2018-09-28

SURE 2018 Undergraduate Science Conference Booklet

SURE Network

First Annual Conference

SURE

Science Undergraduate Research Experience

28th September 2018

Sharing Discovery

AIT Connect & Discover

Dublin Institute of Technology

Waterford Institute of Technology

INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

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Welcome from the SURE Network

The Science Undergraduate Research Experience (SURE) Network was established in 2017 by a community of Irish institutions interested in enhancing practice in undergraduate research in the Sciences. The SURE Network is a disciplinary network and member of the National Forum for the Enhancement of Teaching and Learning in Higher Education. I am delighted to welcome you to the first conference of the SURE Network to see the excellent research contributions made by the Science students from across the SURE Network institutions as part of their undergraduate work in the last academic year. The conference is being held simultaneously across three Institutes of Technology (Dublin, Waterford, Athlone).

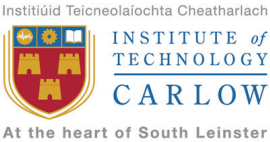
In addition to the aim of providing recent graduates with an opportunity to gain a reviewed publication based on the scientific research undertaken by them during their undergraduate studies, the conference also aims to celebrate the academic achievements of recent graduates in the scientific disciplines and provide a multi-disciplinary scientific forum through which undergraduate research outputs can be disseminated to students, researchers, academic professionals and industry.

Furthermore, the conference provides an opportunity for science students who are currently commencing their undergraduate research projects to be supported through hearing about ongoing research, listening to recent graduates give oral presentations, and reading recent graduate posters. Additionally, all participants will be able to avail of workshops aimed supporting future research careers in academia and industry.We have every confidence that all of these aims will be achieved in this year's conference and in future conferences.

We acknowledge the excellent work of both the students and the supervisor of the research work set out in this book of abstracts. The work is a hugely impressive reflection of the excellence that is achieved by our students on an annual basis.

We also recognise the work that has been undertaken the local Conference Committees and the Programme Committee in order for this conference to take place. We are very grateful for the support of our sponsors, in particular the Technological Higher Education Association (THEA).

Ciaran O'Leary, SURE Network Chairperson



Athlone Institute of Technology, Cork Institute of Technology, Dublin Institute of Technology, Dundalk Institute of Technology, Galway-Mayo Institute of Technology, Institute of Technology, Blanchardstown, Institute of Technology, Carlow, Institute of Technology, Sligo, Institute of Technology, Tallaght, Institute of Technology, Tralee, Limerick Institute of Technology, Waterford Institute of Technology

SURE Network Committee (Current members)

Michelle Bennett, Limerick Institute of Technology

Dina Brazil, Institute of Technology, Carlow

Eva Campion, Institute of Technology, Sligo

Emma Caraher, Institute of Technology, Tallaght

Gordon Cooke, Institute of Technology, Tallaght

Mary Deasy, Institute of Technology, Tallaght

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Valerie McCarthy, Dundalk Institute of Technology

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Daniel McSweeney, Institute of Technology, Blanchardstown

Siobhan MacSweeney, Institute of Technology, Tralee

Therese Montgomery, Athlone Institute of Technology

Noel Mulligan, Institute of Technology, Tralee

Anne Marie O'Brien, Athlone Institute of Technology

Eileen O'Leary, Cork Institute of Technology

Ciarán O'Leary, Dublin Institute of Technology

Cormac Quigley, Galway-Mayo Institute of Technology

Lisa Ryan, Galway-Mayo Institute of Technology

Aubrey Storey, Waterford Institute of Technology

Arjan van Rossum, Dundalk Institute of Technology

Barry Ryan, Dublin Institute of Technology

Nicolas Touzet, Institute of Technology, Sligo

Daniel Walsh, Limerick Institute of Technology

Conference Committees

SURE National Conference Committee

- Julie Dunne (Chair), Dublin Institute of Technology
- Claire Lennon, Waterford Institute of Technology
- Therese Montgomery, Athlone Institute of Technology
- Anne-Marie O'Brien, Athlone Institute of Technology

SURE2018@Athlone Local Organising Committee

- Therese Montgomery (Co-Chair), Athlone Institute of Technology
- AnneMaire O'Brien (Co-Chair), Athlone Institute of Technology
- Anne Friel, Athlone Institute of Technology
- Gary Stack, Athlone Institute of Technology
- Don Faller, Athlone Institute of Technology
- Siobhan Kavanagh, Athlone Institute of Technology
- Dawn Howard, Athlone Institute of Technology
- Iain Murray, Athlone Institute of Technology
- Treacy McIntyre, Athlone Institute of Technology

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- Julie Dunne (Chair), Dublin Institute of Technology
- Barry Ryan, Dublin Institute of Technology
- Bianca Schoen Phelan Dublin Institute of Technology
- Ciaran O'Leary, Dublin Institute of Technology
- Claire Mc Donnell, Dublin Institute of Technology
- Greg Byrne, Dublin Institute of Technology
- Joe Condon, Dublin Institute of Technology
- Muireann O Keefe, Dublin Institute of Technology
- Siobhan Daly, Dublin Institute of Technology
- Arjan Van Rossum Dundalk Institute of Technology
- Emma Caraher, Institute of Technology, Tallaght
- Daniel McSweeney, Institute of Technology, Blanchardstown

SURE2018@Waterford Local Organising Committee

- Claire Lennon (Co-Chair), Waterford Institute of Technology
- Aubrey Storey (Co-Chair), Waterford Institute of Technology
- Helen Hughes, Waterford Institute of Technology
- Denise O'Meara, Waterford Institute of Technology
- Evelyn Landers, Waterford Institute of Technology
- Nabla Kennedy, Waterford Institute of Technology
- Mike Kinsella, Waterford Institute of Technology
- Eleanor Owens, Waterford Institute of Technology
- David O'Neill, Waterford Institute of Technology
- Fiona Power, Waterford Institute of Technology
- TJ MacDonald, Waterford Institute of Technology
- Michael Breen, Waterford Institute of Technology
- Annette Murphy, Waterford Institute of Technology
- Siobhan Walsh, Waterford Institute of Technology

Programme Committee

Mary Deasy (Chairperson), Institute of Technology, Tallaght

Local Conference Programme Committee Chairpersons

- Therese Montgomery (Athlone Institute of Technology)
- Barry Ryan (Dublin Institute of Technology)
- Aubrey Storey (Waterford Institute of Technology)

Programme Committee Membership

- Emma Caraher (Institute of Technology, Tallaght)
- Gordon Cooke (Institute of Technology, Tallaght)
- Ciarán O'Leary (Dublin Institute of Technology)
- Brian Murphy, Athlone Institute of Technology

SURE Network Science Research

The SURE Network comprise member institutions of the Technological Higher Education Association (THEA)

Research, development and innovation is an established and strongly growing area of activity for the technological higher education sector. It is intrinsically linked with teaching and learning, knowledge transfer and engagement, with a primary aim to produce research-informed graduates with skill-sets aligned to enterprise and community needs. The Institutes of Technology are performing research at basic, applied and pre-commercial stages with a range of regional, national and international enterprise and community partners. Although long recognised for strong research and innovation capacity in STEM areas, particularly in working with enterprise, the Institutes have developed and are continuing to grow capacity in arts, media, the humanities, business and social sciences. The Institutes are also an incubator of new enterprise, supporting start-up and spin-out companies, and assisting those companies to engage in research and innovation.

thea
Technological Higher Education Association
IRELAND

The scope of the sciences for the conference are in the following categories

- Biology: Including Applied Biology, Bioanalysis, Biomedical Science, Biosciences, Biomolecular Science
- Chemistry: Including Chemical Sciences with Medicinal Chemistry, DNA and Forensic Analysis, Forensic and Environmental Chemistry
- Computing: Including Computer Science, Computing, Computing (Information Technology), Digital Forensics and Cyber Security, Information Technology Management
- Food Science, Nutrition and Horticulture: Including Food Innovation, Horticulture, Human Nutrition and Dietetics, Nutraceuticals in Health and Nutrition
- Health Science: Including Clinical Measurement Science, Environmental Health, Ophthalmic Dispensing, Optometry, Pharmaceutical Healthcare, Public Health Nutrition, Sports Science and Health, Human Nutrition and Dietetics, Nutraceuticals in Health and Nutrition
- Mathematics: Including Industrial Mathematics, Mathematical Sciences
- Pharmaceutical Science: Including Medicinal Chemistry and Pharmaceutical Sciences, Pharmaceutical Science
- Physics: Including Industrial and Environmental Physics, Physics Technology, Physics with Energy and Environment, Physics with Medical Physics and Bioengineering, Science with Nanotechnology

SURE2018@Athlone Schedule	Douglas Hyde Theatre, AIT
9.00 - 9. 40 am	Welcome, registration desk, tea & coffee, Turning Technologies app download
9:45 - 10.00 am 9.45 – 9.50 am 9.50 – 10.00 am	**Welcome by AIT Conference organizer's:** Dr. Therese Montgomery & Dr. AnneMaire O'Brien **Opening Address AIT president Professor Ciarán Ó Catháin** **National Conference launch & Opening Ceremony** streamed live through AIT Facebook to DIT and WIT **Minister Kevin Boxer Moran 9.50 am – 10.00 am**
10.00 -12.10 pm 10.00 - 10:40 am	**Session 1** Chair: Dr. Cormac Quigley, GMIT Invited Guest Lecture: Abbot, Longford. *From academia to research to industry: the truth I would have told myself*
Student Presentations: 10:40 - 10:55 am	*Scanitive - Simplifying Nutritional Information for the General Public* by Ryan Gordon and John Healy (GMIT)
10.55 - 11.10 am	*Assessment of Weight Gain and Other Clinical Parameters in Patients Admitted to Sligo University Hospital and Treated According to MARSIPAN protocol from 2014 to 2017* by Ciara A O'Meara and Laura Keaver (IT Sligo)
11:10 - 11.25 am	*Investigation of the Bio-activity of Hyaluronic Acid vs. Hot Melt Extruded Hyaluronic Acid in Neuronal Cultures* by Ciara M Buckley, Ian Major and Therese Montgomery (AIT).
11.25 - 11.40 am	*Optimisation of a Minimum Inhibitory Concentration Assay to Investigate the Functional Activity of Antimicrobial Peptides* by Lisa Anderson, Joan O'Keeffe and Orla Slattery (GMIT)
11.40 - 11.55 am	*Investigation of the Presence of Pharmaceuticals and Personal Care Products (PPCP) in Treated Wastewater Samples from a Wastewater Treatment Plant in Sligo* by Lucy Maidment and Fiona McArdle (IT Sligo)
11.55 - 12.10 pm	*Novel Iron Delivery Systems* by Michael Greene, Patricia Heavey and Clem Higginbotham (AIT)
12.10 - 13.15 pm	Poster Session & lunch break Buffet sandwiches, tea and coffee available **Reminder to vote for best poster**

