Sustainable bio-based chemicals production – towards a fossil free future

Dear Participants

It is a pleasure to welcome you to this one-day conference on **Sustainable bio-based chemicals production – towards a fossil free future.** The conference takes place on 8th November 2023 in Glasgow and is jointly organised by the Biochemical Engineering Special Interest Group (BESIG) within the Institution of Chemical Engineers (IChemE), and the Industrial Biotechnology Innovation Centre's (IBioIC) Scottish Fermentation network (SFN).

The majority of organic chemicals, nutraceuticals, fuels, and polymers are still derived from fossil-based feedstocks, predominantly oil and gas. Advances in molecular biology techniques and an increased awareness and understanding of many emerging microorganisms, engineering biology methods, and bio-based feedstocks, are now allowing scientists and engineers to rethink how the chemicals of the future are produced.

This one-day conference will bring together those with an interest in chemistry, biology, engineering and entrepreneurship, the key skills that will be needed to transition chemical production to biobased methods using bio-based feedstocks. We will welcome a range of speakers from universities and industry, covering a variety of sectors with a stake in this transition. As well as discussing how they are addressing technical challenges, speakers will also explore how to scale to production with support from several organisations that can offer support services from cell identification to engineering and de-risking scale-up.

We hope that you will enjoy the science, interact with our trade sponsors and extend your network.

On behalf of the organising committee,

James, Glenn, Neil, Luke, Alicja and Lorna

IBioIC

SFN Scottish Fermentation Network

IChemE Biochemical Engineering Subject Group

ORGANISING COMMITTEE

James Winterburn
University of Manchester

Glenn Robinson
Getinge

Neil Renault
IBioIC

Luke Johnston
University of Edinburgh

Alicja Zimmer
Getinge

Lorna Watt
IBioIC

EVENT SPONSORS

VENUE INFORMATION

The Technology and Innovation Centre (TIC), University of Strathclyde, 99 George Street, Glasgow, G1 1RD.

The Event will take place in the Executive Suite, Level 9.

Getting to the Venue

Rail

The closest railway stations are:

National Services

- Queen Street (0.4 miles), 8 minute walk (turn left on exiting the station)
- Glasgow Central (0.8 miles), 19 minute walk (turn right on exiting the station)

Local Services

- High Street (0.1 miles), 4 minute walk
- Argyle Street (0.5 miles), 12 minute walk

Subway

- Nearest stop is Buchanan Street- 8 minute walk away.

Bus

- Buchanan Bus Station is a 15 minute walk from the venue, with services throughout the UK.

Car

The venue does not have dedicated parking but there are numerous options nearby including Duke Street (capped at £5 for a full day) and NCP George Street and NCP Glasshouse, as well as on street paid parking.

Glasgow's LEZ

Please note Glasgow's Low Emission Zone (LEZ) is now in force. From 1 June all vehicles entering Glasgow's LEZ must meet the less-polluting emission standards or face a penalty charge. You can check your vehicle at https://www.lowemissionzones.scot/vehicle-registration-checker

Air

A direct bus connection (Glasgow Airport Express) will take you close to the venue (10 minute walk). Journey time is around 15-20 minutes into the centre of Glasgow and the single fare is £10 or £16 return. Please alight at the North Hanover Street stop.

