



Opportunities and Challenges in Industrial Scale Biomanufacturing

18–19 October 2010, Edinburgh,
Scotland, UK

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IB-2025 the recent report by the UK's Industrial Biotechnology Innovation and Growth Team led by IChemE Past President, Ian Shott, examined the state of the industrial biotechnology sector within the UK and elsewhere. A number of scenarios for growth in the sector through to 2025 were examined. **The report concludes that the use of biotechnology to produce speciality and fine chemical is likely to grow under all plausible scenarios.** Conversely, the growth of commodities, platform chemicals and biofuels will be heavily dependent on a mix of drivers and regulations and will be capital intensive.

Chemical engineering stands on the brink of a major opportunity that can be likened to the expansion in petroleum processing in the early part of the 20th Century. The chemical engineering skill set is ideally suited to the needs of the fine and speciality chemicals IB sector. Engineers and scientist working in the area of fine and speciality chemicals could find themselves seriously disadvantaged if they do not keep up to date with the latest developments in IB. The technology and innovation on the agenda at *Opportunities and Challenges in Industrial Scale Biomanufacturing* will also be of relevance to those involved in the production of biofuels from new raw materials and bulk chemicals.

Opportunities and Challenges in Industrial Scale Biomanufacturing will focus on the production of fine and speciality chemicals using industrial biotechnology (IB) via dedicated single-compound production processes. The conference will examine industrial scale manufacturing of relevance to process engineers and scientist working in the sector; it will also provide a valuable introduction to IB for those who are not yet familiar with the subject.

This aspect of IB is growing for several reasons, not least the need to find alternative and more sustainable sources of raw materials. These new raw materials will demand new processes. Another major driver is the fact many of the products simply cannot be made by conventional chemical means.

The importance of IB via dedicated single compound processes is growing rapidly in the area of biopharmaceuticals. Around a third of the new products in the R&D pipeline at UK based pharmaceutical companies' are biologically derived. Other European nations report similar figures and the proportion is even greater in the US. Global 'big' pharma players are actively buying out smaller companies with strong IP in the area IB innovation in



order to gain access to this new market. As the classic chemical route to new products declines or migrates to lower cost economies it is clear that the UK and Western Europe must follow the US into IB if they are to maintain a competitive position.

Opportunities and Challenges in Industrial Scale Biomufacturing will form a key part of Edinburgh's Industrial Biotechnology Week, which sees a number of major bioprocess meetings in the city. Other meetings include the Bioscience KTN Annual meeting and the European Forum for Industrial Biotechnology 2010 (www.efibforum.com), which opens on Wednesday 20 November. The proximity of these events presents an excellent networking opportunity.

Opportunities and Challenges in Industrial Scale Biomufacturing is specifically relevant to all those working in the field both in Europe and the US and indeed anywhere where industrial biotechnology is being used to produce fine and speciality products via dedicated single-compound processes.

Conference Topics & Themes

Opportunities and Challenges in Industrial Scale Biomufacturing will examine three important aspects of fine and speciality products manufacture via IB routes:

With more than 25 companies active in the field in the UK alone, **Biopharmaceuticals** is by far the most active area of the application of IB and the first day of the conference will be dedicated to this topic. IChemE has invited a stimulating range of eminent speakers who will present on a range of subjects including disposable systems, downstream processing, scale up, room classification and vaccine manufacture.

The second day will focus on some of the broader aspects of **21st Century Industrial Biotechnology** with contributions from industry speakers on subjects including large scale enzyme production and advanced fermentation biotechnology.

The third topic on the agenda is the role of **Industrial Biotechnology in Regenerative Medicine**. This area has grown substantially over the last decade and whilst the prospect of growing back a severed limb remains in the realm of science fiction, much progress has been made since the development of bone marrow transplantation in the 1950s. Presentations will include an assessment of the challenges that lie ahead and the automation of stem cell bioprocessing.

Opportunities and Challenges in Industrial Scale Biomufacturing will feature invited speakers specifically chosen by IChemE for their knowledge in an area of industrial scale bio-manufacturing.