13:15 – 14.30 pm 13:15 - 13:45 pm	**Session 2** Chair: Laura Keaver, IT Sligo Invited Guest Lecture: Dr. Barbara Cooper, Jazz Pharmaceuticals: *Preparation for a Career in Industry*
Student presentations: 13.45 – 14.00 pm	*The Effect of a Supervised Exercise Programme (MedEx) on Health and Well-being Measures* by Sarah Roughan and Edwenia O'Malley (IT Sligo)
14.00 – 14.15 pm	*Ovar-DQA1 Null Allele Frequency and Nematode Resistance in Texel and Suffolk Sheep* by Niamh Higgins, Orla Keane and Michael Mullen (AIT).
14.15 – 14.30 pm	*Novel Technologies and Optimized Formulation for Delivery of Solid Dispersion of BCS Class II Drugs* by Lawrence Yee Foong Ng and Clem Higginbotham (AIT).
14.30 – 14.40 pm Short presentation review	**Chair:** Dr. Therese Montgomery, Dr. AnneMaire O'Brien A short overview of student presentations as reminder to Vote for best oral presentation
14.40 – 15.00 pm	Short break/poster viewing
15.00 – 15.15 pm	**Poster and oral presentation Awards ceremony** **Chair:** Dr. Therese Montgomery, Dr. AnneMaire O'Brien **Presenter: Dr. Joseph Ryan, CEO, THEA** 1. **Enterprise Ireland Best Scientific Poster** (SURE Network judging committee) 2. **Abbott Best Oral Presentation** (SURE Network judging committee) 3. **Irish Society of Toxicology: Best Poster:** Audience Participation Award (APA) 4. **Turning Technologies Best Science Communicator** (APA – oral presentations) *Audience feedback survey using Turning Technologies smartphone app.*
15.15 - 16.00 pm A career in Research: Student workshop	**Career Development Session** **Chair:** Nicolas Touzet, IT Sligo Postgraduate research experience – stories from the front line! Speakers: 1. Ms. Caitriona Kielty, Bioscience Research Institute (BRI), AIT 2. Mr. Stephen McGirr, IT Sligo's Strategic Research Centre CERIS

SURE2018@Dublin Schedule

St. Lawrence's Oral presentations, registration
Rathdown house (Lobby, RD006, RD004): Posters & Lunch

8:45 - 9. 30 am	Welcome, registration, Tea and Coffee, (St. Lawrence's) and poster set up (Rathdown) Dr. Claire Mc Donnell and Dr. Bianca Schoen-Phelan
9:30 – 9:35 am 9:35 – 9:45 am 9:50 - 10.00 am	**Welcome by SURE Network chairperson Ciaran O'Leary** **Opening Address by DIT President Prof. Norton** **National Conference launch & Opening Ceremony streamed live** through AIT Facebook to DIT and WIT: Minister Kevin Boxer Moran
10.00 -12.00 pm	**Session 1** (Dr. Sinead Loughran DKIT)
10.00 - 10:30 am	Invited guest lecture Dr. Gordon Cooke, IT Tallaght
10:30 - 10:45 am	*A Comparative Evaluation of Colistin Susceptibility Testing Methods using Pseudomonas Aeruginosa Isolates from Patients with Cystic Fibrosis* Niamh A Stanley (DIT), Mary O'Connor (Beaumont Hospital) and Denise Drudy (DIT)
10.45 - 11.00 am	*Synthesis and Characterisation of Novel 1,2,4,5-Tetraoxanes as a New Class of Iron-Activated Anti-Tumour Agents (Amide Route)* Robert Redmond (DIT) and Claire McDonnell (DIT)
11:00 - 11.15 am	*Are We Studying Bacterial Biofilms Correctly? A Comparative Analysis of Single Versus Multi-Species Biofilm Formation* Ferdia O'Brien (IT Tallaght) and Gordon Cooke (IT Tallaght)
11.15 - 11.30 am	*Advancement and Development of a Novel Ibuprofen Formulation to Address Limitations of Current Marketed Product* Michelle Jia Yi Teh (DkIT) and Sinead Loughran (DkIT)
11.30 - 11.45 am	*Lichens as Air Pollution Indicators in Rural and Urban Areas of County Louth and Meath, Ireland* Kateryna Anisimova (DkIT) and Eleanor Jennings (DkIT)
11.45 - 12.00 pm	*Neonatal Porcine Diarrhoea Subtyping of Porcine Clostridium Perfringens Type A Isolates Using Cpn60 Sequencing* Sophie Masterson (DIT), Jenny Larsson (Swedish University of Agricultural Sciences), Anna Aspán (Swedish University of Agricultural Sciences) and Julie Ann Naughton (DIT) **Reminder to vote for best poster** (Tickbox form available Rathdown House)
12.00 - 13.00 pm	**Poster Session & lunch break (Rathdown House)** Open buffet sandwiches, tea and coffee. Vote for best poster.

13:00 – 14.30 pm	**Session 2** Chair Dr. Emma Caraher (St. Lawrence's)
13:00 - 13:15 pm	*Synthesis, Characterisation and Cytotoxic Evaluation of Ruthenium (II) Polypyridyl Complexes on the A549 Cell Line* Lewis More O'Ferrall (DIT) and Christine O'Connor (DIT)
13.15 - 13.30 pm	*MindGame: A Machine Learning Framework for Electronic Games* Simon D O'Neill (DIT) and Damian Gordon (DIT)
13.30 - 13.45 pm	*Investigating the Potential Virulence Factors of the Novel Cystic Fibrosis Pathogen Pandoraea* Helen Collins (IT Tallaght) and Emma Caraher (IT Tallaght)
13.45 – 14:00 pm	*Vote for best oral presentation using Clickers*
14.00 – 14.30 pm	Invited guest lecture Dr. Sinead Keogh, Director, Medtech & Engineering at Ibec
14.30 – 14.40 pm	10 min comfort break
14.40 – 15.00 pm	**Poster and oral presentation Awards ceremony Prof. Michael Devereux DIT and Dr. Jennifer Brennan, THEA Director of Research and Innovation.** 1. Best Scientific Poster (SURE Network judging committee (Dr. G.Byrne DIT) 2. Best Poster: Audience Participation Award (APA) 3. Best Oral Presentation (SURE Network judging committee) 4. Best Science Communication prize (APA – oral presentations)
15.00 – 15.30 pm Career planning and Industrial perspective	**Career Development Sessions** Dave Kilmartin, Head of DIT Careers Service: Career decision making, CV preparation for Industry & getting past the interview. Research in Industry Dr. Jennifer Brennan THEA Director of Research and Innovation
15.30 – 16.00pm Research perspective/next steps for academia	Prof. Mary McNamara Head of Graduate Research School, DIT: Postgraduate research experience – Funding opportunities and Stories from the front line with IOT postgraduate student panel: Kim Millar, Eline Manaloto, Prabhakar Sidambaram, James Walshe, Deimante Zizyte, Mariana Rocha

SURE2018@Waterford Schedule	**WIT Arena: Lobby**- registration **Studio 2/3**- oral presentations **Pavilion & balcony**- posters and lunch
9.00 - 9. 40 am	Welcome, Registration, Turning App Download, Tea And Coffee Poster set-up at pavilion balcony area
9.40am – 10.00 am	**Regional Opening Ceremony** **Chair: Dr Claire Lennon and Aubrey Storey WIT**
9.40 am - 9.50 am	**Dr Peter McLoughlin, Head of School of Science and Computing, WIT.**
9:50 am - 10.00 am	National Conference Launch & Opening Ceremony streamed live from AIT
10.00am – 11.45 am	**Session 1 Chair: Dr Nabla Kennedy WIT and Dr Eileen O'Leary CIT**
10.00am - 10.30am	**Invited Guest Lecture:** Tom Brennan Co-Founder of Eirgen Pharma
10.30am - 10:45am	*Genetic Variation of the DGAT 1 Gene And Its Influence on Economically Important Breeding Traits in Irish Dairy Cows* Mark E Armitage (WIT) and Denise O'Meara (WIT)
10:45am - 11.00am	*The Effect of a Prolonged High Intensity Intermittent Running Protocol on the Standardised Assessment of Concussion Scores* Marie Carey (IT Carlow), Clare Lodge (IT Carlow) and Darragh O' Meara (IT Carlow)
11.00am - 11.15am	*A Comparison of Extraction and Assay Protocols for the Analysis of Total Phenolic Content in Natural Fruit Product Extracts* Sinead Daly (WIT) and Audrey Hearne (WIT)
11.15am - 11.30am	*Detecting Falls in a Video Stream Using Machine Learning Algorithms* Mark Mc Cormack (CIT) and Meabh O'Connor (CIT)
11.30am – 11.45pm	*Enantioselective Lipase-catalysed Esterification* Rupali Ahashan (WIT) and Wayne Cummins (WIT)
11.45 am – 1.15 pm	Lunch & Poster Session: Pavillion and balcony area
1.15 pm - 2.45 pm	**Session 2 Chair: Dr Eleanor Owens WIT and Dr Carloalberto Petti IT Carlow**
1.15pm - 1.45 pm	**Invited Guest Lecture:** Dr Mícheál Ó Foghlú, Engineering Director, Google Munich, Co-Founder TSSG and FeedHenry.
1.45 pm - 2.00 pm	*Immediate-Early Genes and Delayed Primary Response Genes Regulated by NmU in SKBR3 HER-2 Positive Breast Cancer Cell Line* Jessica Murphy (WIT) and Sweta Rani (WIT)

