

# NEWS UPDATE

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Sustainability



Small Molecule



Biologics



Health



Education & Public Engagement

## societal goals

### Michael Lohan, CEO, IDA Ireland

Watch IDA CEO **Michael Lohan** explain how Ireland has a strong heritage in bi-pharmaceuticals and the significant role of SSPC in this global ecosystem, as a widely regarded world leading centre in pharmaceutical research. Thank you Michael. [See video here.](#)



### SSPC 2023 symposium celebrating 15 years



**Prof. Mark Lautens**, University of Toronto, **Dr Magali Hickey**, Senior VP R&D Syntis Bio and SSPC Director **Prof. Damien Thompson**

The SSPC symposium is a highly anticipated event each year that brings together experts from various fields to foster collaboration, and showcase scientific breakthroughs. Held in August, we had captivating keynote presentations from **Dr Magali Hickey**, SVP R&D Syntis Bio and **Prof. Mark Lautens**, University of Toronto. Our SSPC symposium serves as a platform for sharing valuable insights and advancing knowledge in the field. [More information here.](#)

As part of our recent symposium, an awards ceremony was held that celebrate individuals who have made major contributions and impact in their respective fields. [More information here.](#)

### Journal of Pharmaceutical Sciences topic cluster on co-processed active pharmaceutical ingredients (APIs)

A special topic cluster issue within the journal is centered around the proceedings from a two-day workshop held in July 2022, sponsored by the Food and Drug Administration (FDA) and the University of Maryland Centre for Excellence in Regulatory Science and Innovation (M-CERSI).

There were two papers from SSPC, with contributions from **Steven Ferguson**, **Michael Stocker**, University College Dublin, **Prof. Anne Marie Healy**, **Monika Myślińska** and **Evangelia Tsolakia**, Trinity College Dublin, Ireland. [More information here.](#)

## PROJECT SPOTLIGHT

### New applications of carbohydrates as chiral auxiliaries and novel compound generation via stereoselective azide-alkene cycloaddition, batch vs flow chemistry

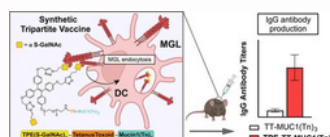


Led by **Prof. Paul Murphy**, University of Galway, working with **Aaron McCormack**, PhD, this project's focus is to develop applications of the Huisgen azide-alkene cycloaddition reaction on carbohydrates, including studying these reactions with flow chemistry techniques. One application is to use inexpensive and renewable carbohydrate-derived chiral auxiliaries to influence the stereoselectivity of the azide-alkene cycloaddition, which can give triazolines that can decompose to synthetically useful aziridines. Thus, there is the prospect of enantioselective synthesis of new chiral aziridines or their derivatives, which can be isolated once the auxiliary is removed. A second application is to use the reaction to generate new glycomimetics based on triazolines and aziridines. Glycosyl triazolines or glycosyl aziridines have hardly been studied in drug discovery and they have potential as inhibitors of lectins, such as siglecs or galectins. Such synthesis developments may influence the structure of future drugs. Flow chemistry techniques have potential in optimisation of reaction conditions for the cycloadditions and for the conversion of triazolines to aziridines, which may proceed sluggishly in batch. The use of flow chemistry also allows for the safer use of organic azides. The use of carbohydrate auxiliaries, such as fructose or galactose derivatives may give rise to environmentally friendly waste-streams in API development.

## FUNDING HIGHLIGHT

**Horizon Europe:**  
**Dr Marco Monopli**, RCSI. European Project on nanosafety, POTENTIAL. To enable nanomaterial safety assessment for rapid commercialisation, focused in obtaining a complete understanding of the mechanisms of interaction between nanomaterials and living systems, essential to predict their potential toxicity and their environmental impact.

## PUBLICATION



**MUC1 Glycopeptide Vaccine Modified with a GalNAc Glycocluster Targets the Macrophage Galactose C-type Lectin on Dendritic Cells to Elicit an Improved Humoral Response**  
Adele Gabba | Riem Attariya | Sandra Behren | Christian Pett | Joost C. van der Horst | Hajime Yurugi | Jin Yu | Moritz Urschbach | Juan Sabin | Gabriel Birrane | Edgar Schmitt | Sandra J. van Vliet | Pol Besenius | Ulrika Westerlind | Paul V. Murphy, in *JACS*.

