWM compared with soft-tissue application of the plantarfascia on acute ankle DFROM.

Methods

20 male participants (Mean ± SD: Age = 22.5 ± 1.5 years, Ankle DFROM = 29.9º ± 8.6º) were split into two groups using subject-matching: MWM (n=10), plantarfascia (n=10). The main outcome measure was ankle DFROM using a Weight-Bearing Lunge Test both pre-intervention and immediately post-intervention.

Results

There was significant evidence to support the utilisation of either treatment for the improvement of acute ankle DFROM post chronic LAS ($P \leq 0.001$). Both groups showed increases in ankle DFROM (MWM: 5.6%, plantarfascia: 18.5%) however, there was no significant differences between groups ($P=0.05$) and only a small effect size was observed (0.4).

Conclusion

These results indicate clinical relevance of incorporating either treatment intervention into the rehabilitation of chronic LAS. It would be of interest to view the lasting effects of this study on a larger population or similarly; to view the combined intervention. Thus, future research is recommended for a greater comprehension of LAS rehabilitation.

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1.10 Impact of Varied Fermentation Times on New-make Whisky from Terroir Malt by Myles McCarthy (South East Technological University Carlow) Supervisor Damien Brady

To determine the significance of the impact of the geographical growth location or “terroir” of malt on the flavour of new-make whisky was investigated by comparing different terroirs with a second variable from which research has shown to be a strong contributor to flavour congeners, fermentation time ;72-hour fermentation compared to 120-hour fermentation with three malt barleys from three terroirs (Bohermore, Co. Carlow, Blackcastle, Co. Kildare, and Ballyrankin, Co. Wexford) of two varieties (Tungsten and Laureate). Six new-make whisky samples; 2 samples from each terroir, one sample undergone 72-hour fermentation and the second sample undergone 120-hour fermentation that were all produced at laboratory scale under controlled conditions. The samples were analysed through HS-SPME (Head Space Solid Phase Micro Extraction), GCMS (Gas Chromatography Mass Spectrometry). 52 VOC (Volatile Organic Compounds) were identified showing strong similarities between new-make whisky of the same terroir when compared to new-make spirit of with the same fermentation time. The Ballyrankin terroir (RM) had high distribution of Isobutyl hexanoate, Isoamyl octanoate, and Isobutyl octanoate creating an aromatic profile of green apples, sweet, oily, fruity/floral, tropical while the Bohermore terroir (MD) had high distribution of Toluene, Ethyl trans-4-decenoate, and 3-methyl-1-butanol creating a nutty, banana, waxy aromatic profile, and the Blackcastle terroir (BA) had high distribution of Ethyl tiglate, Ethyl heptanoate, and D-limonene creating a citrus, fruity, caramel like sweet aromatic profile. From the results of this research, it can be concluded that terroir of barley has greater significance on the impact of the VOC profile when compared to variation of fermentation time.

1.11 Covid-19; The Effect on Junior Cycle Students' Physical Activity Participation by Kym O Brien (South East Technological University Carlow) Supervisor Clare Lodge

Objectives
Covid-19 brought a worldwide decrease in physical activity. However, there is limited evidence exploring its effect on Irish adolescents PA. The aim of this study was to investigate PA pre - peri Covid-19 in Junior Certificate students, to compare PA levels for this age cohort to international counterparts, and to use this information if faced with future crises.

Methods
Irish adolescents (n=107; ages 12-19) participated in an online study during October 2021-January 2022. Surveys were distributed to secondary schools via Microsoft Forms containing questions on frequency and intensity of PA and types of sports played. These schools had previously participated in a larger scale study 'Is Everybody Going WeLL'. Differences in PA levels pre - peri Covid-19 were examined using a Mann Whitney U test.

Results
PA levels increased pre-peri Covid-19. 0% of students pre Covid-19 participated in PA daily compared to 11% peri Covid-19. However, it was not significant ($p = .264$) Conversely, there was a significant difference found in frequency of vigorous PA ($p = .016$).

Conclusion
Although our study revealed no significant difference in daily PA of at least 60 minutes pre-peri Covid-19, insufficient levels of PA have been reported internationally. Therefore, findings suggest that Covid-19 has contributed to a decrease in PA among Irish adolescents. Public health, schools and communities should implement interventions to ensure daily PA.

1.12 Effects of Glatiramer Acetate on Gene Expression Patterns of Inflammatory Cytokines by Lucy O' Mahoney (South East Technological University Waterford) Supervisor Sweta Rani

As dry AMD is currently one of many degenerative disease that have no active cure, the study of Glatiramer Acetate (GA) as a possible therapeutic was essential. The following research carried out will determine the possibility of GA being an effective therapeutic treatment for AMD due to GAs potential ability to modulate the gene expression patterns of pro-inflammatory cytokines within the retina. The pro-inflammatory cytokines examined were TNF-α, IL-1β, IL-18, and IL-6. This modulation of pro-inflammatory cytokines was the main focus of the research, if the pro-inflammatory cytokine production is modulated then this will have a direct reduction in the levels of inflammation expressed within the RPE cells and limiting Drusen formation.

In this study ARPE-19 cell line were either untreated control or treated with lipopolysaccharide (LPS), LPS+ GA1 (16µg/ml) and LPS+ GA2 (64µg/ml). GA concentrations were selected based on the results obtained from cytotoxicity assay, to imitate the effect GA therapies would have on the early-stage AMD patients.

Co-culturing of ARPE-19 cell lines and THP-1 cell line showed that GA reduced the differentiation, adherence and migration of THP-1 cells induced by LPS treatment. Effect of GA in modulating the LPS-induced expression of pro-inflammatory cytokine in ARPE-19 cells was determined RT-PCR. TNF-a was found to be increased and IL-1beta was decreased following GA treatment.

The results obtained from these studies provides evidence that GA stimulation of RPE cells can potentially play a role in the regulation of the expression of pro-inflammatory cytokines within the ocular fluids of the retina.

1.13 The Effect of Surface and Footwear on Speed During Low Intensity Running Cytokines by Niamh Padden (South East Technological University Carlow) Supervisor Peter Francis

This study aimed to determine if footwear or surface has an effect on running speed when running at a low intensity. There is limited research already that include barefoot running on a soft surface and at a low intensity. 17 participants were required to run for 3 minutes at a rate of perceived exertion of 11 in four different conditions: Shod on track, barefoot on track, shod on grass and barefoot on grass. Distance covered in each condition was measured using a trundle wheel and compared using a two-way repeated ANOVA. Results of this study found that footwear had no significant effect on speed ($p= 0.064$) and surface had no significant effect on speed ($p=0.114$). This study found that running barefoot on a hard surface had a significant negative affect on speed ($p=0.044$). These results suggest that when running barefoot on a hard surface and number of factors lead to a decrease in speed. Factors that affect speed include extrinsic factors (footwear and running surface) and intrinsic factors (Spatiotemporal; stride length and frequency, kinematic; movement patterns and lower limb joint angles, and kinetic; ground reaction force). This study looked at extrinsic factors and how they can affect the intrinsic factors leading to a subsequent effect on speed.

1.14 Analysis of Peat Carbon Sequestration Potential in Horticulture Crops by Connor Place (South East Technological University – Carlow) Supervisor Carloalberto Petti

Since the mid-1900s, incorporating peat into plant growing mediums has remained common practice in both the agriculture and horticulture industries. However, peat's effect on the carbon sequestration capability of plants has received little attention. In this study, we investigated what effects peat-based and peat-free growing mediums have on plant growth and on the carbon sequestration capability of several plant species. To determine if peat could increase a plant's carbon sequestration capability, a variety of plant species were grown in both peat-based and peat-free growing mediums and were subjected to identical lighting, watering, and heating regimes to ensure any variations in growth could be accurately attributed to the incorporation of peat into the growing medium. Endpoint measurements showed plants grown in peat-based mediums grew 29.4 % taller, produced 35.7 % more total chlorophyll and 7.8 % more total carotenoids, and sequestered 11.2 % more CO_2 (on average) in comparison to plants grown in peat-free substrate. Although the limitations of only testing the effects of peat-based compost in controlled conditions are understood, these results indicate the incorporation of peat into plant growing mediums improves plant growth and promotes carbon sequestration.

1.15 Assessing Shoulder Function in Non-Injured Female Rugby Players by Jessica Schmidt (South East Technological University – Carlow) Supervisor Peter Francis

Background
Musculoskeletal injury is a large topic of interest within the game of rugby (Grainger et al., 2018). Previous literature is largely based upon and limited to acute and overuse musculoskeletal injuries leaving a gap for studies looking into musculoskeletal function in non-injured rugby players (Partner and Francis, 2018).
This study was carried out to look at the prevalence of shoulder dysfunction as well as the effect of player position, shoulder dominance and player experience on shoulder function in non-injured amateur female rugby players in Ireland.

Methods
This study was carried out as a cross-sectional survey study. The "Contact Sport Shoulder Function Questionnaire" was distributed among amateur female rugby teams across Ireland.

Results
The mean overall SFS of the 30 participants was 212±13.08 with 53.3% of participants reporting a perfect SFS. No statistically significant difference was found in mean overall SFS between forwards and backs (213.67±12.74 and 210.75±13.96, respectively). There was also no statistically significant difference in SFS between the dominant and non-dominant shoulder (105.2±10.35 and 107.3±5.19, respectively). There was a poor negative correlation between SFS and the number of years player experience; this was also not statistically significant ($r=-0.186$, $p>0.05$).

Conclusion
From this study we can see that a large portion of players who were classified as non-injured were carrying functional deficits in the shoulder. There was no statistically significant effect of player position, shoulder dominance or player experience on SFS found in this study, this may be due to the small sample size.