2.00 pm - 2.15 pm	*Comparison and Characterisation of Solar Irradiance Detectors, and Solar Irradiance Monitoring Station Development* Siobhán O'Neill (CIT) and Eva Norris (CIT)
2.15 pm - 2.30 pm	*Evaluation of Enzyme Production in Bacillus used as Probiotics for Pigs* James Cullen (WIT) and G. E. Gardiner (WIT)
2.30 pm- 2.45 pm	*Recovery of Phosphorus from Disposable Nappies* Anna Karpinska (IT Carlow) and John Cleary (IT Carlow) **Session end** - Voting for best presentation and poster
2.45 pm -3.00 pm	Break
3.00 pm - 4.15pm	**Session 3 Chair Dr. TJ McDonald WIT**
3.00 pm - 4.15pm	**Invited guest lecture:** Sinead Quealy Co-Founder and Managing Director of VirtualVet
3.15 pm - 3.45 pm	**Q&A Panel Discussion** "The Role Of Research In Industry" Invited panellists: Sinead Quealy Co-Founder and Managing Director of VirtualVet, Dr Mícheál Ó Foghlú, Engineering Director, Google Munich, Co-Founder TSSG and FeedHenry, Dr. Peter Mc Guigan, Principal Scientist, Chemistry, Analytical Development, MSD, Dr Mark White Vice President for Research, Innovation and Graduate Studies WIT. Moderator Dr Patrick Lynch, School of Business WIT, Founder and Senior Researcher for RIKON.
3.45 pm – 4.05 pm	**Research Funding Information And Postgraduate Research Experience** – Dr Aisling O'Neill, National Research Programme Officer, Department of Research, Innovation & Graduate Studies WIT, Annabel Higgins-Hoare, Postgraduate researcher, School of Science and Computing, WIT.
4.05 pm - 4.15 pm	**Poster And Oral Presentation Awards Ceremony – Dr Claire Lennon and Aubrey Storey WIT** 1. Best Scientific Poster SURE Network judging committee: Kindly sponsored by MSD 2. Best Scientific Poster Audience prize: Kindly sponsored by BioSciences 3. Best Oral Presentation SURE Network judging committee: Kindly sponsored by PMBRC, WIT . 4. Best Oral Presentation Audience Prize: Kindly sponsored by Eirgen Pharma. *Audience feedback survey using Turning audience participation software.*
4.15 pm - 4.25 pm	**Closing Comments** , Dr Mark White, Vice President for Research, Innovation and Graduate Studies, WIT

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MSD INVENTING FOR LIFE



EirGen Pharma, a subsidiary of OPKO Health Inc., was established in 2005 and employs over 200 people across their campus on the outskirts of Waterford city; EirGen Pharma's Commercial Centre is located is located in Westside Business Park along the Old Kilmeaden Road, and in early 2018 EirGen opened its R+D Centre which is based in the IDA Business & Technology estate on the Cork Road. Voted Irish Pharma company of the year (SME) in 2017, EirGen produces and supplies various pharmaceutical products globally, including those required for cancer treatment. OPKO is a publically traded healthcare company, headquartered in Miami, USA, involved in the discovery, development, and commercialization of next-generation diagnostics, pharmaceuticals, and vaccines.

At EirGen we want to recruit, develop, and retain the right people and so we are always seeking the highest calibre of graduates to join our rapidly growing team. In 2019 we will have graduate opportunities across the following disciplines:

- Microbiology
- QC & Stability Chemists
- Quality Assurance Officers
- Research & Development Chemists
- Formulation Development
- Process Engineering
- Finance

What makes us different? "The EirGen Way" –this is the value we place on the fun and informal vibe that is our work environment; the Craic, madness, and innovative & supportive people that make up our team. For more information see EirGen.com or follow us on LinkedIn.

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If you have any questions or would like to arrange a visit, please feel free to contact your local sales person or FAS...

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For more information, please visit www.biosciences.ie.

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TURNING technologies

I would like to take this opportunity to invite you along to the Turning Technologies End User Conference that will be held this year in the vibrant city of Barcelona on Wednesday 7 th November, 2018. #TTUC18 has been carefully constructed to offer a full schedule of breakout sessions and networking opportunities that will connect you to your peers. Held just 15 minutes' walk from La Sagrada Familia, this event will focus on best practices and knowledge sharing, creating a truly unique beneficial learning experience for all participants. More information on the event including our keynote speaker and how to register can be found right here on our website www.turningtechnologies.eu/ttuc18. Groups of 3 or more attendees will also receive discount on registration, just contact us for the discount code. If you have any questions please do not hesitate to contact me, it would be great if you could make it!

Kathryn Douglas | Marketing Executive EMEA
Turning Technologies | UK Office, The Innovation Centre, Queens Island, Queens Road, BELFAST, BT3 9DT
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PMBrc | Pharmaceutical & Molecular Biotechnology Research Centre

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ROYAL SOCIETY OF CHEMISTRY | REPUBLIC OF IRELAND LOCAL SECTION

What is the Royal Society of Chemistry?
'The RSC is a not-for-profit organisation with a heritage that spans 175 years, we have an ambitious international vision for the future. Around the world, we invest in educating future generations of scientists. We raise and maintain standards. We partner with industry and academia, promoting collaboration and innovation. We advise governments on policy. And we promote the talent, information and ideas that lead to great advances in science.

In a complex and changing world, chemistry and the chemical sciences are essential. They are vital in our everyday lives and will be vital in helping the world respond to some of its biggest challenges.

We are committed to promoting, supporting and celebrating inclusion and diversity. We understand that the success of our community depends on our ability to nurture the talent of the best people regardless of who they are or their background.

We're working to shape the future of the chemical sciences – for the benefit of science and humanity.'

Why join the RSC?
The RSC provide a huge amount of resources, from journals to outreach activities, on the main website, www.rsc.org, for members, professional bodies, students and interested parties of all ages.

Membership for the RSC can be obtained using the following url: *http://www.rsc.org/membership-and-community/join/* Membership events for students and academic staff are held in all Irish universities each year. The current cost for student membership is €20.

The RSC Local Section, Republic of Ireland
The RSC have almost 1,200 members in the Republic of Ireland. The RSC Local Section is the largest of the RSC local section bodies, and has a traditional role in promoting chemistry throughout the Republic of Ireland. Typically, the local section can offer financial support at Primary, Secondary and Third Level, through various initiatives. The local section can also promote chemistry and science initiatives through advertisement, to RSC members, via the RSC magazine 'Chemistry World'. Applications for support can be submitted to the local section committee for consideration (email:rsclocalsec@gmail.com).

Irish Society of Toxicology
Cumann Tocsaineolaíochta na hÉireann

The Irish Society of Toxicology was founded in 1985 serves as a representative voice of the Irish toxicology community on the national and international stage. We aim to increase knowledge and awareness of toxicological issues facing society. Our diverse membership includes industry, academia and governmental agencies involved in toxicology-related activities, and provides a broad spectrum of expertise and perspectives on toxicology-related issues

SURE2018 Book of Abstracts (Oral Presentations)

SURE2018@Athlone

"Scanitive - Simplifying Nutritional Information for the General Public"
by Ryan Gordon (GMIT) and John Healy (GMIT)

Nutritional information is provided on products using different size metrics such as Per 100g serving, Per Unit (whole item) serving and in some cases a serving size suggestion. Due to a need to compute and calculate the nutritional benefit of a product, consumers can in some cases be misled into getting a less healthy product based on how the information and sizes are presented on each product. Furthermore, consumers trying to make purchase decisions may not have the time or ability to calculate and compare the sugar content of two products during a shopping trip.

In this project, software was designed and implemented to assist the general public to better comprehend the nutritional benefit of their product choices by breaking down nutritional metrics like the sugar content of a product and presenting the data in a format which is easier to visualise than adding up grams. The software maintains a synchronized database of other food and drink products, enabling it to suggest similar types of products that contain less sugar. The software is comprised of a cross-platform mobile application and a server administration console. The mobile application allows users to scan the barcodes on food and drink packaging and receive suggestions of similar products with a lower sugar count. The sugar content values for both the scanned product and suggestions are compared and displayed.

"Assessment of Weight Gain and Other Clinical Parameters in Patients Admitted to Sligo University Hospital and Treated According to MARSIPAN protocol from 2014 to 2017" by Ciara A O'Meara (IT Sligo) and Laura Keaver (IT Sligo)

Anorexia nervosa is one of a group of eating disorders [1]. It affects 0.5-1% adolescent females [2] and has the highest mortality rate of all psychiatric illnesses [1]. These high mortality rates have led to the MARSIPAN guidelines being developed in the UK (Management of Really Sick Patients with Anorexia Nervosa) to handle behavioural and metabolic issues involved in admission, detention, refeeding and rehabilitation [3].

This study aimed to measure the effectiveness of the MARISPAN protocol at improving and sustaining weight gain in those with anorexia nervosa in Sligo University Hospital.

It is a retrospective observational study including chart analysis of data on 10 anorexia nervosa patients being treated in Sligo University Hospital between 2014-2017. Descriptive, Student T-Test and Correlation analysis was carried out using SPSS version 24.

There was a statistically significant increase in weight *(p=0.002)* and BMI *(p=0.003)* in the 10 participants who completed the treatment. Length of stay was significantly associated with weight gain *(p=0.002)* however, calorie intake *(p=0.651)* and sabotaging behaviours *(p=0.636)* were not. Refeeding syndrome occurred in 50% of the participants but was not statistically significant *(p=0.346)*. The six participants who attended outpatient treatment post-discharge continued to significantly increase their BMI *(p<0.001)*.

Patients gained significant weight between admission, discharge and follow up. Rates of refeeding syndrome where corrected immediately and there was no evidence of patient readmission post discharge. Hence identifying, this protocol is successful in increased body weight and maintenance in a population group that have an intense fear of weight gain.

"The Effect of a Supervised Exercise Programme (MedEx) on Health and Well-being Measures" by Sarah Roughan (IT Sligo) and Edwenia O'Malley (IT Sligo)

Background: Literature indicates that a positive relationship exists between self-reported health and mental well-being and exercise (Wanderley et al, 2011, Bravo et al, 2016). This study aims to assess self-reported health and well-being measures, before and after a community based exercise programme. Method: Twenty-seven participants, 15 from Cardiac rehabilitation, 4 from the stroke unit and 8 from the Multiple sclerosis physio department volunteered participation. Warwick- Edinburgh and the SF-12 questionnaires were administered pre- and post a 20- week supervised exercise programme. SF-12 scores were analysed using Quality Metric Health OutcomesTM scoring software 5.0 to obtain mental component (MCS) and physical component (PCS) scores. Means and standard deviations are used to describe outcomes. Comparisons were made using paired-samples t-tests using SPSS version 22 software.

Results: There was a statistical difference between pre (M=58.11, SD=9.901) and post Warwick-Edinburgh scores (M=61.22,SD=8.750) (P=0.019). However, there was no statistical difference in pre- to post scores in the SF-12, PCS (Pre: M=47.8, SD=8.5, Post: M=48.3, SD=8.3, P= 0.708) or MCS scores (Pre: M=51.5, SD=10.3, Post: M=51.9. SD= 8.9, P=0.854).

Conclusion: Physical activity has a significant influence on mental well-being when measured by the Warwick-Edinburgh Scale. Mental well- being was improved following a 20-week supervised exercise programme. There was no change in health -related quality of life scores post community based exercise programme when measured with the SF-12 Questionnaire.

