Biotechnology Group Newsletter

Spring 2024

Formed in 1987 the Biotechnology Group furthers the interests of academic and industrial members of the RSC in the area of biotechnology.

This is primarily achieved through the organisation of conferences and courses promoting the advancement of knowledge of biotechnology and facilitating the networking of its members.

More information about the group and its activities can be found on the RSC website (www.rsc.org) by following the links to Members and Networks.

Or you can go direct to the Biotechnology Group page using the link below:

Biotechnology Group

Welcome

The RSC Biotechnology group has organised conferences and workshops for over 30 years on a wide range of topics including biotransformation, formulation and analysis for biotherapeutics, systems biology, biotherapeutic approaches to neurological disorders, glycotechnology, combating antibiotic resistance, natural products as leads for drugs and agrochemicals, freeze-drying, and biodiversity.

So that we can best tailor our future conferences for our membership, it is important for us to keep in touch with you and hear about your interests and needs. Please let us know your thoughts by email to our secretary Dr Colin Bedford (c.t.bedford@talktalk.net).

Please see details below on how to become a member of the committee.

The conferences organized already for 2024/25 promise to be very exciting and we look forward to meeting you at some of these. Paul Race (Chairman)

Call for new Committee Members

We are actively seeking individuals from both industry and academia who are interested in joining the RSC Biotechnology Group Committee. (Current members are listed below.)

We meet three times a year at Burlington House, usually in January, June and October.

We are currently under-represented in food chemistry, biomaterials, and cell and gene therapies (CGTs), and also in areas such as the chemistry important to vaccines, targeted drug delivery, and tissue engineering.

Committee members play an active role in organising conferences, as well as enthusiastically pursuing RSC's policy on biotechnology, and we would welcome new members with the passion, energy and drive to keep the ball rolling in terms of delivering an agenda that sustains Biotechnology for RSC members. Maybe this could be a development opportunity for yourself, a colleague or for a member of your staff!

Please contact by email our secretary Dr Colin Bedford (c.t.bedford@talktalk.net).

Member News

Felix Franks Biotechnology Medal – 2019/2024

In the 2019 Newsletter, one of us (SH) as Chair of the Felix Franks Biotechnology Awards Committee described the inception and launch of the Felix Franks Biotechnology Medal. The award was set up by the RSC's Biotechnology Group to recognise outstanding achievement in the field of Chemical Biotechnology by Early Career Scientists, and in commemoration of Professor Felix Franks (1926-2016), distinguished former Chair of the Biotechnology Group, and is a result of the generosity of his family who have agreed to provide the medals.

Covid delayed the issue of a Newsletter, but here in the 2024 Newsletter we report the names of the winners of the six medals awarded in the period 2019 to 2024. Full details of the achievements of each is available on the Biotechnology Group's website, but here we provide a pen portrait of the winners in chronological order.

Winners

Felix Franks Biotechnology Medal – 2019 Winner

The recipient of the inaugural 2019 RSC Felix Franks Biotechnology Medal was **Professor Zhen Gu of the Department of Chemistry, Zhejiang University.**

Zhen Gu's key contribution is that he pioneered "programmed medications" that apply physiological signals-responsive materials/systems for precisely delivering therapeutics, especially for diabetes and cancer treatment.

Zhen Gu with Vice Chancellor Zhou and Professor Gao. The screen shows some of the on-line participants from the RSC Biotechnology Group, the University of Nottingham and members of the Franks family. Picture: Xu Xiao, Zhejiang University

On 15 January 2021 Zhen Gu received the award of the 2019 RSC Felix Franks Biotechnology Medal from the Vice Chancellor of Zhejiang University, Professor Tianhua Zhou, on behalf of the RSC Biotechnology Group. This was the inaugural (2019) award, delayed due to the Covid pandemic.

The award ceremony was broadcast live on Microsoft Teams and included an introduction by Prof Stephen Harding, Chair of the Award Committee, a short presentation by Prof Gu, and was concluded by Prof Harding, Prof Suzanne Franks and Professor Jianqing Gao, Vice Dean of the College of Pharmaceutical Sciences. You can watch the event here:

A recording of the lecture is available on https://www.youtube.com/watch?v=4s9C3IMiKlw&list=PLN1ANYZrllJ1zB5LkN8PHYL41kmTrE6JN&index=1

Felix Franks Biotechnology Medal – 2020 Winner

The recipient of the 2021 RSC Felix Franks Biotechnology Medal was **Dr Jenny Zhang of the Department of Chemistry, University of Cambridge.**

Jenny, a BBSRC David Phillips Fellow, has been a key player in the advancement of bio-photoelectrochemistry which focusses on the 'wiring' of natural photosynthetic components to electrodes and forms the foundation of emerging sustainability-driven biotechnologies such as (photo)microbial fuel cells (biophotovoltaics) and semi-artificial photosynthesis devices for solar power/fuel generation.