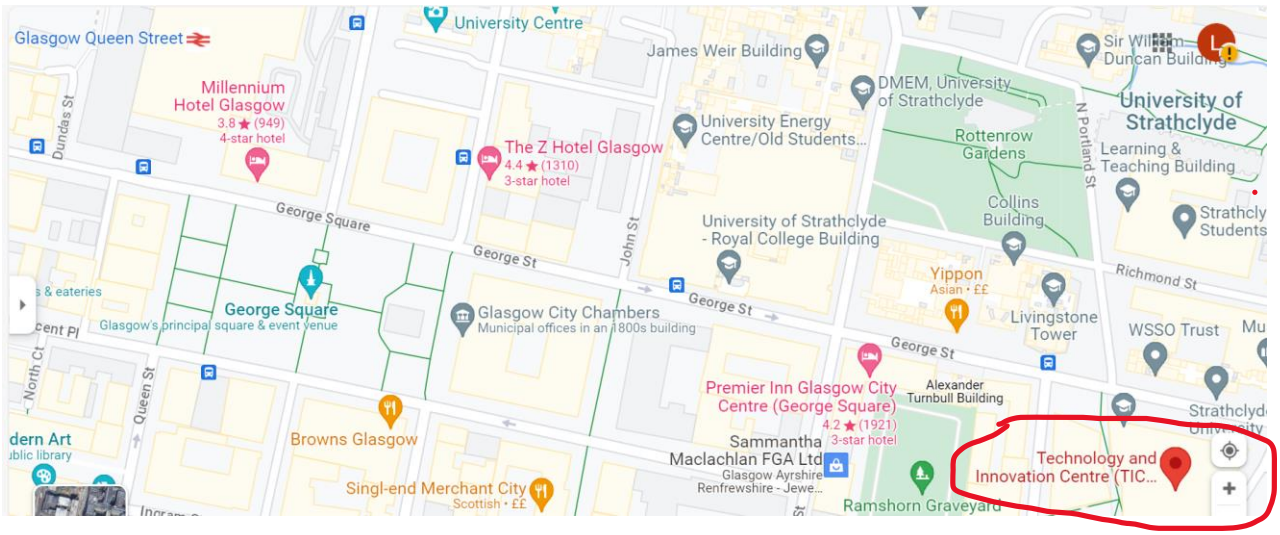
Bike

Secure bike racks are available around the perimeter of the Technology and Innovation Centre and across the Strathclyde Campus. Take a look at our Campus Map for more information on locations. People Make Glasgow Next Bikes are available to rent from as little as £1 for 30 minutes and e-bikes from £2 for 20 minutes. The closest Next Bike location is at 40 George Street, outside the Graham Hills Building. Find out more on the Next Bike website.

Taxi

Glasgow Taxis Tel- 0141 429 7070 https://www.glasgowtaxis.co.uk/contact/

Uber operate in Glasgow

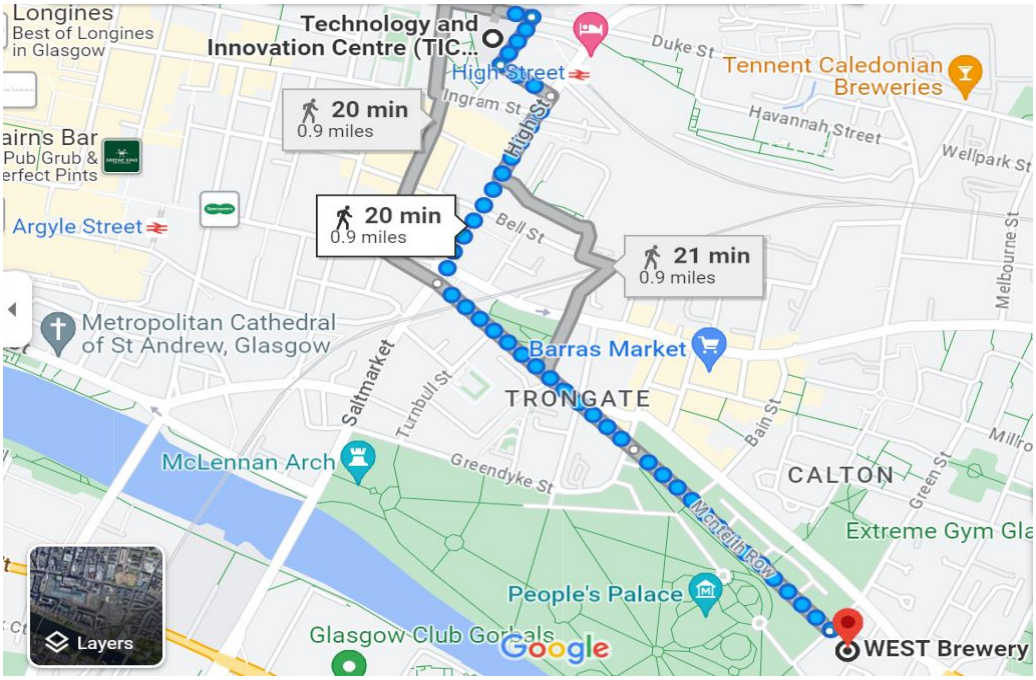


BREWERY INFORMATION

WEST Brewery, Templeton Building, Glasgow Green, G40 1AW

At the conclusion of the event, transport will be provided to take delegates to the optional social activity at WEST brewery. A one hour tutored tasting session will take place in the Hop Room, comprising four specially selected beers. There will be the option to stay on for an additional refreshment after the tasting finishes at around 5.30pm.