"Investigation of the Bio-activity of Hyaluronic Acid vs. Hot Melt Extruded Hyaluronic Acid in Neuronal and Schwann Cell Lines" by Ciara M Buckley (AIT), Ian Major (AIT) and Therese Montgomery (AIT)

Background

Peripheral nerve injuries (PNI) affect thousands of people world-wide each year, with little chance of restoring full function after injury. Using an endogenous human polymer reduces the risk of rejection when designing synthetic nerve conduits. Hyaluronic acid (HLA) is a bio-stable, bioactive polymer which aids in extracellular matrix organisation by facilitating axonal migration and regeneration (1). The primary objective of this research was to investigate the effects of HME treated HLA on nerve and glial cell adhesion and proliferation in-vitro.

Methods

A neuronal (SH-SY5Y) and Schwann cell line (RT4 D6P2T), were used to determine the cytotoxicity and/or bio-efficacy of HLA and PCL. The bio-stability of HLA was determined via IR analysis. HLA/PCL disc conditioned media was examined for detectable leachates by IR and related cytotoxicity by the MTT assay. MTT, Lucifer yellow and Trypan Blue assays were used to investigate cellular adherence. Microscopy was used to examine any morphological changes in the presence of HLA.

Results

HLA increases the proliferation of both neuronal and Schwann cells when incorporated with PCL in a HME scaffold. This increase in proliferation was found to be 283.4783% and 266.6667% in RT4 D6P2T and SH-SY5Y respectively when compared to PCL scaffolds as 100% control. In addition, no leachates and/or cytotoxicity were identified following 24 hour stability studies using HLA/PCL disc conditioned media as cell treatments. Overall, this project showed that HLA increases the cell adhesion properties of biomaterial scaffolds and thus may have the potential to promote cell adhesion and proliferation in vivo.

References

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"Investigation of the Presence of Pharmaceuticals and Personal Care Products (PPCP) in Treated Wastewater Samples from a Wastewater Treatment Plant in Sligo" by Lucy Maidment (IT Sligo) and Fiona McArdle (IT Sligo)

The presence of pharmaceuticals and personal care products (PPCP) in treated wastewater is a growing problem across the western world.

A validated method for the detection of caffeine in treated wastewater was developed using a Shimadzu LC-20 HPLC and a Shimadzu SPD-M20A DAD. A Kromasil C18 column 250 x 4.6mm ID, 10mm particle size was used with an oven temperature of 35°C. The mobile phase was ultrapure water: acetonitrile (80:20) with a flow rate of 1 $mLmin^{-1}$. The detector cell temperature was 40°C and the wavelength range was 190-300nm. Caffeine retention time was 3.1-3.2min throughout the study with a lambda max of 273nm. The method displayed a quantification limit of 2 mgL^{-1} with linear range of 2-50 mgL^{-1}. The equation of the calibration line was $y = 61340x + 13248$ with an R^2 value of 0.999. Precision was determined to be 6.8-0.6% for the standards and the accuracy determined as % error was between 8.2% and -2.2%. Following SPE with an Oasis HLB cartridge caffeine recovery for a 10 mgL^{-1} standard solution was 93.3% $^{+}/_{-}$ 2.23%.

Treated wastewater samples from a WWTP (wastewater treatment plant) in Sligo Town resulted in a caffeine concentration of 9.19 $^{+}/_{-}$ 2.45 mgL^{-1}. The presence of the caffeine molecule in the sample was verified by retention time and lambda max.

The molecule caffeine has no natural source. Its' presence in the environment can only emanate from anthropogenic sources. Hence, caffeine has been used as a marker molecule for the presence of PPCP in treated wastewater.

"Novel Iron Delivery Systems" by Michael Greene (AIT), Patricia Heavey (AIT) and Clem Higginbotham (AIT)

Iron deficiency is one of the most common micronutrient deficiencies worldwide. According to the World Health Organisation, it is estimated that approximately 2 billion people suffer from iron deficiency anaemia. Iron supplements are generally recommended to treat iron deficiency anaemia. However, supplements have limitations due to poor bioavailability and can be poorly tolerated.

Therefore, a novel iron delivery system is of importance. This project aimed to investigate the use of hydrogels as a novel iron delivery system.

The chemically crosslinked Polyethylene Glycol Dimethacrylate (PEGDMA) Molecular Weight 550 hydrogels used in this study were synthesised by UV polymerisation, during which the Fe^{2+} was directly incorporated into the gels. The gels were characterised by Fourier Transform Infrared (FTIR) Spectroscopy, gel fraction determination, and swelling studies. Iron concentrations were detected colourimetrically with 1,10-phenanthroline, a tricyclic nitrogen heterocyclic compound, that reacts with metal ions, such as Fe^{2+}, to form a strongly coloured complex which absorbs at 510nm. In vitro dissolution testing was carried out on the prepared hydrogels for 72 hours and results recorded.

The dissolution results showed that there was a relatively rapid release of iron for the first 24hrs after which time the rate of release slowed down. Ideally, a slower steady release is more advantageous. FTIR and gel fraction confirmed UV polymerisation. This study showed that PEGDMA hydrogels have great potential for use in a prolonged delivery system for oral iron supplementation, and could potentially extend to the delivery of other biologically active agents.

"Optimisation of a Minimum Inhibitory Concentration Assay to Investigate the Functional Activity of Antimicrobial Peptides" by Lisa Anderson (GMIT), Joan O'Keeffe (GMIT) and Orla Slattery (GMIT)

Antimicrobial peptides (AMPs) are natural cationic peptides exhibiting broad antimicrobial activity, with potential for treating antibiotic resistant infections.

In this study, minimum inhibitory concentration (MIC) assays were used to evaluate antimicrobial activity of 2 AMPs (melittin and magainin 1) and 3 antibiotics against 5 pathogens; 2 human pathogens *(Staphylococcus aureus and Escherichia coli)* and 3 salmon pathogens *(Aeromonas salmonicida, Vibrio anguillarum and Yersinia ruckeri)*. Firstly, calibration curves at OD600 were generated for each pathogen. MICs were then performed to assess the functional activity of the AMPs with the antibiotics ampicillin, kanamycin and chloramphenicol used as controls. Mean MIC results for AMPs and antibiotics were then compared to CLSI guidelines and published data.

Results showed that melittin is significantly more effective than ampicillin at inhibiting the growth of V. anguillarum *($p<0.001$) in vitro.* Magainin 1 was less effective than all other antimicrobials tested. Magainin 1 and melittin combined appear to be more effective at inhibiting the growth of *E. coli* and *A. salmonicida*, than when acting alone.

In conclusion, an MIC assay was optimised for the investigation of the functional activity of AMPs in vitro. From the results, melittin is a novel alternative to antibiotics for treating infections caused by *V. anguillarum*, but further studies are warranted to confirm the findings of this study.

"Novel Technologies and Optimized Formulation for Delivery of Solid Dispersion of BCS Class II Drugs" by Lawrence Yee Foong Ng (AIT) and Clem Higginbotham (AIT)

The aim of this study was to formulate amorphous solid dispersions (ASDs) of a BCS class II drug using hot-melt extrusion (HME) to increase the dissolution rate of the drug and to investigate the effect of cooling on the solubility of the drug. The model drug used for this study was indomethacin (INM). PVP VA64 and Poloxamer 407 (ethylene oxide and propylene glycol copolymer) (P407) were selected as hydrophilic polymeric carriers for indomethacin based on pre-formulation studies. This was done using calculations based on the Hansen solubility parameters and Hildebrand and Scott drug polymer interaction factor. Modulated differential scanning calorimetry (MDSC) studies showed a single glass transition temperature (T_g) for all ASD formulations with the exception of the 50% and 70% INM ASD samples indicating that most of the INM samples have been converted into their amorphous forms. This was further confirmed by a slight halo above the baseline of the XRPD diffractograms. FTIR spectroscopy detected shifts in the amide carbonyl group which indicated the presence of hydrogen bonds between the INM and the PVP VA64. This was further confirmed by the results of the Raman spectroscopy. Phase solubility studies of INM in aqueous solutions of PVP VA64 and P407 showed an increase in the kinetic solubility of INM at 37°C as compared to that of pure drug with a kinetic solubility of 29.17 µg/ml. The ASD formulations showed a higher dissolution rate compared to pure and amorphous drug in pH 1.2 with a kinetic solubility of 20.73µg/ml.

"Ovar-DQA1 Null Allele Frequency and Nematode Resistance in Texel and Suffolk Sheep" by Niamh Higgins (AIT), Orla Keane (AIT) and Michael Mullen (AIT)

One of the greatest causes of diseases in ruminants including Ovis aries are gastrointestinal nematodes. As there is an increase in anthelmintic resistance, there needs to be alternative strategies used including breeding for host resistance. The aim of this study is to estimate the Ovar-DQA1 null allele frequency of Texel and Suffolk sheep and to determine if there is an association between the presence of the Ovar-DQA1 allele and nematode resistance based on faecal egg count. The Ovar-DQA1 null allele causes deletion of the Ovar-DQA1 allele. There were 53 Suffolk and 48 Texel tested for the presence of the Ovar-DQA1 gene using Polymerase Chain Reaction. The null allele frequency based on the Hardy-Weinberg equilibrium was estimated to be 79% in Texel and 65% in Suffolk with a significant difference in number of null alleles seen between the breeds ($p = 0.02922$). There was generally a higher resistance in the Texel than Suffolk with Texel showing lower faecal egg count at 17 weeks for Nematodirus and at 14 and 17 weeks for Strongyle. There was no significant difference between the two breeds at 17 weeks for Strongyle or at for Nematodius ($p > 0.05$). There was a significant difference seen at 14 weeks ($p = 9.595 \times 10^{-5}$). There was no significant difference seen within breeds for Ovar-DQA1 allele positive animals and Ovar-DQA1 allele negative in relation to nematode resistance or susceptibility ($p > 0.05$). Therefore, there was no association established between the presence of the Ovar-DQA1 allele and nematode resistance.

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"Lichens as Air Pollution Indicators in Rural and Urban Areas of County Louth and Meath, Ireland" by Kateryna Anisimova (DkIT) and Eleanor Jennings (DkIT)

Bioindicators are species or groups of species that are used to indicate the qualitative status of the environment. A good bioindicator species should be geographically diverse, occupying broad ranges of environments, be tolerant to toxicants, produce a range of responses to toxicants that can be measured, and show effects that are dependent on the concentration of the pollutant. For many years, bryophytes have been used as air quality indicators both in rural and urban areas. Due to the morphology of lichens and their ability to absorb air pollutants, they have been defined as 'permanent control systems' of air pollution assessment. This fourth year study investigated lichens as air pollution indicators in rural (Ballinlough) and urban (Dundalk and Duleek) areas of County Louth and Meath. Ten trees from each location were randomly selected and lichen samples were removed from the trunk for identification and analysis. Following drying, lichens were analysed for heavy metal content- zinc, copper, lead and arsenic using atomic absorption spectroscopy (AAS). The data were assessed using analysis of variance. Overall, the analysis showed that zinc, copper and lead were present in all of the lichen samples from the three locations, and more interestingly, were significantly higher than each other in the sequence: Ballinlough (rural) < Dundalk (urban) < Duleek (urban/industrial). Notably, arsenic was only detected in the Duleek samples. Although these results cannot be related to specific atmospheric concentrations, the results confirm that lichens can provide a means to inform further and more detailed investigations.

