

## *Program*

# **Microbial Engineering III: New Generation of Cell Factory to Meet the Future Challenges and Seize New Opportunities**

**March 30 – April 3, 2025**

**Porto, Portugal**

### **Conference Chairs**

**Eli Keshavarz-Moore**  
**University College London, United Kingdom**

**Thomas Sauer**  
**Sanofi, Germany**



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**Previous conferences in this series:**

***Microbial Engineering***  
**March 4-8, 2018**  
**Santa Fe, New Mexico, USA**

*Conference Chairs:*

Eli Keshavarz-Moore (University College London, UK)

Barry Buckland (BiologicB, LLC USA)

***Microbial Engineering II***  
**April 3-7, 2022**

**Albufeira, Portugal**

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## **Sunday, March 30, 2025**

|               |                                                                                                                                                                                              |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15:00 - 17:00 | <b>Conference check-in (Ballroom Foyer)</b>                                                                                                                                                  |
| 17:00 - 17:15 | <b><u>Welcoming remarks</u></b><br>ECI Technical Liaison: Barry Buckland<br><br>Co-chairs: Thomas Sauer, Sanofi; Eli Keshavarz-Moore, University College London                              |
| 17:15 - 18:15 | <b><u>Keynote lecture</u></b><br><b>Is microbial production a good option for exceptionally low cost monoclonal antibodies for global access?</b><br>Vijay Yabannavar, Gates Foundation, USA |
| 18:15 - 18:45 | <b><u>Poster competition announcement</u></b><br>Chair: António Roldão, iBET, Portugal                                                                                                       |
| 18:45 - 19:00 | <b>Break</b>                                                                                                                                                                                 |
| 19:00 - 20:00 | <b>Welcome reception (Auditorium Foyer)</b>                                                                                                                                                  |
| 20:00 - 22:00 | <b>Dinner</b>                                                                                                                                                                                |

### ***Locations and Notes***

- *Technical sessions will be in Ballroom I.*
- *Poster Sessions will be in the Ballroom Foyer.*
- *Meals will be in the Restaurant.*
- *The ECI on site office is in Ballroom II.*
- *Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, PDAs, watches) is strictly prohibited during the technical sessions, unless the author and ECI have granted prior permission.*
- *Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).*
- *Speakers – Please leave at least 3 minutes for questions and discussion.*
- *Please do not smoke at any conference functions.*
- *Turn your mobile telephones to vibrate or off during technical sessions.*
- *After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.*
- *Emergency Contact Information: Because of privacy concerns, ECI does not collect or maintain emergency contact information for conference participants. If you would like to have this information available in case of emergency, please use the reverse side of your name badge.*

## **Monday, March 31, 2025**

- 07:00 - 08:30           **Breakfast**
- 09:15 - 12:20           **Session I: Health | therapeutics**  
Co-chairs: Zhang Yali, Sanofi; Brigitte Gasser, BOKU/DBT, Austrian Centre for Industrial Biotechnology (ACIB)
- 09:15 - 09:20           **Session introduction**
- 09:20 - 09:45           **A predictive tool to design the protein folding machinery in *Escherichia coli***  
Duygu Dikicioglu, University College London, United Kingdom
- 09:45 - 10:10           **Numaswitch, a novel biochemical platform for efficient peptide and protein production**  
Christian Schwarz, Numaferm GmbH, Germany
- 10:10 - 10:30           **Next generation *Komagataella phaffii* strain engineering by CRISPR-mediated targeted integration**  
Daniel Degreif, Sanofi-Aventis Deutschland GmbH, Germany
- 10:30 - 10:50           **Towards a more cost-effective and sustainable production of therapeutic proteins**  
David Pollard, Sartorius, USA
- 10:50 - 11:20           **Coffee break**
- 11:20 - 11:40           **Purecoli: An optimized microbial chassis delivering a holistic solution for therapeutic protein manufacturing**  
Erik Nordwald, KBI Biopharma, USA
- 11:40 - 12:00           **Revolutionizing RNAi therapeutics manufacturing with enzymes**  
Stefan Lutz, Codexis Inc., USA
- 12:00 - 12:20           ***Hormonema carpetanum*: From juniper tree to patient- the story of an endophytic fungi and the oral treatment of *vulvovaginal candidiasis***  
Ben Huckle, GSK, United Kingdom
- 12:20 - 13:30           **Lunch**
- 13:30 - 14:15           **Keynote lecture**  
**Role of microbial technology in the bioeconomy: An overview**  
Barry Buckland, NIIMBL, USA
- 14:15 - 16:55           **Session I: Health | Vaccines**  
Co-chairs: Dominique Garnier, Sanofi; Manuel Carrondo, iBET
- 14:15 - 14:20           **Session introduction**
- 14:20 - 14:45           **Glycoengineering and production of therapeutic and vaccine proteins in the filamentous fungus *Thermothelomyces heterothallica* C1**  
Markku Saloheimo, VTT Technical Research Centre of Finland, Finland