1.16 Analysis of Honey, Plant Seed Extracts and Natural Plant Butters for Skin Repair by Debbie Umukoro (Technological University of the Shannon –Midlands Midwest) Supervisor Natasha McCormack

The skin is an important and vital organ that plays a crucial role in protecting the body from infections and thermal dysregulation. For this reason, it is crucial to protect the skin barrier from trauma that can lead to the loss of organ functioning and making the skin barrier vulnerable to infections and wounds. Non-healing wounds are seen as one of the most difficult conditions to treat. Non-healing wounds are also a huge economic burden as treatment costs are expensive. The majority of treatments available include medical device dressings, vacuum pressure dressing or hyperbaric oxygen treatment. These modern technologies for skin barrier repair have been proven to be time-consuming and expensive. Natural compounds have become significantly important in recent years due to its many therapeutic uses in the medical field. Honey and Plant Seed Extracts have been used in ethnomedical studies both traditionally and recently. Using honey to repair skin wounds dates back to approximately 8000 years ago as can be seen in paintings from the Stone Age. Recently, honey and plant seed extracts such as Shea butter, CBD Oil and Jojoba oil have become heavily incorporated into modern medicine and ethnomedical practices due to their anti-microbial and anti-inflammatory effects. This research project aims to provide an in-depth review of the use of natural agents to study skin wound healing and migration, this could open doors to a more affordable and convenient approach. A natural method can be explored by studying the different properties of natural compounds for optimum treatment.

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1.1 Laid-back breastfeeding: Knowledge, Attitudes, and Practices of Midwives and Student Midwives in Ireland by Margaret McGuigan (Dundalk Institute of Technology) Supervisor Patricia Larkin

Background

Breastfeeding rates in Ireland are among the lowest in world, with 37.3% of mothers breastfeeding exclusively on discharge, although 63.8% initiate breastfeeding at birth (National Women and Infants Health Programme, 2021). Nipple trauma and difficulties with baby latching are major contributors to the introduction of formula and discontinuation of breastfeeding. Laid-back breastfeeding (LBBF) has been shown to significantly reduce problems such as sore and cracked nipples, engorgement and mastitis and to encourage a deeper latch (Wang et al., 2021; Milinco et al., 2020). Although LBBF's benefits are well documented, this position does not seem to be routinely suggested to mothers when establishing breastfeeding. Instead, upright positions are recommended both in text and verbally by health professionals.

Objective

To determine midwives and student midwives' knowledge, attitudes, and practices of using laid-back breastfeeding in Ireland.

Method

A cross-sectional descriptive survey distributed to three maternity hospitals in Ireland and two Irish online midwifery groups.

Results

The study received 253 valid responses. Most participants (81.4%) were aware of LBBF. However. only 6.8% of respondents cited it as their "go-to" position. More than a third (38.34%) have never used this position with mothers. Those who had received specific education about LBBF were 9x more likely to suggest it. Barriers included, lack of confidence and experience, time and staffing issues and cultural/old habits to continue suggesting familiar positions.

Conclusion

A high awareness of LBBF by midwives does not correlate with the use of this position in practice. Specific education for midwives on LBBF is required for the position to be suggested regularly to mothers, leading to more successful breastfeeding establishment and maintenance in Ireland.

1.2 The Effect of Breastfeeding On Weight Status In Children And Adolescents (1-17 Years) Living In Ireland

by Nada Akl (Technological University Dublin) Supervisors John Kearney and Daniel Hazley

Background/Objectives
A number of meta-analyses and systematic reviews have associated breastfeeding with a decrease in the odds of overweight/obesity while other studies did not find such an association.

Subjects/Methods
This study used data from three cross-sectional studies including a total of 1,537 participants: 1-4 years (n=500), 5-12 years (n=556) and 13-17 years (n=441). Data was obtained from the National Pre-School Nutrition Survey, National Children Food Survey, and the National Teens' Food Survey, respectively. A chi-square test was conducted for both breastfeeding and weight status. The independent effect of breastfeeding duration on weight status was estimated using binary logistic regression analysis while controlling for potential confounders.

Results
Of the 1,537 participants, 20.5% were overweight/obese, 47.3% were never breastfed, and 15.9% were breastfed for 6 months or more. After adjustment for confounding variables (child's sex and age, parental education and social class, mother's BMI, birth weight and solid food's introduction), no statistically significant association was observed between the duration of breastfeeding and overweight/obesity. Education, social class, and mother's BMI were significant determinants of the mother's likelihood to breastfeed. Mother's BMI and birth weight were strong predictors of the children and adolescents' likelihood of being overweight/obese.

Conclusion
There was no significant association between breastfeeding and weight status in children and adolescents. Conflicting findings in the literature indicate a need for further investigation. Nevertheless, breastfeeding should continue to be promoted as it has beneficial short-term and long-term health outcomes which are well-recognised.

1.3 SARS-COV-2 disease severity according to Vaccination status and vitamin D deficiency amongst hospitalised Covid-19 patients by Martyna Sanecka (Technological University Dublin) Supervisors Modar Youssef, A Al Lawait, S.I. Shah, M Abdulsalam, A Qadeer, Daniel McCarthy, John Foul

Background/Objectives
Due to its immunomodulatory effects, low vitamin D status has been associated with increased disease severity and poorer clinical outcomes in Covid-19. The aim of this study was to investigate the association between serum 25(OH)D status and clinical outcomes according to vaccination status in hospitalised Covid-19 patients.

Subjects/Methods
The clinical outcomes (mortality, ICU admission, requirement for supplemental oxygen and mechanical ventilation) of 171 Covid-19 patients treated at Connolly Hospital, Blanchardstown were recorded. Serum 25(OH)D levels were collected on admission and categorised as follows: deficient (<30nmol/L), insufficient (30-49.99nmol/L), and sufficient (>50nmol/L).
Univariate analyses were used to determine whether clinical outcomes differed according to vitamin D status between vaccinated and unvaccinated patients, and also to establish what factors, if any, were associated with poorer clinical outcomes.
Multivariate logistic regression models were used to determine whether any of the factors highlighted on univariate analysis persisted as predictors of the clinical outcomes of interest after adjustment for confounding.

Results
On multivariate analyses, vitamin D deficiency was significantly and independently associated with mortality (OR: 24.807 (95% CI: 1.57-392.062) (P=0.023) and ICU admission (OR: 6.868 (95% CI: 1.134-41.852) (P=0.036) in unvaccinated patients, after adjustment for major confounders. Unvaccinated patients were younger, had less comorbidities and more vitamin D deficiency than their vaccinated counterparts.

Conclusion
Serum 25(OH)D is strongly and independently associated with increased mortality and ICU admission in unvaccinated (but not vaccinated) hospitalised Covid-19 patients. This study supports the development of more large-scale studies and the encouragement of supplementation to correct vitamin D deficiency in Irish adults..

1.4 DNA barcoding as a tool for species identification of commercial tuna products concerning seafood mislabelling by Valeria De Santo (Atlantic Technological University) Supervisor Luca Mirimin

Seafood fraud leads to economic loss, threatens consumers' health and the ocean's sustainability. Highly processed products are susceptible to fraud because of the nature of their production and packaging, including tuna (Thunnus spp), one of the most valuable taxa in the market. DNA barcoding is an effective tool to identify seafood products including tunas. However, there are issues concerning method standardization, reference databases and species sampled. This study aims to validate an established method for the molecular authentication of canned tuna products (preserved in olive and sunflower oil, brine, spring water), and to investigate the accuracy of labelling, with two extraction methods and three mitochondrial DNA genetic markers (Cyt-B, Control Region, ND5). The Chelex method was considered a cheaper alternative to the commercial kit DNeasy Blood&Tissue and yielded a high quantity of DNA extracts but of low purity. PCR amplification and sequencing failed in several products, most likely due to the presence of PCR inhibitors and DNA degradation during production. The smaller gene was the most successful, with 5 out of 7 sequences obtained. Two samples were found not to match the label description; however, this analysis alone does not confirm a case of mislabelling as the best BLAST hit is insufficient evidence of seafood fraud. DNA barcoding is a valid method for the authentication of seafood species, however, this study showed that improvements are still needed, including progress with public reference databases, sequencing methods and market regulations, which will be paramount for the mitigation of seafood mislabelling and fraud.

1.5 Exploring the relationship between the menstrual cycle and markers of physical performance in intercounty Ladies Gaelic Football players by Colette Collins (Atlantic Technological University) Supervisor Siobhan Leahy

Introduction

There is a significant lack of research surrounding the impact of the menstrual cycle (MC) on performance in Ladies Gaelic Football (LGF). This study aimed to assess the prevalence of self-reported MC symptoms and perceptions of impact on performance; explore the effect of the MC phase on sprint and power and investigate the relationship between self-reported MC symptoms and objective measures of speed and power.

Methods

20 senior intercounty LGF players (age 23.2±4.8) were recruited. All players completed an online questionnaire where they reported MC information. Speed (20-metre sprint time (s)) and power (counter movement jump height (cm)) during the early follicular (EF) and mid luteal (ML) MC phases.

Results

Speed was lower in the EF phase (3.6±0.3s) compared to the ML (3.4±0.2s). There was no difference in jump height (EF:29.8±4.2cm, ML:30.8±3.6cm). A significant interaction was discovered between a decline in sprint performance and reported symptom time ($F=34.877$, $p=<0.001$). All the players reported experiencing MC symptoms, and 50% believed it impacted their performance. Only 15% of players (3/20), had previously informed their coach about MC issues.

Conclusion

The findings of this study highlight that sprint performance is negatively affected in the EF phase. The interaction between symptom time and sprint performance was the first result of its kind. This study highlights the widespread negative effects of the MC on LGF players, indicating a need for more research in the area, and open lines of communication between players and coaching staff regarding symptoms and their impact on performance.