"A Comparative Evaluation of Colistin Susceptibility Testing Methods using Pseudomonas Aeruginosa Isolates from Patients with Cystic Fibrosis" by Niamh A Stanley (DIT), Mary O'Connor (Beaumont Hospital) and Denise Drudy (DIT)

Background: In 2016 the Joint CLSI-EUCAST Polymyxin Breakpoints Working Group recommended Broth Microdilution (BMD) as the reference method for colistin susceptibility testing. Agar dilution, disc diffusion or gradient diffusion methods were not recommended. BMD is laborious therefore it is not routinely performed in most diagnostic laboratories. The recent development of commercial BMD kits provides more user-friendly colistin susceptibility testing.

Methods: In this study an evaluation of two commercial BMD products (MICRONAUT MIC-Strip and the Rapid Polymyxin™ *Pseudomonas*) and one gradient diffusion method (MIC-Test Strip) was carried out. These were performed on 30 *P. aeruginosa* isolates from a cohort of people with Cystic Fibrosis (CF) attending Beaumont outpatient CF clinic or admitted to Beaumont Hospital collected over a two-month period from September 2017 to October 2017. Of the 30 samples, 11 were mucoid isolates and 19 were non-mucoid isolates. The colistin Minimum Inhibitory Concentration (MIC) and interpretive results of the three methods were compared to the results from an accredited CF referral laboratory.

Results: The MICRONAUT MIC-Strip demonstrated the highest correlation with the MIC results from the accredited CF referral laboratory (Categorical Agreement (CA) 100% and Essential Agreement (EA) 93.33%), along with 100% sensitivity and specificity. The Rapid Polymyxin™ *Pseudomonas* failed to grow three of the samples; therefore these samples were excluded from calculations. Of the 27 samples that grew, the Rapid Polymyxin™ *Pseudomonas* demonstrated a good correlation to the reference results (CA 96.30%) with 100% sensitivity and 85.71% specificity. Of the two commercial BMD products, the MICRONAUT MIC-Strip displayed better diagnostic utility. The gradient diffusion MIC-Test strip was considerably poorer in terms of correlation and (CA 93.33%, EA 66.67%) and performance with only 71.43% specificity. The 30 clinical isolates were also tested for the MCR-1 gene via Real-Time PCR. All isolates were negative for the MCR-1 gene.

Conclusion: This study's finding supports the recommendations for the use BMD methods for colistin susceptibility testing. Additionally, the results confirmed that gradient diffusion testing should not be used.

"Investigating the Potential Virulence Factors of the Novel Cystic Fibrosis Pathogen Pandoraea" by Helen Collins (IT Tallaght) and Emma Caraher (IT Tallaght)

Cystic fibrosis is an autosomal recessive disease, which is the most common fatal recessive genetic disorder in Caucasian populations. It is an illness which is characterised by repeated and chronic lung infections, which lead to the death of the patient. There are several opportunistic bacterial pathogens that are harmful to CF patients including *Pseudomonas aeruginosa*, *Burkholderia cepacia complex*, *Staphylococcus aureus*, and more recently, *Pandoraea species*. This study was undertaken to determine the potential virulence factors of *Pandoraea species* to better understand how it causes disease in cystic fibrosis patients. Four potential virulence factors were examined in this study.

Protease production was examined using skimmed milk agar plates. The protease produced by *Pandoraea pulmonicola and Pandoraea apista* was characterised through the use of inhibitors to determine the type of proteases produced. Minimum inhibitory concentrations of antibiotics were determined, as well as minimum bactericidal concentrations. Biofilm formation and the production of lipases were also examined.

Both *Pandoraea* species were determined to produce serine proteases. *Pandoraea pulmonicola* and *P. apista* were both resistant to multiple antibiotics which were tested. *Pandoraea apista* showed increased growth at the higher concentrations when grown in the presence of ceftazidime. The lipase production test did not produce any clear zones for any of the bacteria tested.

Pandoraea species are multi-drug resistant, opportunistic pathogens which require further examination to determine how best to treat infections, so that the best outcome for the patient is achieved.

"Are We Studying Bacterial Biofilms Correctly? A Comparative Analysis of Single Versus Multi-Species Biofilm Formation" by Ferdia O'Brien (IT Tallaght) and Gordon Cooke (IT Tallaght)

In the context of *Pseudomonas aeruginosa (P. aeruginosa)*, chronic infection leads to progressive lung destruction in cystic fibrosis (CF) patients. Chronic infections of *P. aeruginosa* are difficult to treat because of the ability of *P. aeruginosa* to form biofilms. Biofilms are surface associated multicellular bacterial communities that are encapsulated in a self-produced extracellular matrix [1]. The ability of *P. aeruginosa* to form biofilms is a major contributing factor to its ecological versatility [2]. Bacteria that live as a biofilm are significantly more tolerant to antibiotics and biocides and are sheltered from the host immune response. Currently we study bacterial biofilm formation in the lab in single species settings, yet we know that in disease they exist primarily as co-operative multispecies systems. A question arises as to whether it is better to study these biofilms as single or multi species. The objective of this project is to study both single and multispecies biofilm formation and compare results to provide guidance to researchers on the topic. Biofilm formation was analysed *in-vitro* using a crystal violet microtiter plate assay. The results indicated *P. aeruginosa* produced the most biofilm in a single species format. While results did not show any enhanced biofilm formation from multispecies there were differences between single and multispecies biofilm formation that warrants further research.

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"Advancement and Development of a Novel Ibuprofen Formulation to Address Limitations of Current Marketed Product" by Michelle Jia Yi Teh (DkIT) and Sinead Loughran (DkIT)

Ibuprofen (2-(4-isobutylphenyl) propionic acid) is a non-steroidal anti-inflammatory drug (NSAID) with biopharmaceutical classification system (BCS) class II classification, which means it has poor gastric solubility and high intestinal permeability. Due to its poor solubility at gastric pH, the drug may have some undesirable direct effects on the gastric mucosa. In this project, an oral lipid-based ibuprofen formulation was developed to attain soluble fast-release formulation. Solubility screening studies on a series of combinations of excipients were performed and a novel combination of excipients (using Solutol HS-15 and Labrasol) was selected for ibuprofen dissolution studies. The effect of Solutol HS-15/Labrasol combined in different proportions (50:50, 40:60, 100:0, 70:30) on the dissolution profile of ibuprofen at Simulated Intestinal Fluid (SIF; pH 6.8) and Simulated Gastric Fluid (SGF; pH 1.5) was investigated. Dissolution studies (n=3) were performed on ibuprofen liquid formulations and a marketed ibuprofen formulation. Dissolution samples were analysed using reversed-phase high performance liquid chromatography (RP-HPLC) and UV-Vis spectroscopy. Dissolution profiles of each formulation were prepared. HPLC analysis was determined to be a more reliable technique than UV-Vis spectroscopy to quantify the amount of ibuprofen released from the formulations. A Solutol HS-15/Labrasol (70:30)/Ibuprofen liquid formulation exhibited increased ibuprofen solubility at gastric pH when compared to marketed ibuprofen formulation.

"MindGame: A Machine Learning Framework for Electronic Games" by Simon D O'Neill (DIT) and Damian Gordon (DIT)

This research demonstrates a novel way to use artificial intelligence to play computer games. An algorithm was developed which can achieve arbitrary goals in popular games such as Snake and Pac-Man. The end result of an iteration of the algorithm is a game which 'plays itself', in a similar manner to that of other documented techniques for automating gameplay with AI. [1][2]

The algorithm trains a specialized classifier, or 'player', on games by mapping sets of the game's possible states to the in-game actions the player should take. No prior knowledge on how to win the game is required for this algorithm to function, other than the final score when gameplay is finished. In each iteration of the learning loop, a new set of players are generated from the highest-scoring player of the previous loop. (In the initial loop, each player performs random actions.)

This algorithm can break down complex systems by reducing gameplay to a collection of 'heuristics', or rules of thumb, that the algorithm generates when playing a game. These heuristics are rules which take the following form: 'If the game's current state possesses all properties in P, then perform action A'. This process generates opaque and easy to edit rules for manipulating systems.

The algorithm consistently cleared 95/98% of a Pac-Man board in less than five minutes of learning, and consistently achieved scores of more than 100 on a Snake board which indicate that this approach has potential in automated gameplay.

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"Neonatal Porcine Diarrhoea Subtyping of Porcine Clostridium Perfringens Type A Isolates Using Cpn60 Sequencing" by Sophie Masterson (DIT), Jenny Larsson (Swedish University of Agricultural Sciences), Anna Aspán (Swedish University of Agricultural Sciences) and Julie Ann Naughton (DIT)

Neonatal Porcine Diarrhoea (NPD) is a pertinent problem in modern pig production despite routine vaccination and treatment of herds with antimicrobials. Clostridium perfringens Type A (CpA) and its role in the NPD disease complex has been deliberated over the recent decade amongst the scientific and veterinarian community. In the present study, the main molecular subtyping technique – chaperonin 60 universal target sequencing was employed with the aim to examine the phylogenetic diversity patterns of CpA isolates (n=182) from healthy and diarrhoeic piglets. Results of the alignment of a 500bp segment of the cpn60 gene from both healthy and diarrhoeic isolates overall were shown to be very similar. Using phylogenetic analysis software, eight clusters of CpA isolates were identified with the majority (n=171 isolates) falling into two main clusters. The two main clusters of CpA differed from each other by two base pairs and were made up almost equally of both diarrhoeic and healthy isolates. This study thus confirms that cpn60 sequencing can be used to study phylogenetic relationships between isolates of CpA from diarrhoeic piglets versus isolates from healthy piglets. However, a difference in diversity must be demonstrated among porcine CpA strains from healthy and diarrhoeic piglets to strengthen the association between CpA and NPD. Moreover, this would then allow for the selection of specific strains for further investigations aiming at identifying specific virulence markers.