**Monday, March 31, 2025 (continued)**

- 14:45 - 15:10      **Engineering archaeal ferritin nanoparticles for vaccine development via tyrosinase-mediated conjugation**  
Margarida Queluz Rodrigues, iBET, Portugal
- 15:10 - 15:35      **Streamlining plasmid DNA manufacturing for advanced therapy manufacturing**  
Salomé Magalhães, University College London, United Kingdom
- 15:35 - 16:05      **Coffee break**
- 16:05 - 16:30      **Integration of microbial processes in a flexible multi-modality vaccine manufacturing facility**  
Bruno Tricoire, Sanofi, France
- 16:30 - 16:55      **Revitalize *Escherichia coli* platform to support biologics development and manufacturing of new modalities**  
Sam Zhang, WuXi Biologics, China
- 16:55 - 17:30      **Keynote lecture**  
**Use of acetic acid as a carbon source for food production**  
Carsten Hjort, Novonosis, Denmark
- 17:30 - 18:30      **Workshop - how to make microbes "cool!"**  
Co-chairs: Tiffany Rau, University College Cork; Jens Rupprecht, Sartorius, Guxhagen
- 18:30 - 19:00      **Poster briefing - Rapid fire talks**  
Chair: António Roldão, iBET, Portugal
- 19:00 - 20:30      **Dinner**
- 20:30 - 22:00      **Poster session I – Odd Numbers**  
Chair: António Roldão, iBET, Portugal

## **Tuesday, April 1, 2025**

- 07:00 - 08:30           **Breakfast**
- 08:30 - 12:10           **Session II: Circular economy | Part 1**  
Co-chairs: Beth Junker, BioProcess Advantage, LLC; Behnam Taidi, University of Paris-Saclay; Barry Buckland, NIIMBL
- 08:30 - 08:35           **Session introduction**
- 08:35 - 08:55           **Biocatalysis of petroleum replacement molecules from biomass wastes**  
John Love, The University of Exeter, United Kingdom
- 08:55 - 09:15           **Making biology easier to engineer, together**  
Patrick Boyle, Ginkgo Bioworks, USA
- 09:15 - 09:35           **From plastic to paper: A novel microbial factory for conversion of PET monomers**  
Sierin Lim, Nanyang Technological University, Singapore
- 09:35 - 09:55           **Development of tools for the molecular engineering of lignocellulolytic anaerobic fungi**  
Kevin Solomon, University of Delaware, USA
- 09:55 - 10:25           **Coffee break**
- 10:25 - 10:45           **Closing the doors of the peroxisome: Towards synthetic methylotrophy**  
Xavier Farge, BOKU, Austria
- 10:45 - 11:05           **Improving the efficiency of organic acid production from one-carbon substrates in *Komagataella phaffii* through enzyme and metabolic engineering**  
Charles Moritz, BOKU, Austria
- 11:05 - 11:25           **Rapid, high-yield, & flexible biomanufacturing for biopharmaceuticals, health, wellness, food, & nutrition**  
Mark Emalfarb, Dyadic International, Inc., USA
- 11:25 - 11:45           **Optimization of protein production in yeast**  
Xiaochun Fan, Merck & Co., Inc., USA
- 11:45 - 12:05           **CO<sub>2</sub> sequestration by microbial rock weathering: Overcoming process limitations with genetic engineering**  
Neil Dalvie, Harvard Medical School, USA
- 12:10 - 13:30           **Lunch**
- 13:30 - 14:15           **Keynote lecture**  
**Bridging the gap from AI to application: Biocatalysis meets cell-free systems**  
Rahul Singhvi, Axella Biosciences, USA

**Tuesday, April 1, 2025 (continued)**

- 14:15 - 16:20      **Session II: Circular economy | Part 2**  
Co-chairs: Diethard Mattanovich, BOKU/DBT, Austrian Centre of Industrial Biotechnology; Carsten Hjort, Novonosis
- 14:15 - 14:20      **Session introduction**
- 14:20 - 14:45      **Accelerating the transition to bioalternatives through systems-level engineering**  
Christine Santos, Manus, USA
- 14:45 - 15:10      **Microbial synergy powers anaerobic conversion of carbon monoxide into bioplastics**  
Diana Sousa, Wageningen University & Research, Netherlands
- 15:10 - 15:30      **Engineering chimeric regulators to unlock non-native substrate assimilation**  
Stephanie HEUX, TBI, France
- 15:30 - 15:50      **Enhancing isobutanol production by *Klebsiella pneumoniae* using synthetic biology tools**  
Frank Baganz, University College London, United Kingdom
- 15:50 - 16:20      **Coffee break**
- 16:20 - 16:50      **Poster briefing - Rapid fire talks**  
Chair: António Roldão, iBET, Portugal
- 16:50 - 17:00      **Break**
- 17:00 - 18:30      **Poster session II – Even Numbers**  
Chair: António Roldão, iBET, Portugal
- 18:30 - 22:00      **Dinner on your own**