Winner of the 2020 Felix Franks Biotechnology Medal Dr. Jenny Zhang of the Department of Chemistry, University of Cambridge Picture: Dr. Jenny Zhang

Jenny was presented with the award on 28 July 2021 at the (on-line) RSC International Solar Fuels Conference by Professor Steve Harding, Chair of the Award Committee immediately before Jenny's Keynote lecture *Photosynthesis on an electrode.*

A recording of the lecture is available on https://www.youtube.com/watch?v=rqshQYKh65w&list=PLN1ANYZrllJ1zB5LkN8PHYL41kmTrE6JN&index=2

Felix Franks Biotechnology Medal – 2021 Winner

The recipient of the 2021 RSC Felix Franks Biotechnology Medal was **Dr Yuval Elani of the Chemical Engineering Department, Imperial College London.**

Yuval, a UKRI Future Leaders Fellow, has been a pioneer in the development and advancement of "bottom-up" synthetic biology, a step-change from traditional efforts, which have focused on the top-down modification of living cells. Yuval's approach has been to develop a series of technologies that allow synthetic cells to be constructed from scratch using biomolecular building blocks.

Winner of the 2021 Felix Franks Biotechnology Medal: Dr Yuval Elani of the Chemical Engineering Department, Imperial College London Picture: Imperial College London

Yuval was presented with his award by Professor Steve Harding, Chair of the Award Committee after his lecture at the RSC MIBIO2022 meeting held at Downing College, Cambridge on 19 October 2022. View details about MIBIO 2022.

Felix Franks Biotechnology Medal – 2022 Winner

The recipient of the 2022 RSC Felix Franks Biotechnology Medal was **Dr Holly Reeve, of HydRegen Ltd., Oxford**.

Holly received the award for her outstanding work in establishing a highly innovative approach – now patented – to decarbonising biocatalysis that addresses many of the requirements for net-zero manufacturing, taking it forward from proof-of-concept to commercialisation.

Holly was presented with the award by Professor Paul Race, Chair of the RSC Biotechnology Group Committee after her lecture *Biocatalytic hydrogenation: robust biotechnologies for sustainable chemical manufacturing* at the RSC Biotechnology Group meeting "Biotransformations II" held at Burlington House on Friday 24 March 2023.

Winner of the 2022 Felix Franks Biotechnology Medal: Dr Holly Reeve of HydRegen Limited, Oxford Picture: HydRegen Limited, Oxford

A recording of the lecture is available on https://www.youtube.com/watch?v=hP4c8Okkd7Q&list=PLN1ANYZrllJ1zB5LkN8PHYL41kmTrE6JN&index=3

Felix Franks Biotechnology Medal – 2023 Winner

The recipient of the 2023 RSC Felix Franks Biotechnology Medal was **Dr Maria Chiara Arno, of the School of Chemistry, University of Birmingham**.

Maria Chiara received the award for her outstanding contributions in advancing the understanding of material-cell interactions.

Winner of the 2023 Felix Franks Biotechnology Medal: Dr Maria Chiara Arno of the School of Chemistry, University of Birmingham

Maria was presented with the award at the RSC MIBIO2023 Meeting by Professor Steve Harding, Chair of the Award Committee after her lecture *Stability of Biopharmaceuticals: from molecular interactions to successful products* held on 18 October 2023 at Downing College Cambridge.

A recording of the lecture is available on https://www.youtube.com/watch?v=1GlHfO5lsII

Felix Franks Biotechnology Medal – 2024 Winner

The recipient of the 2024 Felix Franks Biotechnology Medal is **Dr Matthew Jenner, of the Department of Chemistry, University of Warwick.**

Matt Jenner receives the award for his internationally leading research into the discovery and biosynthesis of natural products through application of innovative mass spectrometry-based approaches.

Winner of the 2024 Felix Franks Biotechnology Medal: Dr Matthew Jenner of the Department of Chemistry, University of Warwick

Matt Jenner will be presented with the award at the RSC Directing Biosynthesis VII Meeting at the University of Birmingham 1-3 July 2024.