"Synthesis and Characterisation of Novel 1,2,4,5-Tetraoxanes as a New Class of Iron-Activated Anti-Tumour Agents (Amide Route)" by Robert Redmond (DIT) and Claire McDonnell (DIT)

A small library of 1, 2, 4, 5 - tetraoxane-amide analogues were synthesised to allow the extension of a structure-activity relationship study on 1, 2, 4 - trioxolanes. Related compounds have shown promising results when biological testing against cancer cell lines was performed. A 4-step synthetic route was utilised for the preparation of these compounds. Step 1 involved the synthesis of a 1, 1 - dihydroperoxide species (75 % yield). In step 2, reaction of this bisperoxide and 2-adamantanone using rhenium (VII) oxide catalyst gave tetraoxane-ester (37 % yield). The tetraoxane-ester was refluxed with potassium hydroxide in methanol to convert it to the tetraoxane-carboxylic acid derivative (87 % yield). The target tetraoxane-amide compounds were formed by way of an activated-ester intermediate in a one-pot synthesis. The reaction of 1-hydroxybenzotriazole and the tetraoxane-carboxylic acid derivative, to give an active-ester, was achieved using an EDC.HCl coupling reaction under basic conditions. Further reaction in situ, of the active-ester with 2-picolylamine or 3-picolylamine yielded 1, 2, 4, 5 - tetraoxane-amide analogues (53 % and 130 % crude yield, respectively). An attempt to synthesise and isolate the tetraoxane-active-ester derivative (78 % yield) was undertaken as this could be used in the parallel synthesis of the final products. However, the reaction conditions used would need optimisation. All compounds synthesised were characterised by ^{1}H and ^{13}C NMR and IR spectroscopy. Melting points and R_f values were also recorded. If required, purification by flash column chromatography and crystallisation was performed.

"Synthesis, Characterisation and Cytotoxic Evaluation of Ruthenium (II) Polypyridyl Complexes on the A549 Cell Line" by Lewis More O'Ferrall (DIT) and Christine O'Connor (DIT)

Ongoing attempts are being made by researchers to develop alternative metal-based drugs with similar chemotherapeutic properties to the platinum-based drugs that are clinically used today that exert less adverse side. This study seeks to show the promise of ruthenium(II) polypyridyl complexes as anti-cancer agents. A series of four ruthenium(II) polypyridyl complexes were synthesized ; $Ru(bpy)_2L.2PF_6$ and $Ru(biq)_2L.2PF_6$, where bpy is 2,2'-bipyridine, biq is 2,2'-biquinoline, and L= *p*-NPIP or *p*-BPIP. The reason behind implementation of these conjugated heteroaromatic ligands was to increase the binding ability of polypyridyl Ru(II) complexes with a pendant arm that have a second binding moiety that has high affinity for DNA.

Following synthesis, a full spectroscopic characterization was performed on each of the compounds. This included the use of NMR to confirm structure (^1H, ^{13}C, HSQC and COSY) and purity of the complexes, vibrational spectroscopy to identify functional groups; ATR-IR and Raman. UV/Vis and fluorescence to confirm the conjugation of the ligand to the ruthenium ion. It was observed that the spectral data of the complexes was in agreement with the literature.

Biological evaluation was carried out on the A549 cell line to determine the cytotoxic properties each of the ruthenium complexes. . This investigation was completed using the Alamar blue assay. The four ruthenium complexes were evaluated to determine IC_{50} values following two incubation periods of 24 and 72 hours. The complexes displayed both concentration and time dependent inhibitory effects. The bipyridine complexes showed to exhibit quite comparable cytotoxic properties on the A549 cell line, with $[Ru(bpy)_2BPIP]^{2+}$ yielding the highest IC_{50}value of 20.60 μM.

SURE2018@Waterford

"Immediate-Early Genes and Delayed Primary Response Genes Regulated by NmU in SKBR3 HER-2 Positive Breast Cancer Cell Line" by Jessica Murphy (WIT) and Sweta Rani (WIT)

Background: HER2-positive breast cancer is an aggressive subtype associated with poor patient prognosis as many patients develop a resistance to therapeutic treatments and relapse. Rani et al. (2014), have associated the acquirement of resistance to HER2-treatment with Neuromedin U, but the mechanisms by which it works remain elusive.

Aim: This study aimed to investigate the effects of NmU on the regulation of immediate early and delayed primary response genes in HER2-positive SKBR3 cells using RT-PCR gene expression analysis. This information was then used to uncover related pathways that may be involved in the progression of this cancer due to NmU.

Results: Treatment of SKBR3 cells with endogenous NmU peptide resulted in a significant change in the regulation of several cancer-associated genes. Jun expression was significantly downregulated after 30 minutes of NmU treatment, which increased significantly after 1 hour. EGR1 and NR4A1 expression levels were significantly downregulated due to NmU, suggesting that NmU may drive cancer progression by inhibiting the action of these important tumour suppressors. Increasing regulation SOD2 and DKK1 was observed due to NmU, suggesting that NmU plays a role in Wnt and MAPK signalling.

Conclusion: Through gene expression analysis, this research project has for the first time identified a number of critical genes and pathways induced by NmU via the NMUR2 receptor. This may be the missing link in determining the mechanism by which HER2-postive breast cancer becomes metastatic and lays the groundwork for the development of alternative therapies by targeting these genes.

"A Comparison of Extraction and Assay Protocols for the Analysis of Total Phenolic Content in Natural Fruit Product Extracts" by Sinead Daly (WIT) and Audrey Hearne (WIT)

Following on from research carried out by Roby et al. (2012), Rockenbach et al. (2010), Caleja et al. (2015), Xu et al. (2016) and Moo-Huchin et al. (2014) where fruits and plants were analysed for their antioxidant capacity in a bid to replace synthetic antioxidants in industry, this study will focus on comparing antioxidants levels of commercial and homemade fruit-based products. Total phenolic content was calculated and expressed as Gallic Acid Equivalents (GAE) in mg/g of fruit preparation. The GAE of fruit products was examined because phenols are a class of antioxidants that help combat the free radical oxidants in our bodies.

In the conference presentation the methods used to extract the antioxidants will be discussed and compared, these methods include maceration and Soxhlet extractions. These methods were chosen as they were the most common extraction methods employed in the literature. In the interest of comparability and repeatability, the determination of total antioxidants extracted was carried out on a micro-cuvette scale and a microtiter scale assay.

Overall it was found that the homemade fruit compote exhibited higher total phenolic levels than its commercial counterparts. In the micro-cuvette scale assay maceration extraction yielded higher phenolic levels than Soxhlet but the opposite occurred in the microtiter scale assay. It was determined that further study was needed to examine whether the fruit composition of the products influenced total phenolic levels observed in this study and whether the concentration of sodium carbonate used in each assay had an impact on results.

"Genetic Variation of the DGAT 1 Gene And Its Influence on Economically Important Breeding Traits in Irish Dairy Cows" by Mark E Armitage (WIT) and Denise O'Meara (WIT)

The Diacylglycerol O-acyltransferase 1 (DGAT 1) gene is significant in dairy production and is associated with the synthesis of fat in milk. There are three variants of the gene: homologous Lysine allele (KK); homologous Alanine allele (AA) and heterogenous Lysine allele (KA). Studies have shown that the KA genotype is associated with higher values for milk energy output, and the A allele has been associated with greater levels of unsaturated fatty acids in milk. The aim of this study was to determine the genotypes in a dual-purpose dairy herd (dairy and beef production). DNA was extracted from hair samples and individual genotypes were generated using PCR and a corresponding RFLP profile or using allele specific real-time PCR. Three variations of the gene were found: KK (n = 5), AA (n = 10), KA (n = 8). The results were statistically compared to Economic Breeding Index (EBI) and EBI sub-indexes. There was no association found between milk production traits and the DGAT1 K232A genotypes (P = 0.178). However, there was a significant association found between other EBI traits including 'Beef' (P = 0.035) and 'Management' (P = 0.023). The AA genotype was associated with the highest beef traits (higher carcass values) and lowest management traits (reduced milking time and good temperament). The KK genotype was associated with the highest management traits and lowest beef traits. This study showed that the AA genotype may be best suited for dual purpose dairy enterprises and could be selectively bred for.

"The Effect of a Prolonged High Intensity Intermittent Running Protocol on the Standardised Assessment of Concussion Scores" by Marie Carey (IT Carlow), Clare Lodge (IT Carlow) and Darragh O' Meara (IT Carlow)

Introduction: The Standardised Assessment of Concussion (SAC) has been reported to detect neurocognitive deficits secondary to a sports related concussion. The SAC is reported to have a sensitivity of 80-94% and a specificity of 76-91% if there is a 1-point decrease in scores (Giza, et al., 2013). No study has been conducted on the effect of an exercise protocol that replicates field sports on SAC scores. A prolonged high intensity intermittent running (PHIIR) protocol has been validated to replicate the physiological and performance measures of field sport (Sirotic & Coutts, 2007). The aim of this study was to investigate whether PHIIR affects SAC scores. This is of practical relevance as the results may impact on the interpretation of this tool as a pitch-side assessment for concussion.

Methodology: The SAC was conducted before the PHIIR protocol and 5-minutes and 10-minutes post exercise for the experimental group. The control group did not complete the PHIIR protocol but followed the same timeline as the experimental group.

Results: Statistical analysis revealed that there was no significant group by time interaction observed, $P>0.05$. The main effect of time showed a statistical significant difference for the pooled means, $F(2,36)=6.602$, $P=0.004$. The experimental group alone exhibited a significant decrease of 2.545 between pre-test and 5-minutes post-test, $t(10)=4.667$, $P=0.001$. No other time points were significant for the experimental and control group.

Discussion: There was more than a 1-point decrease in SAC scores due to PHIIR intervention. This may have a vital practical and clinical impact of the administration of the SAC examination in a pitch-side setting.

References:

Giza, C. C. et al., 2013. Summary of Evidence-Based Guideline Update: Evaluation and Management of Concussion in Sports: Report of the Guideline Development Subcommittee of the American Academy Neurology. Neurology, 80(24), pp. 2250-2257.

Sirotic, A. C. & Coutts, A. J., 2007. The Reliability of Physiological and Performance Measures during Simulated Team-Sport Running on a Non-Motorised Treadmill. Journal of Science and Medicine in Sport, 11(5), pp. 500-509.

"Enantioselective Lipase-catalysed Esterification" by Rupali Ahashan (WIT) and Wayne Cummins (WIT)

Enzymes can be highly enantioselective due to the amino acids within proteins that are predominately chiral. The enantioselectivity of an enzyme from the lipase group called Candida rugosa lipase (CRL) was investigated in this research project. Using this enzyme, the enantioselective performance of four esterification reactions was assessed. The first two reactions involved a racemic carboxylic acid with an achiral alcohol to investigate. The final two reactions involved the same racemic carboxylic acids but this time with a racemic chiral alcohol. Chiral GC methods were developed for the analysis of these reactions with varying degrees of success.