Please note that places for the tasting are strictly limited and allocated on a first come, first served basis. If you are attending the tasting session, we would advise you not to bring your car. Delegates will be required to make their own way home. There are bus services into the centre of town, which is a 15-minute walk away.



CONFERENCE PROGRAMME

10.30am	**Registration, Refreshments & Sponsor Displays**
11.00am	**Welcome & Introduction** Dr James Winterburn, Reader in Chemical Engineering, University of Manchester Albert Serrano Gomez, Senior Fermentation Scientist, IBioIC Caroline Kewney, Senior Business Engagement Manager, IBioIC
11.15am	**Session 1 - Keynote Address (Chair - Albert Serrano Gomez, IBioIC)** **Plastic Bio-Upcycling for Sustainable Synthesis** Dr Joanna Sadler, BBSRC Discovery Fellow, University of Edinburgh
11.55am	**Sponsor Address – GPE Scientific Ltd**
12.00pm	**Networking Lunch & Sponsor Displays**
13.00pm	**Session 2 – Early Career Researchers (Chair - Luke Johnston, University of Edinburgh** **Dark Autotrophs as an Alternative Protein** Gary Newton, PhD Student, University of Nottingham
13.15pm	**Keratinases: a combined colourimetric screen and fermentation scale up for the valorisation of wool** Rhona Cowan, PhD Student, University of Edinburgh
13.30pm	**Applying Optogenetics in Photosynthetic Bacteria for Sustainable Biochemical Production** Liam Forbes, PhD Student, University of Glasgow
13.45pm	**Networking Coffee Break & Sponsor Displays**
14.05pm	**Session 3 – Industry (Chair - Alicja Zimmer, Getinge)** **Researching towards a Sustainable Planet** Dr Ellis Robb, Team Leader- Fermentation, Ingenza
14.20pm	**Scale-Up Solutions for a Bright, Green Future** Dr Charlotte Green, Small-scale Fermentation Lead, Colorfix
14.35pm	**Harnessing the power of microbes to build a sustainable bioeconomy** Dr Edward Green, CEO, NCIMB
14.50pm	**Sponsor Address – Broadley James**
14.55pm	**Green Bioactives: expanding the potential of plant cell culture for the sustainable production of bio-based chemicals** Dr Samuel Casasola Zamora, Production Lead, Green Bioactives

15.10pm	**Addressing challenges in the scale-up of novel bio-based production methods** Dr Catherine Hill, Tech Transfer Associate, MiAlgae Ltd
15.25pm	**Event Round Up & Close** Dr James Winterburn, Reader in Chemical Engineering, University of Manchester
15.30pm	**Travel to Brewery (Optional tasting visit)**
17.30pm	**Brewery Tasting ends**

SPEAKER BIOGRAPHIES

Dr Joanna Sadler

University of Edinburgh

Joanna obtained a MSc in Chemistry from the University of Bristol in 2013 and a PhD in Biocatalysis and Organic Chemistry from GSK and the University of Strathclyde collaborative PhD programme in 2017. She has held postdoctoral positions at the Manchester Institute of Biotechnology and the University of St Andrews where she specialised in directed evolution and metabolic engineering. She moved to the University of Edinburgh in 2019 to take up a BBSRC Discovery Fellowship in the lab of Dr Stephen Wallace, where she developed new bio-based processes to degrade and upcycle waste plastic. In 2021, Joanna was awarded a Chancellor's Fellowship at the University of Edinburgh and established her own research group which focusses on developing novel biotechnological processes to upcycle waste feedstocks into useful chemicals. This includes enzyme discovery, pathway engineering and optimisation and developing novel enzyme display methods.

Harry Newton

University of Nottingham

Working alongside industrial partner Deep Branch at the University of Nottingham, Harry is researching the metabolism of *Cupriavidus necator*, a carbon fixing bacteria that can use hydrogen as its sole energy source. His work aims to optimise an established method of biologically capturing and upcycling CO_2 into food.