Prof Steve Harding, Chairman RSC Felix Franks Biotechnology Medal Committee

Dr Colin Bedford, Hon. Sec, Biotechnology Group

24 May 2024

Forthcoming Events

Forthcoming events being organised by the Biotechnology Group in 2024/25 are:

Formulation and Analysis for Biotherapeutics, December 2024, RSC Chemistry Centre, Burlington House, London

Protein Misfolding, April 2025, RSC Chemistry Centre, Burlington House, London

Biotherapeutic Approaches to Neurological Disorders III, December 2025, RSC Chemistry Centre, Burlington House, London

Chemical Tools in Systems Biology IV, 2025, RSC Chemistry Centre, Burlington House, London

Microtechnologies for Diagnostics & Therapeutics, 2025, RSC Chemistry Centre, Burlington House, London

Bioengineering of polymers for archaeological conservation, 2025, RSC Chemistry Centre, Burlington House, London

Combating Antibiotic Resistance (CAR II), 2025, RSC Chemistry Centre, Burlington House, London

Recent Events & Proceedings

The following conferences were organised recently by the Biotechnology Group. Reports are available for many of them on the *Biotechnology Group* website.

Biotechnology for the environment, 17 September 2021, RSC Chemistry Centre, Burlington House, London

Advances in isotope ratio and related analyses for mapping migrations from prehistory to the Viking Age, *** 13 Jun 2022, RSC Chemistry Centre, Burlington House, London

*Biotransformations: From Science to Industrial Application II,*** 24 March 2023, RSC Chemistry Centre, Burlington House, London

*** Conference Report below

Conference Reports

Advances in Isotope Ratio and related analyses for mapping migrations from Prehistory to the Viking Age
13 June 2022, London, United Kingdom

A one-day Discussion meeting was held at Burlington House on 13 June 2022 jointly by the RSC Biotechnology Group and the Society of Antiquaries. The meeting was held in honour of J.D. Bu'Lock (1928–1996), who was both founding Chairman of the RSC Biotechnology Group and a distinguished Viking Age antiquarian and Fellow of the Society of Antiquaries.

It was organised by Stephen Harding and Chas Jones (RSC) and Mark Pearce (Antiquaries Society) and was the first "hybrid" meeting run by the Group directly after the Covid pandemic with ~ 50 attendees.

Recent advances in analytical methods, in particular solid state mass spectroscopic analysis, have increased the potential of stable isotope ratio of biological (using principally carbon, oxygen, nitrogen and strontium isotopes) and non-biological (glass/metal) analysis, using principally strontium and lead isotopes. The meeting helped catalyse the establishment of international isotope ratio geo-databases of high resolution data (such as the lead isotope database GlobaLID and similar to the highly successful protein data bank in molecular biology) which when sufficiently populated will ultimately allow the resolution of important questions regarding diet, historical movements, trade routes - and the provenance or origins of people and objects.

The meeting was opened by Prof Martin Millett (President of the Council, Society of Antiquaries) & Prof **Stephen Harding** (Royal Society of Chemistry) and was the first time the two Burlington House "Courtyard" Societies had held a joint meeting together. Both praised the work of Dr John Bu'Lock contrasting the contributions he had made to Chemical Biotechnology and Antiquaries (Viking Artefacts of NW England) before looking forward to the programme of presentations which followed.

In ***Session I: Advances in Instrumentation & the need to create extensive isotope databases*** (Chair: Mark Pearce) the presenters and their titles were: **Jane Evans** (British Geological Survey, Notts UK), *All models are wrong, but some are useful. Construction and use of spatially distributed multi isotope datasets*; **Till Sonnemann** (Otto-Friedrich-Universität Bamberg), *Isotopes, Isoscapes, and the Search for Geographic Origins: unrealized potential or unrealistic expectations?*; **Yiu-Kang Hsu** (Deutsches Bergbau-Museum Bochum), *GlobaLID: a FAIR lead isotope database and* **Mark Jobling** (School of Genetics, University of Leicester), *Past human population migrations: lessons from genomes, ancient and modern.*