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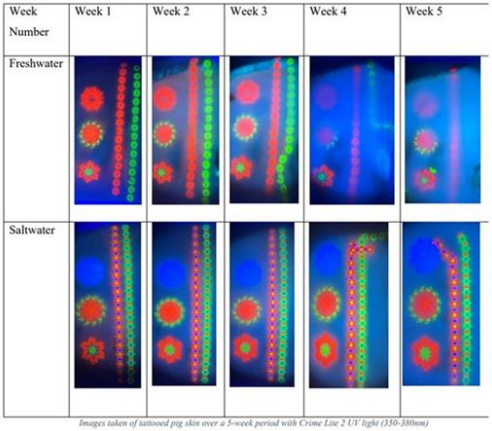
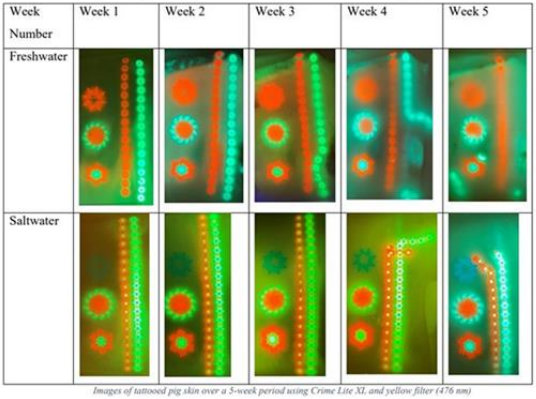
1.6 The use of forensic alternate light sources for the location and identification of temporary (stick-on) tattoos in identifying unknown individuals by Rachael Carey (Atlantic Technological University) Supervisor John Cassella

Alternate Light Sources (ALS) enhance the ability to visualise evidence on the human body and have been reported useful for tattoos. A temporary tattoo is a decorative image, applied to the skin for short time periods using a process of screen printing to create the tattoo image on paper coated with a transfer film. They differ from permanent inked tattoos in the chemistry and longevity of the process and have seen an increase in popularity over permanent tattoos, reportedly only lasting approximately 2 weeks on human skin. Some of these are fluorescent, created with ultraviolet-reactive ink, which glows under ultraviolet light. During the day they appear as regular (inked) tattoos, but the vivid colours cannot be seen until ultra-violet light is employed.

The purpose of this research was to determine if it was possible to use temporary tattoos as an identification tool in forensic investigations in individuals found deceased in rivers (freshwater) and seas (saltwater). The tattoos were placed on pig skin as the proxy for humans, submerged in fresh or salt-water and monitored over a decomposition period of 5 weeks to measure any change in fluorescence. ALS was used to visualise the tattoos; photographs were taken over the experimental time period and evaluated for changes in fluorescence using 'Image J' software. Results demonstrated that the fluorescence of the tattoos did not change significantly over a 5-week period when immersed in freshwater, but there was in saltwater. Results suggest a value in postmortem drowning victim screening for individualisation and identification.



Images taken of tattooed pig skin over a 5-week period with Crime Lite 2 UV light (350-380nm)



Images of tattooed pig skin over a 5-week period using Crime Lite XL and yellow filter (476 nm)

1.7 A qualitative analysis of women's postnatal experiences of breastfeeding supports within the maternity unit or during homebirth in Ireland by Niamh Lawlor (Technological University Dublin) Supervisor Liz O'Sullivan

Background
Despite extensive evidence outlining the benefits associated with breastfeeding for the mother and baby, breastfeeding rates in Ireland are among the lowest worldwide. The objective of the present study is to analyse women's experiences of the breastfeeding supports available postnatally in the maternity unit, or during homebirth in Ireland.

Methods
A qualitative analysis based on the responses to an open-ended question on a cross-sectional survey aimed of women in Ireland who breastfed, or considered breastfeeding was conducted. Data were analysed using the 'six-step Thematic Analysis Framework' developed by Bruan and Clark which allowed for the development of themes and sub-themes.

Results
Two themes, with accompanying sub-themes were identified; (1)'Support was either inaccessible, inadequate and/or inappropriate'. This theme portrays how supports received were less than optimal in aiding woman to successfully establish breastfeeding. While many described difficulty in accessing supports, others who received supports found them to be 'non-specific', 'rushed' and sometimes 'rough'. (2)'Breastfeeding support in theory but not in practice'. This theme illustrates how breastfeeding was promoted by healthcare professionals (HCPs) antenatally. The challenges of breastfeeding were rarely mentioned antenatally. Women felt unsupported by HCPs in overcoming these challenges postnatally.

Conclusions
A lack of adequate knowledge, time and support from HCPs was described. Women require practical, informative and specific support from trained HCPs to overcome challenges relating to breastfeeding. Adequate training of HCPs and a provision of funding to expand services for lactation supports is required to improve supports and alleviate mixed information.

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1.8 The association between diet quality and sleep quality in Irish undergraduate students by Emer O'Sullivan (Technological University Dublin) Supervisor Mairead Stack

Background

This study examines the association between Diet Quality (DQ) and Sleep Quality (SQ) in Irish undergraduate students, there is a lack of data available on the DQ and SQ of Irish students using validated questionnaires.

Methods

This cross-sectional study included an online questionnaire distributed through social media using snowball sampling. Data was collected from the 24/2/2022 to the 3/3/2022. Irish Undergraduate Students were invited to participate and 415 valid responses were collected. U-Mann Whitney, Kruskal-Wallis tests and Pearson Chi-Square tests examined the association between DQ and SQ and sociodemographic characteristics of the student population.

Results

17% (n=72) of participants had a healthy DQ and 42.4% (n=176) of participants had good SQ. There was a significant association between DQ category and SQ category (p·=·0.004), those with poor SQ were more likely to have unhealthy DQ. Field of Study (p = 0.04) and Covid-19 infection history (p = 0.025) were significantly associated with DQ category. 86.6% of those who tested positive had unhealthy DQ. Half (50.4%) of respondents were meeting the 5 portions a day fruit and vegetable (F&V) recommendations but only 17.3% (n=72) were meeting the 7 portions a day recommendation.

Conclusion

The results from this study suggest that a bidirectional relationship exists between DQ and SQ and that the DQ and SQ of undergraduate students should be addressed through interventions. Further research should be conducted on the knowledge and attitudes of students towards diet, F&V consumption and sleep to inform future interventions).

1.9 An investigation into polyphenolic variation within forage crops in Ireland by Brian Jordan (Technological University Dublin) Supervisor Nissreen Abu Ghannam

With the enactment of the Climate Action and Low Carbon Development Bill in 2021, the Irish agricultural industry has come under increasing pressure to evaluate strategies targeted at reducing greenhouse gas emissions. One mitigative strategy currently gaining traction involves the enhanced inclusion of polyphenols in the diets of dairy cows via novel forages. The objectives of this study were to therefore analyse the polyphenol content of several novel forages, and to then ascertain whether polyphenolic variation exists between forage species or different seasons.

The total phenolic content, total flavonoid content, ferric reducing antioxidant power and DPPH radical scavenging capacity of six forage species (perennial ryegrass, timothy, white clover, red clover, chicory, plantain) were quantified and compared individually, across five separate months, and in three feed combinations. Results subsequently underwent statistical analysis.

All four assays (in both individual and feed treatments) presented Pearson's correlation coefficients of greater than 0.7, indicating a strong positive correlation. Perennial ryegrass, white clover, and red clover reported the lowest polyphenolic, flavonoid, and antioxidant equivalents, followed by timothy and chicory, with plantain presenting the highest overall values (average equivalents of 139.38mg GAE/g, 92.17mg CE/g, 116.39mg TE/g, and 73.15% DPPH inhibition).

All four colorimetric assays, performed on both individual and feed treatment samples, subsequently confirmed that there was a statistically significant ($p < 0.05$) polyphenolic variation between forage species. Seasonal polyphenolic variation, finally, remains inconclusive; individual species indicated no significant polyphenolic variation between seasons ($p \geq 0.05$), whereas feed treatments presented the opposite ($p < 0.05$).

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1.10 Modelling of oxides and polymer based anti-reflective layers for Si-based PV cell using AFORSHET by Angel Oliveira Lira (Technological University Dublin) Supervisor(s) George Amarandei, John Doran

Solar photovoltaics (PVs) have attracted particular interest in recent years due to the ever-increasing global demand for sustainable energy production. However, despite this increased demand for solar energy, in their current form, PV devices suffer from relatively low conversion efficiencies due to their non-ideal optical response to the incident solar irradiation. In this investigation, a series of retrofittable optical structures, which contained one or more thin-films, were designed and evaluated for the purpose of enhancing the solar energy harvesting efficiency of monocrystalline silicon (mc-Si) based solar cells using a computational method. A number of commonly available materials were evaluated for their potential role in such structures including PMMA, Si3N4, SiO2, TiO2, ZnO, Ag, Al and Cu. The optical simulations were performed using the open-source software “AFORSHET” to determine the impact of the optical thickness, refractive index, and the number of thin-films used in the structures design on the resulting short-circuit current (Jsc) delivered by a mc-Si solar cell, under standardised illumination conditions. Through the addition such optical structures, the Jsc generated by the mc-Si solar cell was predicted to increase by 10.6% from glass layer to 30.86% for TLARC layer, depending on the configuration of the stratified structure. These results suggest that thin-film coatings which present a continuous decrement of refractive index, may be used to improve the conversion efficiency of an mc-Si solar cell by tuning optical parameters such as thickness, on the order of nanometers.

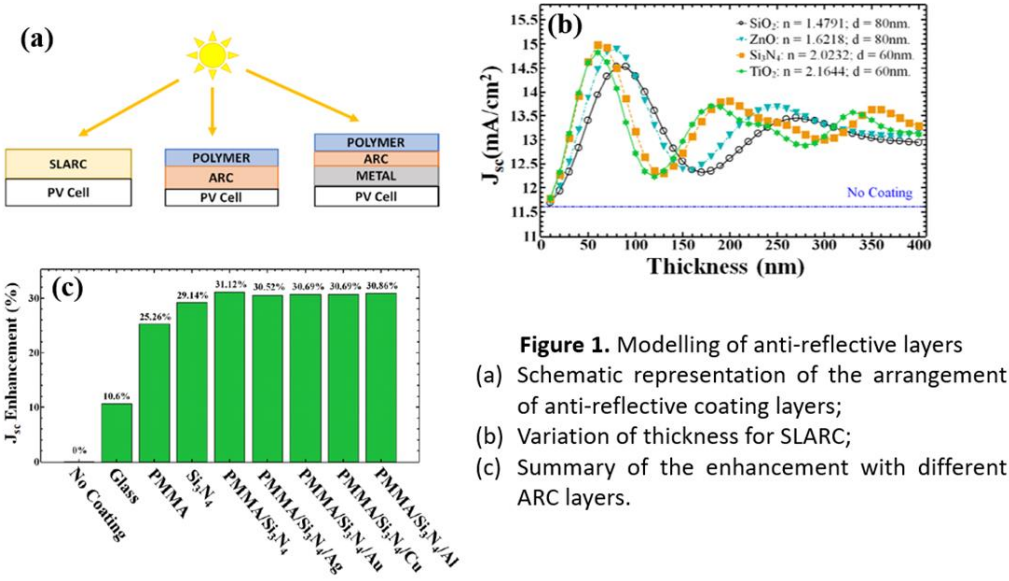

Figure 1. Modelling of anti-reflective layers
(a) Schematic representation of the arrangement of anti-reflective coating layers;
(b) Variation of thickness for SLARC;
(c) Summary of the enhancement with different ARC layers.