Using his background in chemical engineering, Harry looks to optimise process conditions in continuous fermenters to produce high value end products. In his talk Harry discusses proteomics, nutrient limitation and metabolic modelling with the aim of maximising yields of high value amino acids and metabolites within the protein rich biomass.

Rhona Cowan

University of Edinburgh

Rhona grew up in the southside of Glasgow. She completed her BSc(Hons) in Biochemistry and Pharmacology in 2017 at the University of Strathclyde. She then went onto obtain a first class MSc in Pharmaceutical Analysis, which included a dissertation on HPLC method development undertaken at Shimadzu UK (Milton Keynes), under the supervision of Prof. Mel Euerby. After a year in industry, Rhona joined the Campopiano group in September 2019. Her PhD is in collaboration with CelluComp and Prickly Thistle to investigate valorising polymers using biocatalysis.

Liam Forbes

University of Glasgow

Liam is a 4th year PhD student in the School of Molecular Biosciences at the University of Glasgow. His PhD is funded by the Industrial Biotechnology Innovation Centre (IBioIC) and the project industrial partner is Xanthella Ltd, who design and manufacture photobioreactors. Liam previously completed an MSc Industrial Biotechnology provided by IBioIC. His main interests are in synthetic biology, biotechnology and low-carbon fermentation.

Dr Ellis Robb

Ingenza

Ellis Robb obtained a PhD focused on the “Sustainable Manufacturing of Platform Chemicals” from the University of Strathclyde (Glasgow) in 2018. After completion of his PhD Ellis joined the fermentation team at Ingenza Ltd (2018- Current) where he has acquired further experience in bioprocess optimisation and development with a focus on projects spanning the human health and sustainability sectors. Now a Team Leader at Ingenza, Ellis has developed bioprocesses utilizing a diverse range of bacterial, yeast, fungal and mammalian hosts in batch, fed-batch and continuous fermentations to achieve customer targets.

Dr Charlotte Green

Colorfix

Charlotte has always been committed to using biology for sustainable solutions to everyday problems. She obtained a PhD at The University of Sheffield, utilising Synthetic Biology tools for type III protein secretion for therapeutics and industrial enzymes. Next she turned her hand to fermentation during a postdoc at The University of Nottingham, working with Mitsubishi Chemicals to produce bio-based plastics. Two years ago she moved to Colorifix to start the small-scale fermentation facility, where she now leads the growing team. Here, we take the first steps in translating our colourful strains from flask to 300 L proprietary Colorifix fermenters.

Dr Edward Green

NCIMB

Edward is a microbiologist with a PhD in Biochemical Engineering from the University of Manchester and over 25 years' experience with anaerobic bacteria. He has pioneered technical improvements in microbial strain engineering and fermentation process development for industrial biotechnology. Edward is also a serial biotech entrepreneur having founded Green Biologics in 2004, a world leading fermentation company manufacturing renewable chemicals. In 2014, Edward founded CHAIN Biotech, a microbiome Company developing live biotherapeutics with a focus on orally delivered anti-infective and anti-cancer vaccines. In 2022, Edward joined NCIMB Ltd., a Scottish biotech company providing microbiology services including the development and supply of microbes for a broad range of applications. Edward chairs the Engineering Biology Advisory Committee (Biotechnology Industry Association) and is a member of the Industrial Biotechnology Leadership.

Dr Samuel Casasola Zamora

Green Bioactives

Samuel is Green Bioactives' Production Lead. He is responsible for the scale-up strategy of cultured plant cells from laboratory-scale to commercial production. Samuel has over a decade of expertise in molecular biology and plant tissue culture and alongside experience in fermentation and biomanufacturing. Samuel has been part of the Green Bioactives journey from the very start and he is committed to expanding plant cell culture as a sustainable source of plant-derived ingredients.

Dr Catherine Hill

MiAlgae

Catherine currently works within MiAlgae's Engineering department, focusing on the scale up and implementation of R&D outcomes for their demonstrator site. Her background and previous experience is within chemical engineering and biotechnology, focusing on process improvement and the integration of novel developments for improved process sustainability.