Keynote Speakers and Session Chairs



Ian Shott CBE FREng FICHEME



Peter Nieuwenhuizen

Ian Shott CBE FREng FICHEME

Reporting to the Secretary of State for Trade and Industry, Shott chaired the UK's Industrial Biotechnology Innovation and Growth Team. Shott was CEO of Excelsyn plc prior to its acquisition by AMRI for \$19 million in February 2010. IChemE's immediate past president; Shott now provides consultancy advice to global manufacturing companies. He will offer a high level view on routes to a modern Bioeconomy.

Peter Nieuwenhuizen

Nieuwenhuizen is a Principal Director with the global management consultancy, Arthur D. Little. Nieuwenhuizen will argue that fermentation and biocatalysis offer attractive possibilities as routes to biochemicals.

The sessions at *Opportunities and Challenges in Industrial Scale Biomufacturing* will be chaired by leading figures from industry and from IChemE's international network of technical subject groups

Who Should Attend?

Opportunities and Challenges in Industrial Scale Biomufacturing will appeal to engineers and scientist who are active in the broad field of industrial biotechnology, as well as those who wish to learn more about the opportunities in this exciting growth area.

This will include those involved processes, equipment, business development etc. in the following areas:

- Research
- Development
- Operations
- Design
- Commissioning and Validation
- Contracting
- Consultancy

Abstracts for Posters

Abstracts for posters (250 words) are invited from prospective contributors with a view to promoting better understanding of bioengineering and its application at the industrial scale. Abstracts can be submitted at:

www.icheme.org/industrialscalebiomanufacturing2010

There will be special discounted registration for one attendee per accepted poster, who will be expected to be in attendance at the poster display during normal viewing times.

For up to date details see:

www.icheme.org/industrialscalebiomanufacturing2010

Registration Fees

£325 + VAT	ICChemE Member Rate
£375 + VAT	Non- Member Rate
£250 + VAT	Full Time Student rate (Proof of Status required)

Fees include attendance at the conference sessions on 18 and 19 October 2010, all documentation, lunch and all interval refreshments for both days and the closing drinks reception on 19 October.

VAT will be charged at the current UK rate of 17.5%

A VAT invoice will be issued upon receipt of payment.

Exhibition Area and Poster Presentation

An exhibition area will be dedicated to companies and organisations wishing to showcase products and services in the area of industrial biotechnology. The catering, exhibition and poster display areas will be organised to ensure good opportunities for networking between the delegates, exhibitors and poster presenters. Potential exhibitors and sponsors are invited to contact the Conference Manager, Mrs. Rosemary Cragg on [+44 \(0\) 1788 578214](tel:+44201788578214) or via email at rcragg@icheme.org

ICChemE Conferences

ICChemE has a well established track record as an organiser of technical conferences for the chemical, biochemical and process engineering community. ICChemE conferences appeal to those from the manufacturing industry, research and development, financial and insurance industries, design contractors, consultants and academia.

Keep up to date with the latest information on this conference by visiting the conference website:

www.icheme.org/industrialscalebiomanufacturing2010



The Venue

The venue for the conference will be the John McIntyre Conference Centre, Pollock Hall Campus, Holyrood Park Road, Edinburgh.

The conference centre is close to the historic centre of Edinburgh and backs onto Holyrood Park a large wild open space in the centre of the city that includes Arthur's Seat. Close by are the royal palace of Holyrood and the historic castle perched on a crag above the city. Also nearby is Princes Street with its landscape gardens, shops and art galleries.

For a capital city, Edinburgh is a surprisingly green place and, even in the heart, you are never far from wide open spaces where you can take in amazing views, have a picnic, or just relax.

Accommodation is available close to the conference venue and there is a vast array of places to eat with many offering seasonal, locally sourced produce.

How to get to Edinburgh and the venue

By air: Edinburgh Airport is Scotland's capital airport. More than 40 airlines serve 100-plus destinations

On arriving at Edinburgh airport, either catch a bus or taxi to the city centre:

Buses: Airlink 100, this express bus service runs every 10 minutes from the airport to Waverley Bridge (near Princes Street and the main rail and bus stations).

Buy tickets at the airport information desk, at the bus stop, from the driver

Service 35, this Lothian Bus service runs to the city centre and on to Ocean Terminal, with stops including RBS World Headquarters, the Scottish Parliament and the Palace of Holyroodhouse. Buses run every 15 minutes Monday

to Saturday daytime and every 30 minutes evenings and Sundays.