In ***Session II: Geo-distribution data and databanks for stable isotopes*** (Chair: Gilberto Artioli) the presenters and their titles were: **Liz Bailey** (University of Nottingham), *The merits of quadrupole-based mass spectrometers for isotope analysis*; **Janet Montgomery** *(*University of Durham*), Diet, migration and isotopes;* **Julian Henderson** (University of Nottingham), *Neodymium, strontium and boron isotopes in ancient glasses: new information about raw material use and provenance*

and **Stephen Merkel** (Vrije Universiteit Amsterdam & University of Oxford), *Application of lead isotope and elemental modelling in reconstructing long-distance trade of Viking-period silver.*

In Session III (Chair: Patrick Degryse), the presenters and their titles were: **Gilberto Artioli** (University of Padua), *A geologically based database of lead isotopes: updates and applications* ; **Daniel Berger** (Curt-Engelhorn-Zentrum Archäometrie GmbH, Mannheim), *Applications of stable isotopes in archaeometallurgical research with special reference to tin isotopes; and* **Jean Milot** (ENS de Lyon & Université de Toulouse), *Provenance study of Roman iron artefacts using Fe isotopes* . These talks were followed by *Concluding Remarks & Overall Discussion*, presented and chaired by **Patrick Degryse** (KU Leuven/ Leiden University)
There was a session of short talks and posters presented by: 1. Madeline Bleasdale and colleagues from the University of York, *Reconstructing cross-channel connectivity in later prehistoric Kent using a DNA and isotope analysis* ; 2. Jean Milot and colleagues at the University of Toulouse, *Ag isotope and volatile trace element analyses of galena samples from Spain: new insights into silver sources of Roman coinage*; 3. Bryony Rogers (with G. Nowell, J. Montogomery and V. Rajkovca at the University of Durham), *High-resolution strontium analysis of bronze age cattle from Cambridge*; 4. Chas Jones (from the Fulford Battlefield Society, York), *The potential, possibilities and problems of provenancing early battlefield iron debris* and 5. Michelle Cutajar with S. Harding, M. Pearce, J. Evans, C. Jones, D. Wagner, V. Pashley and P. Halkon on *Combining isotope ratios for provenancing Viking Age iron artefacts in the British Isles: a pilot study*.
The J.D. Bu'Lock poster prize was awarded jointly to Madeline Bleasdale, Bryony Rogers and Jean Milot.

Two peer-reviewed papers were published as a direct consequence of the meeting, both published in *RSC Advances:*

1. Harding SE, Jones C, Evans J, Milot J, Cutajar M, Bailey E, Pashley V, Wagner D, Halkon P (2023) Combining isotope ratios for provenancing Viking Age iron artefacts in the British Isles: a pilot study. *RSC Advances* **13**, 31292-31302 https://doi.org/10.1039/D3RA06367D

2. De Ceuster S, Machaira D, Degrysse P (2023) Lead isotope analysis for provenancing ancient materials: a comparison of approaches. *RSC Advances* **13**, 19595-19606 https://doi.org/10.1039/D3RA02763E

and the full proceedings of the meeting recorded on:
https://www.youtube.com/watch?v=tCwbU9RJzI8&list=PLN1ANYZrllJ0uQ_dya-elo6FM8hvxAzrt&index=1 (Part 1) and
https://www.youtube.com/watch?v=3J0zW7DATjM&list=PLN1ANYZrllJ0uQ_dya-elo6FM8hvxAzrt&index=2 (Part 2)

The great help of staff of the RSC at Burlington House and also Michelle Cutajar (NCMH, University of Nottingham) and Dr Barbara Boligiano (NIBSC, Potters Bar) was greatly appreciated.

Stephen Harding, NCMH, University of Nottingham & RSC Biotechnology Group
21 September 2022

RSC Biotransformations II: From Science to Industrial Application

24th March 2023

RSC Burlington House, Piccadilly, London, UK.

This one-day Meeting, held at the RSC Burlington House, featured nine international and national speakers, including three early career speakers (from the Universities of Portsmouth and Keele and Astra Zeneca) chosen from submitted abstracts. The total attendance, a mix of Academia and Industry, was 72 and from. The delegates clearly enjoyed the Conference, since there were lively Question and Answer Sessions after most of the lectures and the informal feed-back to the Conference Committee on the day was excellent. The range of speakers was particularly noted by delegates as this covered a fully multidisciplinary range of topics from industrial examples in practice, commercial and economic drivers, emerging advances in biocatalysis, enzyme discovery, bioreactor design, enzyme engineering, metabolic engineering, and natural product biosynthesis.

The keynote speaker was Prof Donald Hilvert (ETH Zurich) who described *High-throughput engineering of biosynthetic assembly lines*.