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**Prof. Edmond Magner**



## PROJECT SPOTLIGHT Preparation of biocatalysts



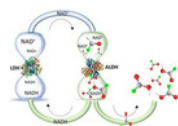
**Prof. Edmond Magner**, University of Limerick, is leading this project with **Kim Shortall, Simin Arshi, Simon Bendl, Xinxin Xiao, Serguei Belochapkin, Denise Demurtas** and **Tewfik Soulimane** in collaboration with the Aalborg University, Denmark. The use of enzymes in biochemical processes is of interest due to their ability to work under mild conditions while attaining high reaction rates. A limitation in the use of enzymes such as oxidoreductases on a large scale lies with their requirement for costly cofactors, e.g. NAD<sup>+</sup>, in stoichiometric quantities. Cofactor regeneration mechanisms using bienzymatic recycling systems is an attractive way to increase productivity and efficiency. Prof. Tewfik Soulimane has worked for many years on the thermophilic enzyme aldehyde dehydrogenase (ALDHTt). The project developed from this work, seeking to use the enzyme for biocatalytic applications and in particular for the selective oxidation of aldehyde functional groups. A reactor system was developed that utilized L-Lactate dehydrogenase (to recycle the cofactor), NADH and storage. This has shown to catalyse the conversion of the substrates hexanal, benzaldehyde, terephthalaldehyde and p-tolualdehyde. The impact of the reactor system is that it enables the conversion of substrates with aldehyde functional groups into the corresponding carboxylic acid products under mild conditions (pH and temperature).

## FUNDING HIGHLIGHT

### MSCA Doctoral Network:

**Prof. Vivek Ranade**, UL, coordinator of CaviPRO that focuses on the modelling, control and applications of hydrodynamic cavitation phenomena. [Read more here](#)

## PUBLICATION



### Coupled immobilized bi-enzymatic flow reactor employing cofactor regeneration of NAD<sup>+</sup> using a thermophilic aldehyde dehydrogenase and lactate dehydrogenase†

Shortall, K. | Arshi, S. | Bendl, S. | Xiao, X. | Belochapkin, S. | Demurtas, D. | Soulimane, T. | Magner, E., in **Green Chemistry**.



**Dr Paula Meleady**

## PROJECT SPOTLIGHT Improving the efficiency of biotherapeutic production



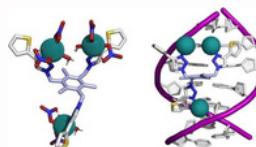
**Dr Paula Meleady**, Dublin City University, works on the proteomic and post-translational modification and characterisation of recombinant Chinese hamster ovary (CHO) cells to improve the efficiency of biotherapeutic production. In CHO production cell cultures, the expression of high levels of recombinant biopharmaceuticals is linked to inducing endoplasmic reticulum (ER) stress, causing enhanced unfolded protein response (UPR) levels to maintain cell viability and productivity. ER stress mechanisms are poorly understood in CHO cells and are a major bottleneck in improving the efficiency of production of high-cost recombinant biopharmaceuticals. Ubiquitination targets substrates (e.g., misfolded proteins) for degradation but also has important regulatory control functions including cell cycle regulation, translation, apoptosis, etc., and hence is likely to be central to understanding and controlling productivity of recombinant biotherapeutics. We are investigating the proteome and the ubiquitinated proteome of CHO cell lines expressing industrially relevant biotherapeutics, chosen for different bioprocess phenotypes (e.g., temperature shift, culture longevity) and different levels of productivity, using advanced LC-MS/MS strategies to gain a better understanding of how ubiquitination is involved in the regulation of these phenotypes (Ryan et al. 2023). From the work to date we have identified several promising protein targets for cell engineering to improve growth and productivity of recombinant CHO cells. [Find out more on her groups collaborations here.](#)

## FUNDING HIGHLIGHTS

### St Luke's Institute for Cancer Research:

**Dr Finbarr O'Sullivan**, Dublin City University. The research focuses on the role of miRNA in pancreatic cancer.

## PUBLICATION



### A Click Chemistry-Based Artificial Metallo-Nuclease

Gibney, A. | de Paiva, R.E.F. | Singh, V. | Fox, R. | Thompson, D. | Hennessy, J. | Slator, C. | McKenzie, C.J. | Johansson, P. | McKee, V. | Westerlund, F. | Kellett, A., in **Angewandte Chemie - International Edition**.

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**Prof. Andrew Kellett**

## PROJECT SPOTLIGHT

### Nature-ETN: Nucleic Acids for Future Gene Editing, Immunotherapy and Epigenetic Sequence Modification

Funded by the European Commission's Horizon 2020 MSCA Innovative Training Network, the project "NATURE", led by SSPC investigator and Dublin City University Professor, **Andrew Kellett**, has forged a new integrated network of 10 industry-academia partners, which trains 15 early-stage researchers (ESRs) using cutting-edge resources at leading research facilities, universities, and biopharmaceutical enterprises throughout the EU. The focus of the training is in the area of Nucleic acid (NA) therapies, a technology that represents major advances in the treatment of human diseases.