Taxis: There are separate taxi ranks for private airport taxis and for city "black cabs" outside the east (UK Arrivals) end of the terminal building.

A third rank is available for advance-booked taxis on the ground floor of the multi-storey car park, directly opposite the terminal.

A journey to the city centre typically takes about 25 minutes. Many taxis are wheelchair accessible.

By train

Edinburgh's principal railway terminus is Waverly Station, less than 15 minutes walk from the University. A taxi to the University will cost around £6. Trains from the West Coast or from Glasgow will also stop at Haymarket station, at the west end of Princes St. GNER trains travel up the east coast line. www.gner.co.uk, 08457 225 225 tickets or 08457 484 950 for enquiries. For details on timetables, see www.networkrail.co.uk or telephone 08457 484 950.

By coach/bus

Coaches arrive in St Andrews Square located almost directly across Princes St from the Waverley Train Station. St Andrews Square is a 20 minute walk from the University. Buses travelling past Pollock Halls (stopping at the Royal Commonwealth Pool) include 30, 33, 2, 14 and 86.

There are frequent services from London Victoria Bus Station to Edinburgh. Further information can be obtained from www.nationalexpress.com or telephone 08705 808 080.

By car

Parking at Pollock Halls is free and is allocated on a first come first served basis.



Programme

Provisional programme at a glance

Monday 18 October 2010

- 09:30** Registration
(Refreshments available)
- 10:30** Introductions and Welcome Remarks
Chair: Eur Ing Keith Plumb,
Chair, IChemE Pharma Subject Group
- 10:45** Keynote Speaker
Building a Modern Bioeconomy
Ian Shott CBE FREng FIChemE
Chair, UK Industrial Biotechnology
Leadership Forum

Session 1: Latest developments in biopharmaceutical manufacturing

- 11:30** *An optimization and comparison of
four single-use systems for monoclonal
antibody production*
Frederic Van Tilborgh,
Senior Process Engineer,
Glenmark Pharmaceutical S.A.,
Switzerland
- 12:00** *Sequential multi-column chromatography*
Chris Davis, Biotechnology Specialist,
Jacobs Engineering, UK
- 12:30** Lunch Break
(Buffet lunch available in the exhibition area)

Session 1 (continued): Latest developments in biopharmaceutical manufacturing

- Chair: Dr. Stuart Stocks,**
Fermentation Technology Specialist,
Novozymes A/S, Denmark
- 13:30** *Bioprocess knowledge management -
reducing costs with increased speed and
flexibility through integrated process
development & manufacturing*
Andrew Sinclair,
Managing Director,
Biopharm Services, UK
- 14:00** *Room classification for efficient
bio-manufacturing*
Dr. Vaughan Thomas,
Technical Director at SciTech
Engineering, UK
- 14:30** *A performance assessment of currently
available disposable mixing systems*
Eur Ing Keith Plumb,
Director, Integral Pharma Services, UK
- 15:00** Break
(Tea & Coffee available in the exhibition area)
- 15:30** *Process simplification and risk reduction in
aseptic process via single use filling systems*
Guy Matthews,
Senior Applications Specialist, Millipore, UK
- 16:00** *A comparison of vaccine
manufacturing techniques*
Austin Locke,
Pharmaceutical Specialist
Ian Dacey,
Biotechnology Specialist,
PM Project Services Ltd., UK
- 16:30** Concluding remarks and session close out

Tuesday 19 October 2010

08:30 Registration
(Refreshments available)

09:15 Opening remarks
Chair: Nigel Perry,
CEO, Centre for Process Innovation UK

09:25 Keynote Speaker
*Fertile grounds for biochemicals derived
through fermentation and biocatalysis*
Peter Nieuwenhuizen,
Principal, Arthur D. Little, NL

Session 2 : Industrial biotechnology for the 21st Century

10:00 *Transforming specialty chemicals with
biotechnology*
Kristian Wadrop,
Chief Operating Officer, Green Biologics, UK

10:40 Break
(Tea & Coffee available in the exhibition area)

11:10 *Large scale enzyme production with food,
feed, and technical applications*
Stuart Stocks,
Fermentation Technology Specialist,
Novozymes A/S, Denmark