1.1 Cognito – Trust-Based Social Network with Spam Detection by Eoghan Martin (Technological University Dublin) Supervisor Jack O'Neill

It is no doubt that social media has become a place that is unsafe at times and can be filled with spam, cyber bullying, discrimination and more. The issue lies in the lack of accountability and the ease with which people can hide behind a blank profile or pretend to be someone else. New research shows that only 59% of accounts on Instagram in the US are real people, the rest consists of bots, inactive accounts and mass followers (accounts with over 1,500 following). It has been well documented at this stage that social media has a big impact on people's mental health and with rises in hate from fake accounts and blank profiles this issue is only getting worse.

Cognito is a social network built on peer-based trust. By modelling trust as a relationship between users, it offers a new way to conceptualise online relationships. Cognito allows users to build a "network of trust"; allowing users to implicitly trust those accounts trusted by their verified friends and connections, and ignore those accounts marked as untrustworthy or spam. By examining the relationships between all users and employing network analysis algorithms on the resulting network graphs, Cognito catches spam accounts early, and keeps users safe from anonymous hate.

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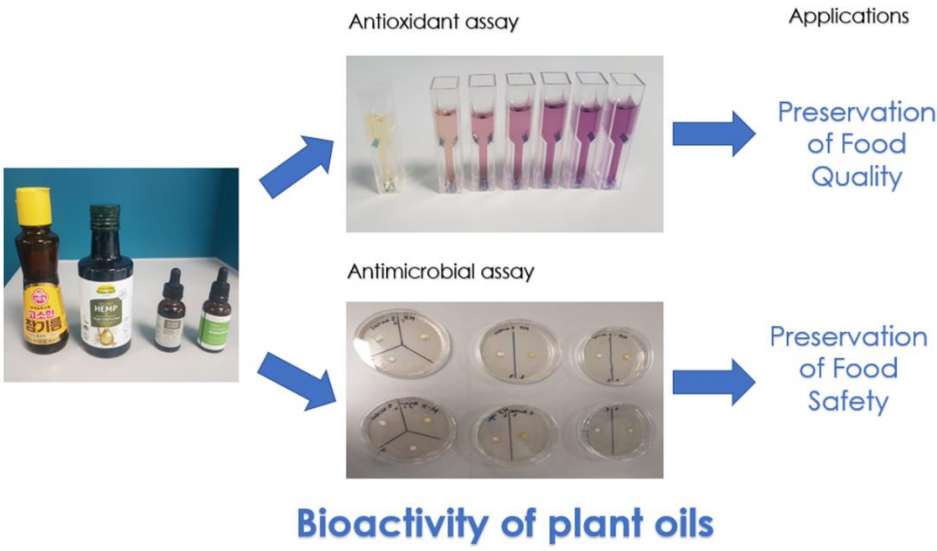
1.2 Comparison of Bioactivity of Hemp Seed Oils and Tea Tree Oil by Marietta Lakatos (Technological University Dublin) Supervisors Julie Dunne, Samuel Obengapori, and Furong Tian

Hemps seed oil is a fashionable novel ingredient in the food and cosmetic industry and its bioactivity have been studied throughout the years. Tea tree oil has been used and researched heavily as an antimicrobial and it has shown bioactivity in previous works. The current study tries to determine which of these plant extracts have better potential to be used as bioactive using DPPH and Kirby-Bauer Disk Diffusion method to demonstrate these oils' antioxidant and antimicrobial activity. *S. aureus*, *E. coli* and *S. enteritidis* were employed in Kirby-Bauer Disk Diffusion method. Hemp oils with different CBD content were used to see whether that affects the bioactivity of HSO. The 5% CBD showed the highest antioxidant activity 17.06 µg/ml among the different oils. The result of commercial HSO was lower than the 5% CBD one. Compared to hemp oil and CBD, the Tea tree oil showed the lowest Antioxidant activity at 10.89 µg/ml among the different oils. The experiments showed that CBD oil was the best antioxidant followed closely by commercial HSO, while Tea tree oil had moderate activity with DPPH. In the antimicrobial tests Tea tree oil produced very good results with inhibition of all bacteria tested. The average inhibition zones were 2.19 cm, 2.02 cm, and 1.87 cm against *S. enteritidis*, *E. coli* and *S. aureus*, respectively. The other oils did not produce inhibition in the current study. In conclusion, both can be important bioactives in the future for both medicinal and food science purposes.



1.3 Transitioning to Sustainable Healthy Diets in Malta: Key Foods and Consumer Challenges by Sarah Hannan (Technological University Dublin & University of Malta) Supervisors John Kearney and Claire Copperstone

Background/Objectives

There is a lack of consensus on the foods that can achieve healthy sustainable diets. This study reviewed the literature on food-based components of sustainable healthy diets in Southern Europe to create a framework of suggested actions for their promotion in Malta. Consumer challenges to following sustainable healthy diets were also mapped.

Methods

PubMed, Scopus and Web of Science were systematically searched for Southern European studies analysing the sustainability of specific foods using environmental, nutritional and sociocultural indicators between 2012 and 2022. Covidence was used to screen the studies and extract data from the final selection.

Results

The initial search retrieved 205 studies. Post-screening, eight studies remained for inclusion. While the sustainability of a food or food group was dependent on many factors in all eight studies, decreasing consumption of animal-based foods was the main recommendation suggested. Plant-based foods, particularly fruit, vegetables and legumes, can act as replacements for animal products and generally need to be increased in Southern European diets. Affordability, acceptability, awareness and availability of sustainable healthy foods were the main consumer challenges identified. A framework of actions for the Maltese government and population was created to suggest ways in which sustainable healthy diets could be promoted in Malta. Conclusion: Research on the topic of sustainable healthy diets is constantly evolving. This study highlights the nuanced discussion around the components of sustainable healthy diets and the challenges that consumers may have in transitioning to them. Further research is required to ensure context-specific guidance for Malta.

Figure 3: A framework of suggested actions for the promotion of sustainable healthy diets in Malta adapted from the socio-ecological model for health promotion[116]

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1.4 Formulation of Cinnamon Oil Loaded Nano-carriers for Food Packaging Applications by Megan Byrne (Technological University Dublin) Supervisor Swarna Jaiswal

Active packaging is growing in popularity due to its success at improving food quality and safety, particular interest for the incorporation of essential-oils into packaging. This study involves the preparation of PLA/PBAT composite blend films incorporated with optimum concentration of the nano-carrier TiO2. Varying concentrations of cinnamon essential-oil were characterised based on their optical and mechanical properties, chemical composition, thermo-stability, surface hydrophobicity, inhibition of biofilm formation and anti-microbial efficiency. Thickness of films increased with the increase in cinnamon oil concentration along with water-contact angle and UV-barrier properties, the 7% cinnamon film producing highest UV-barrier. However, a decrease was seen in tensile properties (1.84folds) and transparency (1.05folds) of the 7% film compared to the negative-control. Highest anti-bacterial activity was exhibited in the 7% film against *S. aureus and E.coli* both resulting in a full log reduction at 4 hours, also producing the highest biofilm formation inhibition of 96%, a 4.3-fold increase compared to the 1% cinnamon film. Application potential was analysed over 12 days storage using cheese and was very successful when compared to the control (current packaging on market) resulting in little surface discoloration and minimal weight-loss. The 7% film performed best in anti-bacterial analysis against *E.coli*, killing all bacteria after nine days, opposed to the control which increased the bacterial growth throughout storage, indicating that overall the use of cinnamon oil loaded nano-carriers incorporated in films produce beneficial and positive effects on shelf-life, quality, and safety of food products and has a high potential for use commercially.

1.5 Replication Study: Acute Enhancement of Jump Performance, Muscle Strength, and Power in Resistance-Trained Men After Consumption of Caffeinated Chewing Gum by Cian O'Keeffe Tighe (Technological University Dublin) Supervisors Jennifer Murphy and Joe Warne

Purpose
Replication is essential for increasing or decreasing the credibility of previous claims. Despite this, few replications have been conducted within the sport and exercise science field. Therefore, the purpose of this study was to determine whether we could successfully replicate the observed significant findings for jump performance using a close replication of the original study by Venier *et al*.

Method
Thirty-eight resistance trained men (age: 21 ± 2 years; height: 176 ± 17.1 cm; body mass: 88.4 ± 20.8 kg; habitual caffeine intake: 229 ± 194 mg.d-1) chewed either 300 mg of caffeinated chewing gum or placebo chewing gum for 10 minutes, in a randomized counterbalanced design, followed by squat jump and countermovement jump testing.

Results
Concerning the evaluation of our replication attempt, we partially replicated the observed findings for SJ, ($p = 0.023$ [original] vs 0.098 [replication], Cohen's dz = 0.57; 95% CI [0.08 to 1.05] [original] vs 0.28; 95% CI [-0.05 to 0.60] [replication], the z score for the difference in Cohen's dz = 0.995 ($p = 0.319$). However, we did not replicate the CMJ results ($p \leq 0.001$[original] vs 0.064 [replication], Cohen's dz = 1.5; 95% CI [0.83 to 2.16] [original] vs 0.31; 95% CI [-0.02 to 0.63] [replication], the z score for the difference in Cohen's dz = 3.203 ($p = 0.001$).