This new and fast growing field underpins Ireland's and Europe's biotechnology and pharmaceutical industries where highly qualified experts in nucleic acid chemistry, biomaterials development and chemical biology are required. The ESRs trained within NATURE-ETN will acquire the necessary knowledge and skillset to fill high-functioning industry jobs, but also to maintain and advance Ireland's and Europe's competitiveness and innovation capacity. **More information here**

Andrew and his team's work on work creating compounds that can damage cancer DNA featured in the media recently. Click chemistry, the method used for the international study, makes it 'much more efficient to find new drugs. **More information here**



## FUNDING HIGHLIGHT

**Prof. Andrew Kellett**, DCU, Novo Nordisk Foundation funding for developing a new type of treatment for glioblastoma.

## PUBLICATION

### Family Practice

**The impact of drug palatability on prescribing and dispensing of antibiotic formulations for paediatric patients: a cross-sectional survey of general practitioners and pharmacists**

Ayat Elgammal | Joseph Ryan | Colin Bradley | Abina Crean | Margaret Bermingham, in **Family Practice**.



## EPE PROJECT SPOTLIGHT

### Exploring the Values that Inform STEM Curricula Development and Selection in the Junior Cycle

**Prof. Orla McCormack** is leading this project at the University of Limerick with **Joan Costello**, PhD researcher. Secondary school participation in Science, Technology, Engineering and Mathematics, and aspirations to STEM careers, are patterned along gender, class, ethnicity and identity lines. The curriculum forms part of a joined-up approach to widening STEM participation, however, the curriculum is not systemically included in initiatives promoting STEM. Yet, the curriculum is a tool for enacting inclusion and equitable education where systems of inclusion and exclusion are considered.

This research examines the transformation of original knowledge, e.g. physics, into pedagogic discourse, e.g. school physics. Competing interests, ideologies and the objectives of the stakeholders involved in the recontextualization process, shape the curriculum and students are socialised through the norms it transmits. This means the curriculum can sustain inequitable patterns or represent the interests of traditionally excluded groups.

**Read more on the project and its potential impacts here**



**Prof. Orla McCormack**

## Electric Picnic

MUSIC AND ARTS FESTIVAL

On Friday, September 1st, in the Manifesto tent at Electric Picnic, **Dr Sarah Guerin** was part of a panel discussion, called *Pilosophy*, based on the future of healthcare and how Irish research is playing a role in the ecosystem. Some big "Human" questions were explored!!



# INDUSTRY CORNER

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## UPCOMING EVENTS

To learn more about any of the events or training opportunities listed below, please contact our industry team, [Kristy.Sirreul.ie](mailto:Kristy.Sirreul.ie), [Jamie.Guideraeul.ie](mailto:Jamie.Guideraeul.ie) and [Aisling.Arthureul.ie](mailto:Aisling.Arthureul.ie)

**NANO TEMPER**

**SSPC**

### Microscale Thermophoresis Training



11-12 October, Dublin City University

- Learn about Microscale Thermophoresis (MST), a novel technology for quantitative analysis of biomolecular interactions, completely in solution, requires minimal sample and delivers results rapidly.
- Discuss your own projects with experts and discover how scientists in your area have implemented this technology in their research.
- Explore how you can advance your biomolecular interaction studies with a hands-on session.
- On request, you can also measure your own samples and develop expertise with this technique.

#### Who should attend?

Anyone interested in biomolecular interactions - maybe you've already been using SPR and are having difficulty optimizing the assay or the data is tricky to interpret?

We offer something completely different as MST is solution based and assay optimization is rapid.

MST also uses a fraction of the material required for iTC. The technology can work with any biomolecule as long as we can fluorescently label one binding partner.



**Oct.** Monolith Training with Nanotemper, Oct. 11-12th, Dublin City University.

**Nov.** Chemometrics with Norma Bargary, Professor of Data Science at the University of Limerick, Nov. 15th, Virtual.

## Second phase of Resin project launched at BPCI Conference



Pictured at the launch of the phase two Resin project, at the BioPharma Chemical Ireland (BPCI) conference were standing, **Aisling Arthur**, SSPC Industry Engagement Manager, **Prof. Sarah Hudson**, (seated), **Matt Moran**, Director, BPCI, **Dr Sarah Hayes**, SSPC COO, **Prof. Damien Thompson**, SSPC Director and **Prof. Philip Nolan**, Director General, Science Foundation Ireland (seated). [Full story here.](#)

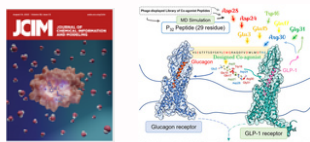
## SSPC15 Industry Champion Tom O'Ceallaigh, MSD



**Michael Napier** ex Janssen presenting the SSPC15 award to **Tom O'Ceallaigh**, MSD

**Tom O'Ceallaigh**, the Director Chemistry in Commercialisation, Development & Supply at MSD Ballydine, has been awarded the SSPC at 15 Industry Champion Award. Tom has played a key role in the Irish world of pharmaceutical research and development. His support to SSPC has been invaluable throughout our 15 years. [Full story here](#)

## PUBLICATION



### Computational Peptide Design Cotargeting Glucagon and Glucagon-like Peptide-1 Receptors

Shubham Vishnoi | Shayon Bhattacharya | Erica M. Walsh | Grace Illebare Okoh and Damien Thompson, in **Journal of Chemical Information and Modeling**.