The initial studies found that the enzyme was R-selective for the carboxylic acid. The enantioselectivity decreased with time as would be expected for a kinetic resolution. It was also observed that modifications to structural features of the carboxylic acid results in a significant change in the kinetics of the reaction when the halogen substituent on the chiral carbon was changed from a bromine to a chlorine atom. The aim of part 2 of this study was to investigate if the enzyme exhibited enantioselectivity for the alcohol also. In this case both reactions yielded products with two chiral centres, hence 4 stereoisomers. This reaction generated very interesting result on CRLs selectivity of the stereoisomers produced. The results obtained indicated a slight entioselectivity for the alcohol also, although substantially less than what was observed for the chiral carboxylic acid.

"Detecting Falls in a Video Stream Using Machine Learning Algorithms" by Mark Mc Cormack (CIT) and Meabh O'Connor (CIT)

As humans age, their bodies weaken and the risk of accidental falls increase. The purpose of this project was to develop a camera-based fall detection system that can distinguish between falls and activities of daily living (ADL) to aid in the care of the elderly who are living in assisted living facilities/nursing homes.

The main objective of this project is to develop a system that can classify human poses in a video stream to detect whether a fall has occurred. By associating the pose of "lying down" with a fallen person, the system will be able to detect falls. The system will comprise of two main components, the fall detection classifier and a web application which will notify the user when a fall has been detected. Written in Python the system uses a convolutional neural network (CNN) to detect if a fall has occurred. A video stream serves as the input to the system, and each frame is passed into the CNN to be classified. When a fall is detected, a record is stored in a database along with an image of the fall. This information is then passed to the web application to notify the user, so they can respond appropriately.

The implemented system operates in real time while classifying input from a webcam on a low-end consumer level laptop. The results show that the system achieves a high level of fall detection accuracy (97.65% on unseen data) which is comparable to related works.

"Evaluation of Enzyme Production in Bacillus used as Probiotics for Pigs" by James Cullen (WIT) and G. E. Gardiner (WIT)

Three commercial *Bacillus* strains used as probiotics for pigs were screened for production of exogenous enzymes related to improving feed efficiency. Firstly, *Bacillus* was isolated from a probiotic feed additive containing *Bacillus* subtilis and the product was verified to contain 2 x 1010 spores/g via microscopic count. The *Bacillus* isolate had high *rpoB* sequence homology to members of the Bacillus *subtilis* group, primarily *Bacillus velezensis* and *Bacillus amyloliquefaciens*; therefore, definitive identification would require sequencing of less homologous housekeeping genes such as *gyrB*, or ideally whole genome sequencing. The isolated *Bacillus* as well as *B. subtilis* and *B. licheniformis*, previously isolated from another commercial feed additive, were screened in triplicate for enzyme production on agar plates containing the relevant substrates. The B. subtilis isolated in this study and the B. licheniformis produced the highest amounts of protease (zones of clearance of 8.3 and 6.5 mm, respectively), cellulase (6.2 and 5.3 mm), xylanase (4.4 and 3.4 mm), β-glucanase (11.4 and 10.8 mm) and amylase (11.3 and 13.5 mm). The *B. subtilis* from the other product was not as enzymatically active; it had no xylanase activity and zones of clearance of only 2.4-4 mm were observed on all of the other enzyme screening media, except the β-glucanase medium (11.4 mm). All three *Bacillus* strains were found to produce phytase to a similar extent (5 mm zones). These results indicate that exogenous enzyme activity varies among probiotic strains and may contribute, at least in part, to improving nutrient utilisation, and thus feed efficiency, in pigs supplemented with certain probiotics.

"Recovery of Phosphorus from Disposable Nappies" by Anna Karpinska (IT Carlow) and John Cleary (IT Carlow)

Phosphorus is a crucial, geographically disperse, non-renewable resource that is necessary to support global economy and food production. Currently, much of the global population relies on phosphate rock as the main source of phosphorus for chemical fertiliser production. It is estimated that world phosphorus resources will be depleted within the coming 200 years (Ashley et al., 2009). Recent years have witnessed increasing awareness of these limited phosphorus resources and the importance of phosphorus recovery from sources including human and animal waste. The aim of this research project was to investigate methods for the recovery of phosphorus from disposable nappies. Most disposable nappies contain super absorbent polymer (SAP) which absorbs the liquid waste. The project involved analysis of the chemical and physical properties of the polymer as well as optimisation of a procedure to recover the phosphorus from artificial urine solution absorbed by the polymer. The recovery of phosphorus from disposable nappies was achieved with recoveries between 14 % and 88 %. The highest percentage recovery was achieved using magnesium chloride, no pH adjustment, and relatively low phosphate concentration in the artificial urine solution. Crystallisation and precipitation techniques were used to recover the phosphorus in the form of struvite. Struvite is a chemical fertiliser that can be used as a raw material or directly within the fertiliser and food growth promoting industry. We note that implementation of phosphorus recovery from disposable nappies would require significant changes in terms of waste collection and treatment infrastructure.

Reference: Ashley, K., Mavinic, D., Koch, F., 2009. International Conference on Nutrient Recovery from Wastewater Streams. IWA Publishing, Alliance House, London. ISBN: 1843392321.

"Comparison and Characterisation of Solar Irradiance Detectors, and Solar Irradiance Monitoring Station Development" by Siobhán O'Neill (CIT) and Eva Norris (CIT)

The aim of this paper is to compare the output of a silicon photodiode pyranometer (SP Lite2) and a thermopile pyranometer (CMP3) to ascertain if there is a significant difference in their performance given the difference in their operating principles. The output of the pyranometers was characterised in the lab using a solar lamp to mimic the sun's output, and using field data. It was found that there was no significant difference in the output of both pyranometers when the data was extrapolated to 120,000 LUX, the level of sunlight on a sunny day. The ideal solar irradiance value at this level was 1000 W/m^2. The actual output of the SP Lite2 was found to be 1023.16 W/m^2, for the CMP3 the output was 1021.22 W/m^2, this is a difference of just 1.94 W/m^2.

In addition a solar irradiance monitoring station was developed for Cork Institute of Technology, using an Arduino connected to a pyranometer. The Arduino converts the pyranometer's voltage output to a solar irradiance value and sends it to a cloud-based time-series-database every 5 seconds, where it was presented graphically for remote access. This project is useful as accurate solar irradiance data can help with modelling surface temperatures in light of greenhouse gas concentrations. In addition, the local data and monitoring station can be used to assess the suitability of solar panels for a given site which is also important for sustainable energy production.

SURE2018 Poster Presentations (Athlone Conference)

1. "Bioinformatic Classification of Expanded Bovine B-defensin Protein Family" by Felicia Cazer (AIT), Micheal Mullen (AIT) and Kieran Meade (Teagasc)
2. "Dietary Intake of Phase IV Community-based Cardiac Rehabilitation Participants Attending MedEx at IT Sligo: A Cross-sectional Study Comparison to Cardiovascular Prevention Guidelines" by Ruth M Kavanagh (IT Sligo) and Laura Keaver (IT Sligo)
3. "Assessment of the Achievement of Folic Acid Intakes to Prevent Neural Tube Defects in Young Nulliparous Female College Students" by Katie Bohan (AIT) and Geraldine Cuskelly (AIT)
4. "Are we Creating a Supportive Environment for Women to Breastfeed? A Postnatal Analysis of Perceived Breastfeeding Support Amongst New Mothers in the North West of Ireland" by Eleanor Loftus (IT Sligo) and Margaret Mc Loone (IT Sligo)
5. "A GIS Based Study of the Environmental Impacts of the Wild Atlantic Way in the West of Ireland" by Leanne Leonard (IT Sligo) and Guy Marsden (IT Sligo)
6. "Do Parental Feeding Styles Differ in Families?" by Hazel Seale (AIT) and Patricia Heavey (AIT)
7. "The Effect of Food Form on Subsequent Food Intake" by Lara J McCann (AIT) and Patricia Heavey (AIT)
8. "The Effects of Double Table Top Pilates Exercise on Core Stability in Inactive Collegiate Students" by Zoe Hamilton (AIT) and Lynn Allen (AIT)
9. "The Effects of Simulated Digestion on the Bioactivity of Phlorotannins from Fucus Vesiculosus" by Denise Cahill (IT Sligo) and Thomas Smyth (IT Sligo)
10. "Assessing the Effectiveness of Using Benthic Macroinvertebrates as an Indicator of Water Quality" by Niamh Fahey (IT Sligo) and Paul Hamilton (IT Sligo)
11. "Investigation of the Effect of Curcumin on microRNA (miRNA) Expression in Mesenchymal Stem Cells" by Ciara M Murphy (AIT) and Cathy Brougham (AIT)
12. "Quality of Life and Anterior Cruciate Ligament Injury" by Melissa Heanue (IT Sligo) and Edwenia O'Malley (IT Sligo)
13. "Inhibitory Effect of D-Amino Acids on Staphylococcus Aureus and Staphylococcus Epidermidis Biofilm Development" by Tomasz Szank (AIT) and Damien B. Brady (AIT)
14. "Investigating the Diversity of Polyhydroxyalkanoate (PHA) Producing Organisms in Soil using Denaturing Gradient Gel Electrophoresis (DGGE)" by Amy C Scanlon (AIT) and Donal Eardly (AIT)
15. "Short- and Long-Term Benefits of a Community Based Cardiac Rehabilitation Programme" by Orla Bagnall (IT Sligo) and Joanne Regan (IT Sligo)
16. "Comparison of the 6-Min Walk Test and the Incremental Shuttle Walk Test as a Measure of Exercise Capacity in MedEx@ITSligo Participants" by Fiona Boyle (IT Sligo) and Joanne Regan (IT Sligo)
17. "Can a brief intervention improve nutrition knowledge in older adults?" by Catriona Thomas (IT Sligo), Clodagh Brennan (IT Sligo) and Laura Keaver (IT Sligo)
18. "The Hemodynamic Responses of a Community Based Cardiac Rehabilitation Class" by Rachel Keane (IT Sligo) and Joanne Regan (IT Sligo)
19. "Pilot Study of Dietary Intake of Irish Coeliacs Aged 18-60 Years Old in Ireland" by Shane Gordon (AIT) and Patricia Heavey (AIT)