Conclusion
A partial failure to replicate the observed jump performance findings highlights the requirement for individual replication studies within the sports and exercise science field

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1.6 The Use of Pollen as an Indicator of Atmospheric Pollution by Tegan O'Donnell (Atlantic Technological University Sligo) Supervisor Paul Hamilton

Pollen plays a vital role in plant reproduction, up to 95% of all flowering plants are reliant on pollinators for reproduction. This study aims to investigate the effect that air pollutants have on pollen grains. The pollen grains were extracted from Bellis perennis, Ficaria verna, Primula vulgaris, Ranunculus bulbosus, and Taraxacum officinale found in rural and urban areas of Sligo, Leitrim and Donegal.The samples were stored in rice prior to analysis in order to absorb any moisture. To extract the pollen, the flower was held upside down directly over the microscope slide, and forceps were used to gently tap the flowers anthers to dislodge the pollen grains. The pollen grains were then analysed under light microscope at varying magnification. Some samples originating from urban areas presented with what appeared to be cracks or damage to the grain's exine layer. Following analysis, the samples were compared against palynological databases PalDat and the Global Pollen Project, in order to compare and confirm the genus and species of the wildflowers that had been analysed, and to determine if the pollen grains sampled from the urban areas were affected by pollutants present in the air. The analyses suggest that air pollutants may have caused damage to the pollen grain's exine layer extracted from wildflowers that originate from urban areas. However, further research would need to be carried out on samples extracted from the same species of wildflower found in urban and rural areas in order to confirm this.

1.7 What does healthy and sustainable eating mean to students? by Alix Mooney (Technological University Dublin) Supervisors Daniel Hazley and John Kearney

Objectives
The present qualitative study aimed to explore what healthy and sustainable eating means to Irish university students.

Methods
A qualitative study design was used by conducting online semi-structured interviews using Microsoft Teams. A total of thirteen participants were interviewed. A participant information sheet and consent form were given to participants before the interviews. Participants filled out an online questionnaire before the interviews using Microsoft Forms. Interviews were recorded, transcribed verbatim and quality checked by another researcher. Thematic analysis was used to identify themes in the data.

Results
Four main themes were identified for the question 'what does healthy eating mean to students?' These included: 1. Regular balanced meals every day; 2. Getting all the nutrients your body needs; 3. Less processed foods, more wholefoods; 4. Eating foods that suit your body and your lifestyle. Five main themes were identified for the question 'what does sustainable eating mean to students?' These included: 1) Less plastic packaging; 2) Less manufacturing processes when producing food; 3) Eating a plant-based diet; 4) Less food waste; 5) Locally sourced Irish foods. The question 'are healthy and sustainable eating associated?' was also examined.

Conclusion
Students have a broad and knowledgeable understanding of what a healthy diet is. On the other hand, students do not know enough about food sustainability. Healthy and sustainable eating programmes need to be established in Irish universities to educate students on this topic. Future studies should investigate whether university-based healthy and sustainable eating programs influence students.

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1.8 An Investigation into the Prevalence & Usage of Caffeine Supplementation in Elite Female Powerlifting Athletes by Gemma Johnston (Technological University Dublin) Supervisor Richard Kelly

Background

The aim of this study was to examine the prevalence and utilisation habits of caffeine supplementation within an elite female powerlifting athlete cohort. Utilisation patterns including dosages consumed, methods of dosage calculations, timing of consumption, methodology of ingestion (split dosing vs bolus dosing), and forms consumed were investigated.

Methods

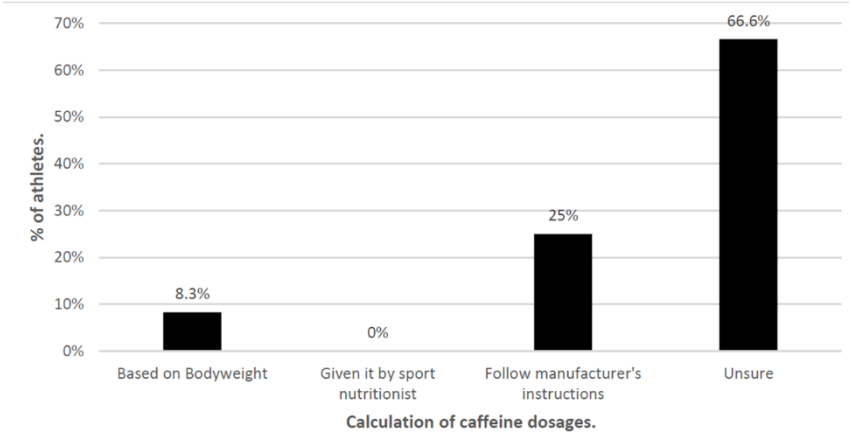
A short, validated survey examining athletes' caffeine consumption patterns was distributed online to various powerlifting gyms in Ireland. Each athlete (n = 16) was ≥ 18 years of age, competed in an IPF sanctioned competition in the past year, and consistently undertook powerlifting training.

Results

Caffeine supplementation was prevalent for both training (75 %) and competition (81.3%) purposes. Prevalence was greater within competition contexts. Few athletes consumed a dosage in line with the recommended guidelines relative to body mass. The majority of athletes under- or over-consumed caffeine relative to their body mass. Most athletes were unsure as to how they calculated their caffeine dosages. Duration of the event (training vs competition) dictated the quantity of dosages consumed ($p = 0.046$). Energy drinks in the form of Monster energy was the most prevalent form consumed. Consumption before training commences is most prevalent, with consumption throughout competitions more prevalent ($p = 0.012$). This is associated with the athletes split dosing for competition purposes, but not training purposes ($p = 0.003$).

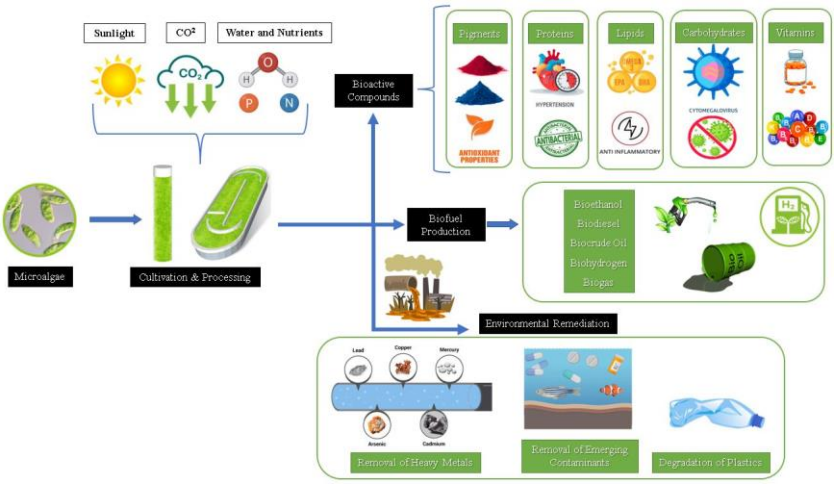
Conclusion

Caffeine supplementation is prevalent within the elite female powerlifting athlete cohort. Findings indicate that knowledge surrounding optimal usage proves limited.



1.9 The Potential of Microalgae in Creating a more Environmentally Sustainable Pharmaceutical Industry: A Thematic Analysis of the Literature by Laura Oates (Atlantic Technological University Sligo) Supervisor Geraldine Duignan

The pharmaceutical sector is a contributor to climate change due to its high greenhouse gas (GHG) emissions and release of pharmaceuticals and heavy metals into wastewater. Microalgae may be a solution to reduce the industry's negative environmental impact and fossil fuel dependency. Through a thematic analysis of the literature, this study aimed to synthesize the current state of knowledge on the potential of microalgae in creating an environmentally sustainable pharmaceutical industry. Specific themes identified include: (1) Potential pharmaceutical applications of microalgae, (2) Benefits of microalgae potential realization, (3) Barriers to microalgae potential realization (4) Methods of optimizing microalgae potential, and (5) Awareness of microalgae potential in the pharmaceutical industry. Evidence-based applications of microalgae include GHG emissions reduction through carbon dioxide sequestration, heavy metal and pharmaceutical drug extraction from wastewaters, plastic degradation, and the production of therapeutic compounds and renewable biofuels. The benefits of realizing microalgae's potential include: Microalgal fuel has superior attributes compared to fossil fuels such as a greater cetane number, fewer GHG emissions, and an absence of ash, carbon, and sulfur. Additionally, microalgae fuels demonstrate greater carbon fixation capacities, reduced land requirements, and enhanced biofuel performance compared to plant-based biofuels. Barriers to microalgae realization include harvesting and drying costs, limited large-scale studies, and environmental impact uncertainties. Methods of optimizing microalgae potential involve genetic engineering, structural modifications, and the use of magnetic nanoparticles and cationic polymers. Evidence suggests that the pharmaceutical industry is unaware or uninterested in microalgae's potential. To understand why, further research is warranted.



1.10 The Use of and User Experience of Data at Senior Level Gaelic Games by Kate Kavanagh (Technological University Dublin) Supervisor Kieran Collins

The aim of the present study was to evaluate the use of and user experience of data at senior level Gaelic games. Specific challenges in relation to the collection, storage, and communication of data within the sporting organisation the Gaelic Athletic Association (GAA) are identified and discussed along with the integration of the role technology plays, by assessing the current knowledge of leading practitioners within the sporting organisation. The methodological approach followed in this study was qualitative with an exploratory-correctional scope using semi-structured interviews questions followed by a thematic analysis on eight (seven male, one female) experienced practitioners. By investigating how practitioners gather, analyse, and communicate their data, we can better understand the individual and organisational factors that make data literacy practices within the sporting domain productive and practical. The results highlight the need for and possible lack of basic data analyses measures and expertise to generate these analyses, followed by an appropriate data feedback system in the organisation to ensure all stakeholders are informed of the decision-making process. Operations must be time efficient which can be done through centralisation, with the need for consistent technology to help with data collection and fluency in all departments. The findings of this study present opportunities for practitioners and coaching staff in sporting organisations to consider the influence of organisational and technological contexts on data practices. The pilot work can guide the next stages needed to understand the opportunities available to develop experiences and learning tools for data literacy in the sporting domain.