11:40 *Cost efficient and practical industrial scale
biotechnology*
Dr. Ian Archer,
Head of Process Development, Ingenza, UK

12:10 *Biotechnology at Croda: New opportunities
and future perspectives*
Dr. Robin Mitra,
Biotechnology Manager,
Croda International plc

12:40 Lunch Break
(Buffet lunch in Exhibition Area)

Session 3 : The role of IB in regenerative medicine

Chair: Prof Chris. Hewitt,
Chair, IChemE Biochemical engineering
Subject Group

13:40 *Bioprocessing challenges for regenerative
medicines*
Dr. Farlan Veraitch,
Department of Biochemical Engineering,
University College London, UK

14:20 *Automation of Stem Cell Bioprocessing*
Dr Rob Thomas,
Centre for Biological Engineering,
Loughborough University, UK

15:00 Panel Discussion
*Lessons learned and next steps
– chemical engineers and the IB revolution;
where do we go from here?*

16:00 Concluding remarks and conference close

17:00 Reception

The conference will conclude with a VIP Reception with senior figures from the various events being hosted during the Edinburgh Biotech Week in attendance. All delegates attending *Opportunities and Challenges* in Industrial Biotechnology will receive an invitation.

The above technical programme may be subject to change.

Registration Form

Opportunities and Challenges in Industrial Scale Biomanufacturing

Conferences & Events Department, IChemE, Davis Building, Railway Terrace, Rugby, CV21 3HQ, UK
Tel: +44 (0)1788 578214 Fax: +44 (0)1788 560833

Organisation name:

Last name:

First names:

Title: (Dr/Mr/Mrs/Miss/Ms/Prof/Eur Ing): Gender: ☐ Male ☐ Female

Company:

Job title: Department:

Country: Post/Zip Code:

Preferred address for pre-conference correspondence: Work ☐ Home ☐

Country: Company/House number:

Post/Zip code:

Address:

.....

Town/City: County/State:

Telephone: Fax:

Email:

Special dietary requirements:

Please tick relevant box for payment

Registrations

- ☐ £325 + VAT IChemE Member Rate
☐ £375 + VAT Non-Member Rate
☐ £250 + VAT Full Time Student rate (Proof of Status required)

Fees include attendance at the conference sessions on 18 and 19 October 2010, all documentation, lunch and all interval refreshments for both days and the closing drinks reception on 19 October.

VAT will be charged at the current UK rate of 17.5%
A VAT invoice will be issued upon receipt of payment.



Registration Form

Method of payment

(Payment must be received in full before the event date otherwise admission cannot be guaranteed).

Your booking will be confirmed by IChemE on receipt of one of the following:

- official purchase order
- cleared funds

☐ Please debit my credit/debit card: (Payment in Sterling only):

☐ Cardholder name (as it appears on the card):

Billing address (if different from overleaf)

.....

Post/Zip code:

☐ Mastercard ☐ Visa ☐ Visa Debit/Delta ☐ Maestro ☐ AMEX ☐ Debit Mastercard

Card Number:

Valid From Date: Expiry Date: Issue Number: Security Code:
(debit card only)

Card holder's signature:

Card holder's telephone number

☐ Cheque enclosed (made payable to Institution of Chemical Engineers)

Please send to IChemE, Conferences Department, Davis Building, Railway Terrace, Rugby, CV21 3HQ, UK

☐ Please invoice my company quoting purchase order number Please note that registration cannot be processed unless a copy of your purchase order is received with your registration form. If your company does not use purchase order numbers, please attach a formal request to invoice on your company's letterhead.

Cancellation policy

Cancellations received in writing 28 days prior to the event will be subject to administration charge of 10% of the fees + VAT.

No refunds will be given for non attendance or cancellations received less than 28 days prior to the event. Substitutions will be welcome at any time. We reserve the right to cancel or alter the programme.

Data protection

In accordance with the Data Protection Act, IChemE (and companies processing data on its behalf) will hold and use the data contained on this form for administration purposes, to keep you informed of its activities, and offer goods and services provided by the Institution.

☐ If you would prefer not to receive IChemE product and service literature please mark the box

☐ If you would prefer not to receive emails on IChemE product and service literature please mark the box

The Institution is fully registered under the Data Protection Act as both a data user and a computer bureau.