20. "Development of a Novel Folate Delivery System" by Niamh Lawless (AIT), Clem Higginbotham (AIT) and Patricia Heavey (AIT)
21. "The Local and Regional Increases in Biodiversity Through the Implementation of the GLAS Wild Bird Cover" by Fergal Bradley (GMIT) and Heather Lally (GMIT)
22. "Sustained Delivery of Antibiotics in Animals using Novel Polymeric Systems" by Pearse Dolan (AIT) and Clem Higginbotham (CIT)

SURE2018 Poster Presentations (Dublin Conference)

1. "Role of Siderophore of Klebsiella Pneumoniae Fitness and Antimicrobial Resistance" by Lauren A Moore (DIT), Maarten Coorens (Karolinska Institutet), Peter Bergman (Karolinska Institutet) and Shane Dillon (DIT)
2. "Genetic variability of Hepatitis E Virus ORF3 Gene on the Host Immune Response against the Virus" by Julie K Moore (DIT), Helene Norder (Gothenburg University), Marie Karlsson (Gothenburg University) and Sara Lynch (DIT)
3. "Verification of a new C-peptide Assay on the Roche e601" by Adebobola Madojutimi (DIT), Geraldine Collier (Beaumont Hospital) and Frank Clarke (DIT)
4. "Investigation into the Ability of TNF-α to Sensitise MCF-7 Breast Cancer Cells to Etoposide-induced apoptosis" by Noirin Mc Ardle (DkIT) and Jade Pollock (DkIT)
5. "Assessment of the Diagnostic Values of MUC-4 and STAT-6 Antibodies in a Soft Tissue Pathology Service" by Siow Han Khong (DIT), Julie Gorman (St Vincent's University Hospital) and Helen Lambkin (DIT)
6. Mechanisms Involved in Relaxations Induced by Electrical Field Stimulation (EFS) in Murine Airways Smooth Muscle by Xin Rui Lim (DkIT), Eamonn Bradley (DkIT), Gerard Sergeant (DkIT), Mark Hollywood (DkIT) and Keith Thornbury (DKIT)
7. "The Development and Validation of Reverse Transcription Polymerase Chain Reaction (RT-PCR) Mutation Scanning Assays for the Initial Investigation of Biochemical Genetic Disorders" by Elena Walsh (DIT), Evan Keogh (St James's Hospital), Sarah Savage (St James's Hospital), Barbara MacNamara (St James's Hospital), Vivion Crowley (St James's Hospital) and Frank Clarke (DIT)
8. "An Investigation into the Likelihood of, and the Conditions Under Which, Commonly Used Heat Insulating Materials may be Accidentally Ignited" by Erica Mooney (IT Tallaght) and Liam Fleury (IT Tallaght)
9. "Evaluation of Four Selective Chromogenic Screening Agars for Detection of VRE and Investigation of the Prevalence of Daptomycin Non-susceptible Enterococci in Healthcare Isolates" by Hui Onn Ngieng (DIT) and Celine Herra (DIT)
10. "Validation of the EntericBio Realtime CPE Assay, the GeneXpert Carba-R assay and the Rapid Polymyxin NP Kit" by Kate Byrne (DIT), Denise Drudy (DIT), Deirdre Keating (St James's Hospital), Emer Coyle (St James's Hospital), Orla Donoghue (St James's Hospital), Susan Fitzgerald (St James's Hospital) and Diarmuid Scanlon (Serosep Ltd)
11. "Project relating to fingerprint development in conjunction with the fingerprint department, Garda H.Q." by Sharon Aisling Flanagan (IT Tallaght) and Liam Fleury (IT Tallaght)
12. "Optimization of Methods for the Identification of Macrophage using the CD68 with THP-1 Cells and Adipose Tissue" by Almundhar Almawali (DIT), Greg Byrne (DIT) and Alison Malkin (DIT)
13. "Evaluation of Anti-VS38 as an Alternative to Anti-CD38 for the Flow Cytometric Analysis of Plasma Cells in Multiple Myeloma Patients" by Santa Rubine (DIT), David O'Brien (St. James's Hospital), Claire Wynne (DIT) and Richard Mc Cafferty (St. James's Hospital)
14. "Investigation of Suitability of New Photosensitive Dyes for Holographic Recording at Red Wavelengths" by Isabel Fernandez Romero (DIT) and Dervil Cody (DIT)
15. "A Screening Assay to Measure the Sensitivity of Fanconi Anaemia Patients' Cells to Cancer Therapy" by Anna M McCormick (DIT) and Fergus Ryan (DIT)

16. "An Investigation of Zooplankton Dynamics During Thermocline Development in Milltown Lake" by Shannon Dixon (DkIT) and Valerie McCarthy (DkIT)
17. "The Development of a Tissue-engineered in Vitro Model of Breast Cancer Metastasis with Tuneable Stromal Properties" by Elizabeth Sainsbury (DIT), Cian O'Leary (RCSI) and Greg Byrne (DIT)
18. "Evaluation of Phenotypic and Genotypic Methods for Detection of Polymyxin Resistance (including Transmissible MCR-1 Genes) in GNB" by Jack Andrew O'Neill (DIT) and Celine Herra (DIT)
19. "Tackling Maths for Dyslexic Students through Technology" by Amandeep Singh (DIT) and Bianca Schoen-Phelan (DIT)
20. "Knowledge and Intake of Folate and Folic acid in Vegetarians" by Michael Dolan (DIT) and Katherine Younger (DIT)
21. "Dietary Patterns and Diet-Disease Relationships in Irish Adults" by Katie Spain (IT Tallaght) and Colin Murphy (IT Tallaght)
22. "Investigating the Effects of Antibiotics and Natural Compounds on Bacterial Growth and Formation of Biofilms" by Jonathan Brady (IT Tallaght) and Emma Caraher (IT Tallaght)
23. "The Association Between the Acute:Chronic Workload Ratio (ACWR) and Countermovement Jump Performance in Elite Academy Soccer Players" by Alan Byrne (IT Tallaght) and Kieran Collins (IT Tallaght)
24. "A Pilot Longitudinal Study: The Effect of Early Postnatal Nutrition on Growth Rates and Body Composition of Preterm Infants" by Shevaun Teo (DIT), Divya Ravikumar (DIT), Daniel McCartney (DIT) and Anne Doolan (The Coombe Women and Infants University Hospital)
25. "Validation of the Grifols Erytra Eflexis" by Lisa Holland (DIT), Irene Devine (Beacon Hospital), Carol McSherry (Beacon Hospital) and Fabian McGrath (DIT)
26. "A Pilot Longitudinal Study Examining the Association between Maternal Diet on Breast Milk Macronutrient Composition" by Divya Ravikumar (DIT), Shevaun Teo (DIT), Anne Doolan (The Coombe Women and Infants University Hospital) and Daniel McCartney (DIT)
27. "A Review of Histochemical and Immunohistochemical Methods for Detection of Mycobacteria in Paraffin-embedded Tissues" by Dawit Beyene (DIT), Helen Lambkin (DIT) and Alison Malkin (DIT)
28. "The Physical Running Demands of Elite Camogie Match-Play" by Leah Butler (IT Tallaght) and Brian Keenan (IT Tallaght)
29. "Validation of a HPLC Method for Quantification of Synephrine in Dietary Food Supplements by Pre-column Derivatization using 9-Fluorenylmethyl Chloroformate" by Aoife Moloney (DIT) and Julie Dunne (DIT)
30. "Investigating whether the Dining Room Impacts Levels of Interaction and Mood and how it may Affect Patients' Nutrient Intake in a Stroke Rehabilitation Ward" by Sali Abouhajar (DIT), Suzanne Doyle (DIT), Grace Bennett (DIT), Linda Dooley (St. James's Hospital), Tracy Waldron (St. James's Hospital), Katie Walsh (St. James's Hospital), Sile Murphy (St. James's Hospital) and Aoibheann McMorrow (St. James's Hospital)
31. "Cannabinoid Receptor Expression in Mantle Cell Lymphoma" by Orla Ryan (DIT), Magali Merrien (Karolinska Institutet, Stockholm) and Derek Neylan (DIT)
32. "Profiling the Immune Response during Influenza-bacterial Co-pathogenesis" by Clare Murray (DkIT), Paula Maguire (DCU), Patricia Johnson (DCU) and Sinead T Loughran (DkIT)

SURE2018 Poster Presentations (Waterford Conference)

1. "A Two-step Approach to Synthesis Chiral Diol Using Biocatalysis and Organocatalysis" by Hoei Ser Chong (WIT) and Claire Lennon (WIT)
2. "The Contribution of Hedgerows to the Conservation of Wildlife and Biodiversity on Irish Farms" by Luke Clogher (WIT)
3. "Exosomes Derived from Human Bone Marrow Mesenchymal Stem Cells Accelerates Cutaneous Wound Healing via Optimising the Characteristics of Fibroblasts" by Ruaidhri Bates (WIT) and Sweta Rani (WIT)
4. "Antimicrobial Properties of Seaweeds" by Lenka Jindrichova (WIT) and Helen Hughes (WIT)
5. "The Gender Differences in Self-esteem, Body-image and Exercise Motives between Exercisers vs Non-exercisers" by Jennifer M Rice (WIT) and Maire Harney (WIT)
6. "Synthesis and Evaluation of Thiocarbonyl Compounds with Pharmacological and Other Activity" by Lucas Bwema Vandi (WIT) and Joe Power (WIT)
7. "An Investigation Into Microbial Air Quality during Processing in a Commercial Abattoir" by Pamela McCormack (WIT) and Nabla Kennedy (WIT)
8. "The Effects of a Prolonged High Intensity Intermittent Running Protocol on Balance Performance as Measured by the Modified Balance Error Scoring System" by Darragh O' Meara (IT Carlow), Clare Lodge (IT Carlow), Marie Carey (IT Carlow) and Ben Hunt (IT Carlow)
9. "A Green Aerobic Alcohol Oxidation Reaction of Various Para Substituted Alcohols Using a Copper(I)/ TEMPO Catalyst" by Sophie L Meehan (WIT) and Claire Lennon (WIT)
10. "Preparation of Dibenzylacetone Through Aldol Condensation Reaction and Purity Analysis by HPLC" by Ronan William Daunt Walsh (WIT) and Richie Ryan (WIT)
11. "Chemical Analysis of Sunscreens Using UV-Vis Spectrometer" by Hilkiah Ako (WIT) and Sheila Donegan (WIT)
12. "Extracting and Testing Antimicrobial and Antioxidant Compounds Found in Fucus Serratus" by Leonat Xhokli (WIT) and Shiau Pin Tan (WIT)
13. "Search for MicroRNA Sequences in Bos taurus Mitochondrial Genome" by Demi M Ryan (IT Carlow) and Andrew T Lloyd (IT Carlow)

Notes

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