1.11 Forensic Identification of Individuals: The novel use of Tattoo Location and Identification using Alternate Light Sources by Karla McKiernan Oates (Atlantic Technological University Sligo) Supervisor John P Cassella

Alternate Light Sources (ALS) emit light in the visible and ultraviolet regions of the electromagnetic spectrum. These sources cause materials to fluoresce, which enhances the ability to visualise specific evidence during searches and examinations in the field, laboratory and on the human body. Tattoos can aid the forensic identification of human remains as tattoos are 'unique' to each person in terms of location and orientation etc. The popularity of tattoos has increased in recent years with reportedly 36% of people having tattoos equating to 145 million Americans. Tattoos have recently shown a resurgence as an identification tool in criminal and death investigations. Tattoos have recently been applied to advanced biometric technologies, databases developed to classify and archive tattoos and their links to possible gangs and terrorist groups as well as correlating the tattoos to specific persons. The aim of this study was to determine if permanent inked tattoos fluoresced and if indeed during the stages of skin decomposition after death, ALS could aid in locating and identifying tattoos and assist in the identification of unidentified individuals in forensic-police enquiries. Using a 'Crime-lite' ALS and 'ImageJ' imaging software, permanent tattoos inked onto pig skin were identifiable over a period of decomposition over more than a month and they demonstrated a change in the ink chemistry implied by fluorescent changes over time. These data suggest a role of ALS in locating permanent inked tattoos on badly decomposed human bodies and potentially assisting with identifying a time since death of that individual.

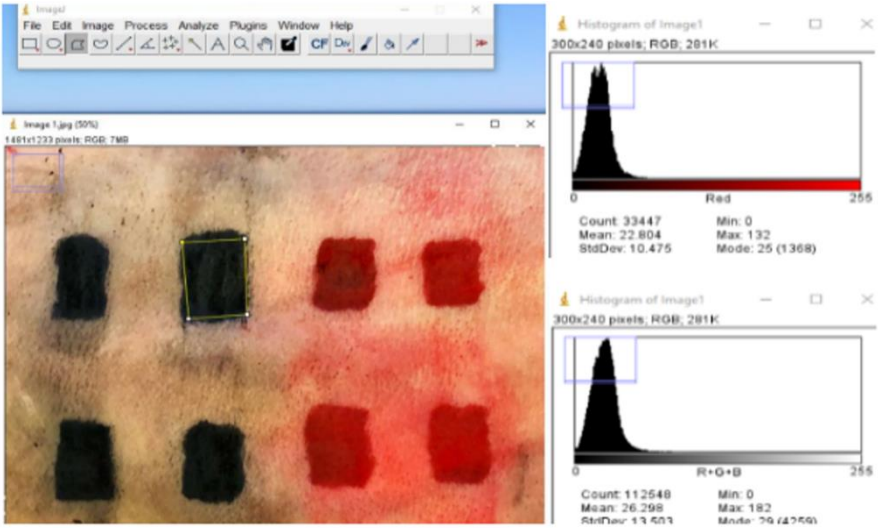


Figure 1: Left image is of the ImageJ task bar with the image to analysis, black square 2 is outlined. On the right are histograms of image 1 using different colour pixels.

1.12 Magnus Effect Wind Turbines: Computational and Experimental Models by Szymon Pietka (Technological University Dublin) Supervisors Aaron Mac Raighne and Derek Kearney

Magnus Effect wind turbines are an alternative to their conventional counterparts. The turbines use rotating cylinders as blades, creating a lift force when fluid passes over them. They have been observed to have many benefits over aerofoil designs. Most notably, they work over a broader range of wind speeds. This allows operation at very low speeds and very high speeds where safety would be an issue. However, due to limited research in the field, their full potential has not yet been achieved. This study developed a computational model to measure lift and drag of the Magnus effect cylinders at various rotational velocities and wind speeds. An experimental model of a single blade rotating on its own axis was also developed where it was positioned in a wind tunnel, capable of measuring lift and drag forces at wind speeds between 6m/s and 28m/s. Results from the experimental study validated the computational study. Lift was found to increase linearly with angular velocity, matching theory. Further simulations using the same model have also shown to agree with the literature. This computational model and complementary wind tunnel experiment show great potential to be used to further investigate Magnus effect wind turbines. Opening possibilities to harvest wind energy in places that were not previously viable, aiding the push for renewable energy.

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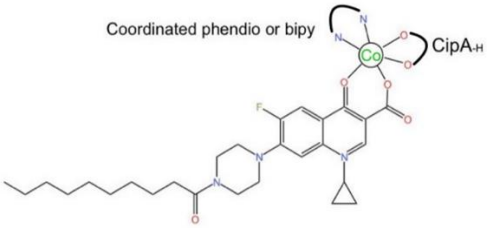
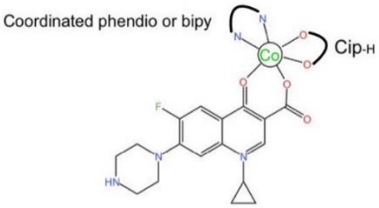
1.13 Rational Design, Synthesis, and Characterisation of novel metallo-antimicrobials by Charlane Beatrice Zambrano (Technological University Dublin) Supervisor Ziga Ude

There are several concerns that control humanity's health and safety. With rising populations and environmental changes every decade, we often adapt aspects of technology and medicine; yet antimicrobial resistance and cancer are still on the rise. Cancer patients, particularly those who develop neutropenia (the white blood cell counts are abnormally low) amidst of their disease, are at high risk of developing infections. Furthermore, therapy-related myelosuppression and immune defects inherent in the cancer disease process add to their risk. The shortcomings of classical anti-cancer platinum-based treatments include side effects and toxicity. There is an unmet need to overcome these drawbacks. This project was designed to rationally develop and synthesise novel metal complexes of Ciprofloxacin (Cip) and its cytotoxic derivative (CipA) with cobalt (II) centre, which have potential to become chemotherapeutic agents. Co(II) complexes have shown great potential as anti-microbial agents. We complexed Cip or CipA and different DNA intercalating agents (e.g. 2,2'-bipyridine) to Co(II) metal centre and successfully generated a library of the following complexes: [Co(Cip-H)2phendio], [Co(Cip-H)2bipy], [Co(CipA-H)2phendio], [Co(CipA-H)2bipy. These complexes were synthesised by stirring methanolic solutions of Cip or CipA, CoCl2.6H2O, and intercalating agents. The final solutions were evaporated in vacuo and redissolved in different mixture of solvents. All organic ligands were fully characterised by 1H and 13C NMR, and FT-IR spectroscopy, while due to the paramagnetic nature of complexes, these were characterised by FT-IR spectroscopy and Gouy Balance. A summary of the results are presented.



$[Co(CipA_{-H})_2bipy]$ and/or $[Co(CipA_{-H})_2phendio]$



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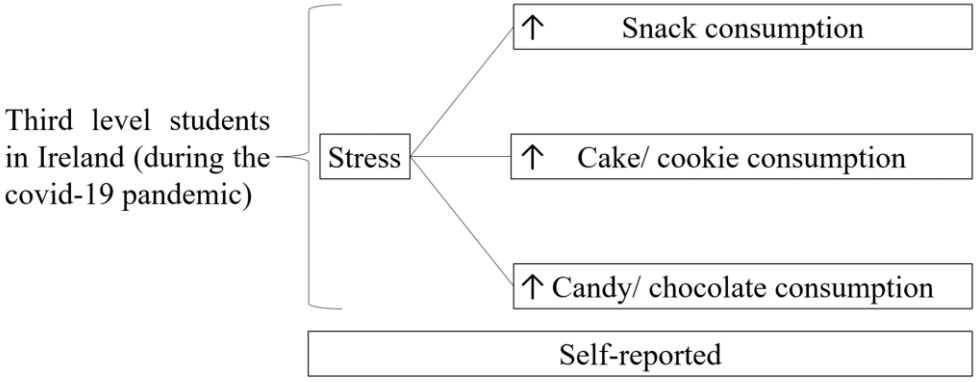
1.14 Use of genetic markers for forensic fingerprinting and anthropological purposes: VNTRs, mtDNA, amelogenin and Alu markers by Sally Webb (Atlantic Technological University Galway) Supervisor Benoit Houeix

This study's aim was to determine and develop efficient protocols for nuclear and mitochondrial DNA extraction from head hair shafts and hair roots for possible application to ancient DNA samples. MtDNA was extracted from hair shafts through alkaline digestion, quantified and compared to mtDNA extracted from hair roots, as well as saliva from the same specimens. For extraction, samples were washed before the digest with sodium hydroxide. After neutralising the samples, the mtDNA was extracted by following the washing and elution steps outlined for silica-based columns. Six individuals were analysed with a 50% success rate for mtDNA extraction from alkaline digestion. In literature Asian samples were unsuccessfully analysed, however, in this study 33% of the 50% are due to Asian samples. The optimised described method shows a promising non-invasive method for analysing ancient and modern hair samples using mtDNA extraction. In conjunction, samples containing hair roots were tested by PCR for gender, using the amelogenin marker, and for tandem repeats by VNTR and Alu typing.The developed methods were validated by using fresh DNA. Extraction was optimised using a commercial DNA extraction kit. Amplification from the Alu primer set was found to be dependent on the template DNA. The VNTR PCR products appear to bind nonspecifically, and all primer sets were optimised prior to running samples. The gender determination using the amelogenin marker proved successful in regular PCR reactions. Characteristic amplicons were amplified for male and female samples. However, multiplex reactions were not successful in amplifying the characteristic male amplicon.

1.15The Impact of Stress On Food Choice Amongst Third Level Students In The Republic Of Ireland During The Covid-19 Pandemic by Shannon Spain (Atlantic Technological University & Michigan State University) Supervisors Robin Tucker, Chen Du, and Laura Keaver

Stress can alter food choice, potentially affecting one's health due to poor dietary practices. This is relevant to third level students, with the coronavirus disease 2019 (covid-19) pandemic possibly elevating stress. Therefore, this study aimed to explore the impact of stress on food choice within this cohort during this time. In December 2020 a survey was distributed via email and social media, to students around the world to assess the health behaviours of these individuals during the covid-19 pandemic. Data collected using an incorporated questionnaire and pertaining to the self-reported impact of stress on food choice amongst students attending 13 different colleges and universities in the Republic of Ireland (ROI) was extracted and analysed. Students reported if stress caused them to eat less, more or the same amount of food overall, snacks, bread, meat/fish, fruit/vegetables, cake/cookies, candy/chocolate and savoury snacks. Data analysis was conducted using statistical package for the social sciences (SPSS) version 26, via frequency and descriptive functions. The students (n=151) had a mean age of 23.8±6.3 years, and they were predominantly female (84.8%, n=128). The majority of students reported eating the same amount of most foods, except for snacks, cake/cookies and candy/chocolate; 51.0% (n=77), 43.7% (n=66) and 57.0% (n=86) reported eating more, respectively. Therefore, an intervention may be warranted with a tailored healthy campus initiative recommended, aimed to navigate the stresses of student life and ideally offset the impact of stress on food choice in this cohort.