The meeting closed with a Plenary presentation from the ***RSC 2022 Felix Franks Biotechnology Medal*** awardee, Dr Holly Reeve (CEO HydRegen Ltd, Oxford, UK), who, after being presented with her medal by Professor Paul Race, gave her lecture entitled: *Biocatalytic hydrogenation: robust biotechnologies for sustainable chemical manufacturing*.

The poster & lunch buffet session provided an excellent opportunity for lively networking, with a total of 16 poster presentations. The winner of the poster prize was Qingyun Tang (University of York) for her outstanding poster on *Study and Application of A Novel Amide Bond Synthetase*.

The Names of the Speakers and the Titles of their presentations are listed in the attached Programme.

We thank the RSC Burlington House for their hospitality. The Organisers wish to thank the speakers and helpers on the day for ensuring the smooth running of a scientifically exciting conference. The sponsorship of £1000 from BioCatNet was used towards the travel and accommodation expenses of our speakers.

Organisers

Prof Paul A. Dalby (Chair) (University College London: p.dalby@ucl.ac.uk), Prof Paul Race (University of Bristol), Dr Stephen Wrigley (Hypha Discovery Ltd), and Dr. Colin Bedford (University College London), under the auspices of the Royal Society of Chemistry Biotechnology Interest Group.

The Biotechnology Group is the focal point within the RSC for members who have an academic or industrial interest in the chemical aspects of biotechnology.

P Dalby, 25 March 2023

PROGRAMME

09.30 Coffee & Registration.

10.00 **Opening Remarks, Paul Dalby**

Session I: ***New advances in biocatalysis and biotransformation***. (Chair: **Paul Dalby)**
10.10 **Don Hilvert**: ETH Zurich
High-throughput engineering of biosynthetic assembly lines

10.45 **Ross Anderson**: University of Bristol
De novo proteins as blueprints for efficient enzymes and photocatalysts

11.20 **Sarah Barry**: Kings College London
New Chemistry Inspired by Natural Product Biosynthesis

11.55 **Liliana Oliveira**: Centre for Enzyme Innovation, University of Portsmouth
Investigating the emergence of poly(ethylene) terephyhalate depolymerase activity through design and bioinformatics

12.15 **Sebastian Cosgrove**: Keele University
Adventures with oxidases and continuous flow biocatalysis

12.35 Lunch & Poster Session.

Session II: ***Industrial and academic perspectives***. (Chair: **Paul Race)**
13.40 **Katja Zorn**: Astra Zeneca
Emerging biocatalytic transformations in early drug discovery

14.15 **Gideon Grogan**: University of York
Unspecific Peroxygenases: Expression, Application and Catalytic Promiscuity

14.50 **Helen Hailes**: UCL
Enzymatic single-step reactions and the construction of biocatalytic cascades

15.25 Tea, Posters & Networking.

Session III: Award Lecture (Chair: **Paul Race)**

16.00 ***RSC 2022 Felix Franks Biotechnology Medal Lecture***
Holly Reeve: CEO HydRegen Ltd, Oxford, UK
Biocatalytic hydrogenation: robust biotechnologies for sustainable chemical manufacturing

16.50 **Closing Remarks - Paul Dalby**

Posters

A list of the titles of 16 poster presentations followed by 16 individual abstracts are available on the Group's website.

Committee Members

The membership of the present Committee is:

Chairman Professor Paul R Race (*University of Newcastle*)

Hon. Secretary Dr Colin T Bedford (*University College London*)

Hon. Treasurer Dr Steven G Burston (*University of Bristol*)

Members of Committee

Professor Tony Cass (*Imperial College London)*
Dr Michael Chen (*University of Edinburgh*)
Dr Sarah Cleary (*HydRegen Ltd., Oxford*)
Professor Paul Dalby (*University College London*)
Dr Yuval Elani (*Imperial College London)*
Professor Stephen Harding (*University of Nottingham*)
Dr Francis Lister (*Science Creates, Bristol*)
Dr Klaus Rumpel *(Boehringer-Ingelheim, Vienna)*
Dr Jenny Zhang (*University of Cambridge*)

Contact Information

Dr Colin T Bedford DSc CSci CChem FRSC
Honorary Secretary
Emeritus Research Fellow
Department of Chemistry,
University College London,
20 Gordon Street,
London WC1H 0AJ, UK

Tel: +44 (0) 7815 659 651
Email: colin.t.bedford@talktalk.net