Please send or fax this completed form with remittance to:

Conferences & Events Department, IChemE, Davis Building, Railway Terrace, Rugby CV21 3HQ

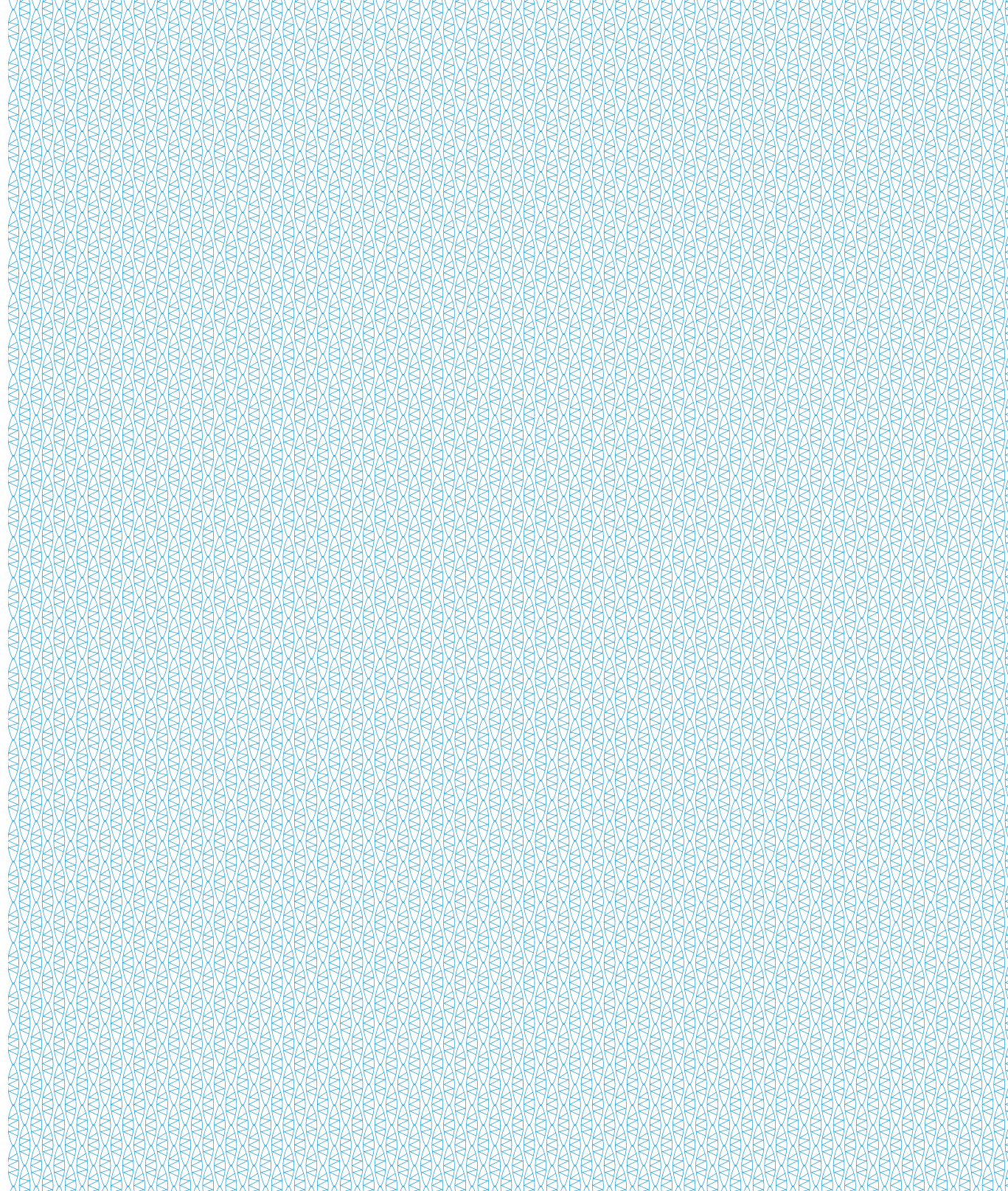
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IChemE offices in Kuala Lumpur, London, Melbourne and Rugby

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