1.16 Determination of the Presence of Saliva Using Fluorimetry by Shaina Fernandes (Atlantic Technological University Galway) Supervisor John Keary

Current scientific tools and techniques for saliva, an essential piece of scientific evidence are destructive, time-consuming, and not 100% reliable since they are heavily based on the α-amylase present. This project is aimed to validate the use of fluorimetry in the analysis of saliva at a given crime scene. It involves repeating a method seen fit by scientists as previously published to prove its working using an amino acid, tryptophan which acts as a fluorophore. Various methods are developed to determine the limit of detection of saliva required as well as a comparison of the intensity of tryptophan to the amount of saliva procured. The effect of time on the saliva stained on glass is also determined to imitate the surface on which saliva is likely to be found at crime scenes. From the analysis, it is confirmed that tryptophan is emitted at 350nm. The logarithmic relationship evaluated between the intensity of tryptophan and the volume is found to be inconsistent in the case of saliva. A significant peak at 310nm is identified in saliva samples' fluorescence emission spectra, and no peak above the threshold is observed. It's safe to say that the interference from salivary constituents has an impact on the results due to additional fluorescing amino acids, photobleaching, quenching effects, and instrumental discrepancies that may have occurred. Fluorometry can be the next developmental boon for criminal serologists once methods to overcome these difficulties are identified and solved.

1.17 Physical Activity and Obesogenic Risk Factors in Competitive Athletes and Non-Competitive Athletes by Aedín Caverly (Technological University Dublin) Supervisor Oscar McCananey

Aim

The aim of this cross-sectional study was to compare anthropometric measures, body composition and physical activity of those who take part in competitive sport (Comp) and those who don't take part in competitive sport (NonComp). The secondary aims were to analyse the data for associations between anthropometric measures and body composition, and physical activity within the 2 groups. 31 female undergraduate students (13 Comp, 18 Non-Comp) participated in the study.

Methods

Anthropometric measures and body composition were measured in the laboratory using a stadiometer (Seca, The Leicester Height Measure, Birmingham, England) and bioimpedance (Tanita, Body Composition Analyser DC-430MA, Europe). Physical activity was measured using an accelerometer (ActiGraph, GT3X, USA) worn by all participants for 7 days. Results: The Comp group were observed to be less sedentary ($p=.016$) and participated in more light ($p=.016$) and vigorous ($p=.037$) physical activity than the Non-Comp group. Waist-tohip ratio was the only anthropometric measure significantly different between the Comp and Non-Comp groups ($p<.001$). A strong positive association was observed between total activity kcals and muscle mass in the Comp group ($r=.666$, $p=.013$). Associations were observed between total activity kcals and fat mass ($r=.627$, $p=.005$), waist circumference ($r=.476$, $p=.046$) and body fat percentage ($r=.552$, $p=.017$) in the Non-Comp group.

Conclusion

The Comp group spent less time being sedentary and more time being light and vigorously physically active than the Non-Comp group. No significant differences were observed in the anthropometric measure or body composition of the Comp and Non-Comp groups except for waist-to-hip ratio.

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1.18 Development of A Protocol To Identify Unknowns In Forensic Science From Mass Spectral Data On DrugsData.org by Rebecca McNamara (Atlantic Technological University Sligo and Trinity College Dublin) Supervisors Pierce Kavanagh and Geraldine Dowling

Gas Chromatography-Mass Spectroscopy (GC-MS) is used universally to identify forensic unknowns. It has become the gold-standard identification method due to reproducibility of results between laboratories. This has allowed mass spectral databases of known and new psychoactive substances to be developed and made freely available online. In conjunction with this, MNova™ have developed a software that searches a database for suitable spectral matches. This allows for the development of a method for unknown identification that would reduce time and resources used by an analyst for identification. The aim of this project was to develop a method using free online databases and MNova™ for identification of forensic unknown compounds. Another aim was to develop a procedure that reduced time and resources needed for identification. Three compounds were selected from DrugsData.org. They were unknown at the time of selection. GC-MS spectra were extracted and searched on a variety of databases. Suggested compounds were generated and compared to what DrugData.org later published each compound to be at a later date when more information was available. Two compounds were successfully identified in this project as BZO-POXIZID and MMMP. Cyputylone was incorrectly identified as 3,4 – MDPV. Factors including lack of experience and a lack of literature and reference spectra surrounding Cyputylone impacted the result. The strategy highlighted the advantage of online global collaboration using MNova™. It also established that MNova™ would reduce interpretation time if the unknown was a known compound added to a database. However, new psychoactive substances still remain a challenge in forensic science.

1.19 Healthy Diet Perceptions of Irish CrossFit Coaches A Qualitative Investigation by Oisin Nolan (Technological University Dublin) Supervisors Daneil Hazley and John Kearney

Background
CrossFit coaches are well placed to assist in community health promotion strategies by providing nutrition advice to their members. However, little is known about how Irish CrossFit coaches view healthy eating. This study aimed to fill this gap by exploring how Irish CrossFit coaches perceive healthy eating.

Methods
This study used a qualitative study design. Snowball and convenience sampling was used to recruit 12 Irish CrossFit coaches with a wide range of ages, level of experience and nutritional education. Online semi-structured interviews were conducted via Microsoft Teams. Thematic analysis using the method outlined by Braun & Clarke (2006) was used to identify common themes from the data.

Results
Three main themes were identified from the data. 1) A healthy diet can be sustained over a long period of time and should support individual energy requirements while being inclusive of food groups. 2) Healthy eating was defined in a way that included or excluded different foods that were categorised in different ways. 3) Consuming the correct balance of nutrients is important for a healthy diet.

Conclusion
The results of this study suggest that the healthy eating beliefs of CrossFit coaches are broadly in line with current healthy eating guidelines1. Thus, the potential role of CrossFit coaches in health promotion should not be discounted as we further develop strategies to tackle the development of chronic disease in Ireland.

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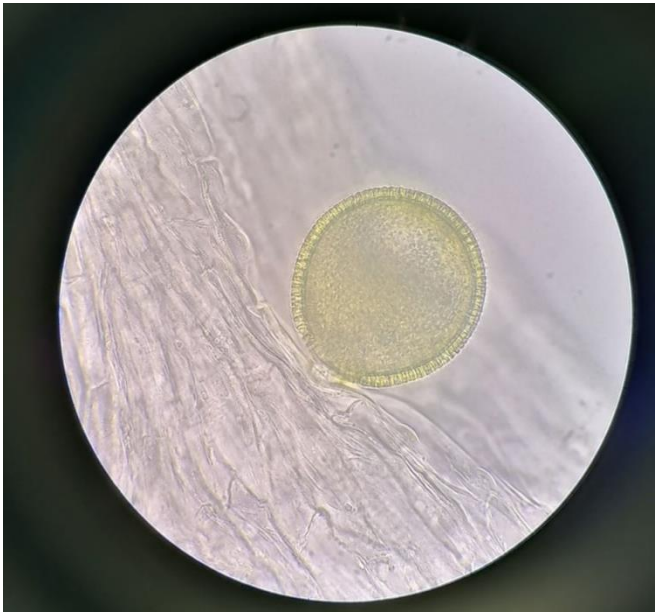
1.20 Potential Utilization of Wildflower Pollen As An Environmental Indicator For Atmospheric Pollution by Harry Reynolds (Atlantic Technological University Sligo) Supervisor Paul Hamilton

This study sets out to examine wildflower pollen found at Sligo and Drogheda sampling sites using microscopy and to determine if the results can be used as an environmental indicator of atmospheric pollution. This was done by analysing the shape, size, and visual structure of the pollen by microscopy, followed by comparisons between the healthy pollen found on the palynological databases and the pollen sampled in Sligo and Drogheda. The air quality data provided by the EPA (Environmental Protection Agency) for Sligo, along with the pollen analysis undertaken, was carried out to study the relationship between the two. This study indicates that the wildflower pollen sampled and analysed would not be suitable as an environmental indicator of atmospheric pollution as little or no damage to the pollen is found. However, there is still potential for the utilization of pollen as an environmental indicator in other locations. This type of research needs to be undertaken in areas where air quality is consistently poor to measure the effects that atmospheric pollution is having on pollen. This study shows there is a shortage of research in this area regarding the effects of air pollution on wildflower pollen health. This needs be recognized, as pollen health is of huge significance to global biodiversity and food supply.



1.21 The Rise of The Machines: Will Artificial Intelligence Algorithms Replace The Human In Forensic Drug Chemistry? The Use If Structure Elucidation Tools And Mass Spectral Libraries by Roisin O Mahony (Atlantic Technological University Sligo and Trinity College Dublin) Supervisors Pierce Kavanagh and Geraldine Dowling

When an unidentified powder is brought into a forensics laboratory to be tested, strategies utilising gas chromatography mass spectrometry and nuclear magnetic resonance (NMR) spectroscopy are used for identification.Databases utilising spectral libraries are used to support the identification of an unidentified powder. The challenge of new psychoactive substance analysis is the absence of a reference standard or associated spectra. Additionally, analysis/interpretation can be time consuming.To assist personnel in identification, artificial intelligence (AI) algorithms have been developed to process data and interpret results in various vendor software. Software like MnovaTM has been developed by MestreLab to support these processes and report analytical chemistry data in a simplified format. It also allows for the sharing and analysis of data remotely between sites where techniques like NMR are unavailable. In this project, NMR spectra of two test compounds were evaluated in MnovaTM software and analysed assigning carbons,hydrogens and the connectivity bonds using automatic/manual tools. These tools were evaluated to identify if AI algorithms can replace the human in forensic drug chemistry and identify when the analyst must interfere.The results showed a structure could only be generated for one of the compounds due to its simpler chemical structure as it did not contain diastereoisomers. Improvements in the algorithm detection of new substances can still require human intervention although working alongside AI will result in quicker identification at various steps in the procedure. However, further research would need to be performed to ensure each step using the algorithms are accurate and precise.

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1.22 Titanium Alloys for Biomedical Applications by Nicole Murray (Technological University Dublin) Supervisors Anne Hopper and Susan Warren

Anodising is an electrolytic technique used to further enhance the corrosion and durability properties of metals used in biomedical applications. It increases the surface oxide layer, offering protection to the metal. This process was carried out by the electrolytic oxidation of pure titanium and Ti-6Al-4V alloy surfaces in the presence of a fluoride containing electrolyte, forming nanotubes within the oxide layer. The growth of TiO2 nanotubes was monitored using current density vs time plots. This procedure is often followed by permanent electrolytic colouring to the oxide layer which enhances aesthetic properties. These concepts were first proven by applying them to a series of Al 3003 samples. The research project then focused on anodising and electrodepositing pure titanium and Ti-6Al-4V alloys with Ag+ ions using a silver nitrate electrolyte based on the research question: 'can we electrodeposit titanium using an AC power supply?'. This research was of interest since AC electrodeposition prevents the polarisation of the metal substrate via the hydrogen ions present in the electrolyte, resulting in hydrogen brittlement. Titanium alloys were anodised and electroplated under a series of altering parameters such as voltages and times to optimise results. The research revealed that using smaller anode to cathode ratios and electrode distances resulted in more uniform anodised surfaces. The TiO2 layers were also successfully deposited with Ag+ ions and this was verified using SEM imaging and EDX spectra for both alloys. It was concluded that AC electrodeposition can be a successful method used for titanium and its alloys.

1.23 An Exploration of Cultural Competence And Awareness In A Sample Of Mental Health Professionals Partaking In A Professional Meeting Entitled "The Race for Mental Health" by Siobhan Lynam (Dublin City University) Supervisors Lorraine Boran and Ray O' Neil

Mental healthcare provision is not always focused on minority communities, and the negative consequences that can flow from such a narrow approach to understanding the patient/client, is a critical next step in the effort to understand diverse populations and the provision of Mental Healthcare for those often stigmatised. Psychologists and mental health professionals across career stages can be engaged in practice with clients from diverse sociocultural backgrounds. We were interested in examining this engagement along with their experience with cultural competence. In addition, training in diversity, inclusion and cultural competence (CC) is variable for professionals, so our secondary aim is to understand the level of prior training in CC and the need for further training in the field. The present study examines CC, and factors impacting CC in a sample of mental health professionals who work with patients and clients who are racially minoritised, and who themselves may also identify as being racially minoritised.The CCA was designed to measure cultural diversity experience, cultural awareness and sensitivity, and cultural competence behaviours. The 20-minute survey measures CC and cultural awareness (CA), the respondent's gender, ethnicity, number of years' clinical experience, as well as any CC or diversity training completed. Following data cleaning, preliminary results suggest that all participants (N=12) within this study scored highly on the CC measures and 66% of participants had received previous training in CC. Distribution of the survey has now been increased to include a larger sample of participants. Data analysis is ongoing.

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1.24 Detection of Recently Handled Materials In Latent Fingerprints Using FTIR by Laura Regan (Technological University Dublin) Supervisor Reeta Joshi

This study sought to determine if recently handled materials can be detected in latent fingerprints, if the quantity of the material can be determined in a latent fingerprint and if a mixture of materials can be separately identified in a latent fingerprint using ATR-FTIR, UV-Vis and microscopy. This application could be used in a forensic investigation to tie a suspect to the handling of an illicit material (explosives, drugs etc.). ATR-FTIR was found to be better suited for the identification of residues and separation of mixtures but not for quantification. UV-Vis was a more robust method for quantification but was not useful in identifying or separating substances. Microscopy was useful for locating the residues in the fingerprint but was not able to identify or quantify the material. A polarising light microscope could be used to separate crystalline materials from non-crystalline in a fingerprint. It was found that ATR-FTIR showed a relationship between peak intensity and concentration of the substance, but this was not proportional. The solvent choice was also key for the FTIR analysis, with methanol producing the clearest spectra. A calibration curve was constructed from standards of caffeine in water in the range of 10-100 mg/L and analysed by UV-Vis. The resulting graph had an R2 value of 0.9952. Using the equation of the line, the concentration of caffeine in the fingerprint was found to be 94.37 mg/L.

1.25 The Role of pKa on Physiochemical Properties of Antibiotics And Antivirals by Flora Mwale (Technological University Dublin) Supervisor Maeve Scott

The acid dissociation constant (pKa) is an important physiochemical property of a drug substance and the knowledge of pKa is important since it influences solubility, efficacy of drugs, plays a major role in organic synthesis and indicates strength of an acid. The aim of this study was to determine the acid dissociation constant of three drug sample Metronidazole, Acyclovir and Cetirelief. A comparison of three various techniques was used to determine the pKa of three drug samples Metronidazole, Acyclovir and Cetirelief. Techniques used included Ultraviolet visible (UV-Vis), Nuclear Magnetic Resonance and Potentiometric titrations and these are widely used in the pharmaceutical industry for dissolution studies. To determine pKa the Henderson Hasselbach equation was used to carry out the calculations. The UV-vis studies were performed using a spectrophotometer in the 200-800nm wavelength range and quartz cuvettes. For potentiometric titrations, a burette and pH meter were utilised and for NMR various buffers were used to alter pH of the drug samples and the change was observed in the chemical shift change. To conclude the three techniques can indeed be used experimentally for determination of pKa in antibiotics and antivirals.

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1.26 Adolescent Females Awareness of Peak Bone Mass – An Investigation into Bone Health Knowledge, Dairy Consumption And Factors Influencing Consumption by Aishling Keane (Atlantic Technological University Galway) Supervisor Paul Conroy

Osteoporosis affects 300,000 people in Ireland, costing the HSE €922 million. By 2034 the number of osteoporotic fractures in Ireland will increase by 58.4% costing the HSE €2,043 million per annum. As one in two Irish females will experience osteoporosis, knowledge of the disease and optimal calcium intake will contribute to its prevention. This study investigated Irish adolescent females bone health knowledge, dairy consumption and identified factors influencing consumption. A cross-sectional study was carried out across the Republic of Ireland on 272 post-primary adolescent females aged 13-18yrs old.An online questionnaire was developed from the Osteoporosis Knowledge Assessment Tool and the Osteoporosis Health Belief Scale. Sixty-one percent of adolescents recognised the definition of osteoporosis but had a 'poor' (<50%) level of knowledge of the disease's risk factors. No adolescent consumed the recommended 5 daily servings of dairy. The majority (30.9%) consumed 2-3 servings per day. This was explained by their 'poor' level of knowledge of the Irish Food Pyramid. Open-ended questions revealed a significant belief amongst Biology students (p=0.003) and Home-economic students (p=0.001) that dairy consumption results in weight gain whilst Agricultural students believed dairy negatively impacts the environment (p=0.001). Intriguing barriers to consumption were a lack of media presence and the belief milk is for men and GAA athletes. Media advertisements surrounding dairy should be adapted to target the young female audience with the aim of eradicating dairy misperceptions. Educating Irish adolescents, Ireland's future ageing generation, will reduce the future economic and social burden osteoporosis has on Ireland.

1.27 The Impact of Algae-Based Omega Supplements On The Mental Health Of Irish Vegans, A Pilot Randomised Control Trial Study by Tara Mc Cormack (Atlantic Technological University Galway) Supervisor Paul Conroy

The field of nutritional psychiatry aims to utilise food to aid in the treatment and management of mental illness. The nutrients in food can be broken into metabolites that help support healthy brain function. Key nutrients that have been identified within this process are vitamin B12, vitamin D, and omega-3 fatty acids. However, these nutrients are often missing in vegan diets. Specific concern is associated with the omega-3 fatty acids EPA and DHA as the only bioavailable vegan form of these nutrients are from algae-based omega supplements. Therefore, this 5-week randomised control pilot study aimed to investigate the impact of algae-based supplements on the mental health of vegans living in Ireland. There were 12 individuals included in this trial, with an average age of 26.5±9.4 in the experiment group and 27.8±7.2 in the control. Mental health was monitored by completion of weekly Beck's Depression Inventory's and Beck's Anxiety Inventory's. After the 5 weeks, the Beck's Depression Inventory scores were reduced in the experiment group (16.3±15.9 to 5.3±6.4). Additionally, a reduction was also seen in the Beck's Anxiety Inventory (13.25±8.8 to 4.8±4). However, in both cases it was not a statistically significant amount. This research is novel and therefore, it is unclear if this result is a systematic error or reflective of the limited beneficial effect of omega-3 supplements on mental health parameters.

1.28 Analysis Of The Level Of Nutrition Education Within Healthcare Professionals' Third Level Education Programmes In Ireland by Eimear Harte and Kayleigh Heron (Atlantic Technological University Galway) Supervisors Gemma McMonagle, Laura Keaver, and Lisa Ryan

Research Background
ROADMAP (nutRition knOwledge AttituDes and coMpetence in Healthcare Professionals) is a collaborative project from the new Atlantic Technological University (Letterkenny, Sligo, and Galway Campus). Currently, the level of nutrition education for Healthcare Professionals (HCPs) in Ireland is unknown. A healthcare programme is a programme/course that educates and qualifies an individual to carry out healthcare jobs e.g., nurse, dentist.

Objective
The aim of this project was to investigate the level of nutrition content in third level education programmes and courses for HCPs in Ireland.

Data Source(s)
Webpage concerning the course curriculum and learning outcomes, personal contact to course leaders and college prospectuses.

Eligibility Criteria
3rd level programmes and courses for HCPs in Ireland.

Data extraction
Information was gathered via online databases and interviews with programme leaders.

Results
In this study, 25 HCPs were identified, and an online search was conducted to evaluate any third level education programmes aimed at those HCPs. Out of a total of 155 education programmes, 48% (n=75) contained implicit reference (indirect reference; wellbeing, breastfeeding, biology), and 14% (n=22) contained explicit reference (direct reference; nutrition, diet, health) to nutrition. 38% (n=58) of HCP education programmes contained no reference to nutrition.

Conclusions
This study outlines the lack of nutrition education in HCP programmes and training at third level in Ireland. Nutrition education is apparent in most HCP qualifications however, there are several areas with a lack of nutrition education although many clinical settings e.g., GPs, Dieticians and Physiotherapists, providing an adequate nutrition basis.

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