## **Wednesday, April 2, 2025**

- 07:00 - 08:30           **Breakfast**
- 08:30 - 09:05           **Keynote lecture**  
**The expanding world of cell-free biotechnologies: From targeted therapeutics to carbon-negative biochemicals**  
James Swartz, Stanford University, USA
- 09:05 - 10:15           **Session II: Circular economy | Part 2 - continued**  
Co-chairs: Diethard Mattanovich, BOKU/DBT, Austrian Centre of Industrial Biotechnology; Carsten Hjort, Novonosis
- 09:05 - 09:25           **Advanced microbial engineering for the production of human milk oligosaccharides**  
Peter Becker, DSM, Denmark
- 09:25 - 09:45           **Engineering *Yarrowia lipolytica* for sustainable lipid production: A scalable alternative to edible and cosmetic oils**  
Leonardo Rios Solis, University College London, United Kingdom
- 09:45 - 10:15           **Coffee break**
- 10:15 - 12:00           **Session III: Role of digital tools in microbial engineering**  
Co-chairs: Duygu Dikicioglu, University College London; Charles Cooney, MIT
- 10:15 - 10:20           **Session introduction**  
Charles Cooney, MIT, USA; Duygu Dikicioglu, University College London, United Kingdom
- 10:20 - 10:40           **Are we there yet? A maturity model for continuous process monitoring and learning in biologics manufacturing**  
Jack Prior, Sanofi, USA
- 10:40 - 11:00           **Advancing metabolic engineering and modelling with AI**  
Thomas Abeel, TU Delft, Netherlands
- 11:00 - 11:20           **Engineering the next generation of microbial production strains for biologics**  
Markus Mund, Sanofi-Aventis Deutschland GmbH, Germany
- 11:20 - 11:40           **Host-agnostic DNA design with generative AI for microbial engineering**  
Rahmi Lale, NTNU, Dep. Biotechnology, Norway
- 11:40 - 12:00           **Engineering inducible autolysis in *E. coli* for large scale intracellular bioproduct recovery**  
Kyle Jonsson, University College London, United Kingdom
- 12:00 - 13:15           **Lunch**
- 13:30 - 18:30           **Excursion: Private wine tour and port tasting**
- 13:30 - 14:00           **Walk to Fonseca port wine cellar**
- 14:00 - 15:00           **Fonseca port wine cellar private tour and tasting**

**Wednesday, April 2, 2025 (continued)**

- |               |                                                                                   |
|---------------|-----------------------------------------------------------------------------------|
| 15:00 - 19:30 | <b>Walk to World of Wine</b><br><b>Explore World of Wine or Porto on your own</b> |
| 19:30 - 20:30 | <b>Reception (Auditorium Foyer)</b>                                               |
| 20:30 - 22:30 | <b>Conference banquet &amp; poster awards</b>                                     |

**Thursday, April 3, 2025**

- 07:00 - 08:30           **Breakfast**
- 09:00 - 11:10           **Session IV: Replacing microorganisms? (Cell free and other systems)**  
Co-chairs: Stefanie Frank, University College London; James Swartz,  
Stanford University
- 09:00 - 09:05           **Session introduction**
- 09:05 - 09:25           **Toward augmenting the global biomanufacturing supply chain with  
decentralized cell-free protein expression.**  
Keith Pardee, University of Toronto, Canada
- 09:25 - 09:45           **A scalable, eukaryotic cell-free protein production technology  
accelerating vaccine and therapeutic development**  
Charles Williams, LenioBio, Germany
- 09:45 - 10:30           **Coffee break**
- 10:30 - 10:50           **Harnessing cell-free protein synthesis technology for the production of  
glycosylated full-length antibodies using bacterial lysates**  
Rochelle Aw, Stanford University, USA
- 10:50 - 11:10           ***E. coli* cell-free protein synthesis platform for rapid Adeno-associated 5  
virus-like particle production**  
Danielle Deuker, University College London, United Kingdom
- 11:10 - 11:55           **Closing keynote lecture**  
**New modalities in medicine and curative therapies**  
Hari Pujar, Tessera Therapeutics & Operating Partner at Flagship Pioneering,  
USA
- 11:55 - 12:10           **Closing remarks**  
Co-chairs: Thomas Sauer, Sanofi; Eli Keshavarz-Moore, University College  
London
- 12:10 - 13:30           **Lunch and departures**

## List of Posters

- 1. Establishing a biosensor for high-throughput screening of isobutanol producing strains**  
Jiaming Chen, University College London, United Kingdom
- 2. *Withdrawn***
- 3. Multiparameter sensors and DO sensor pills for shake flasks: removing black boxes for improved bioprocess development**  
Hendrik Schmidt, Scientific Bioprocessing, Germany
- 4. Complex waste stream valorization through combined enzymatic hydrolysis and catabolic assimilation by *Pseudomonas putida***  
Micaela Chacon, University of Manchester, United Kingdom
- 5. Characterising plasmid DNA release and impurity removal in continuous alkaline lysis**  
Jay Stonehouse, University College London, United Kingdom
- 6. Enhancing tartaric acid metabolism in probiotic *Escherichia coli* Nissle 1917**  
Greta Emma Katharina Kleinert, RWTH Aachen University, Germany
- 7. Microbial engineering of extremophiles for the discovery of bioactive molecules**  
Barbara Andrews, University of Chile, Chile
- 8. Establishing *Aureobasidium pullulans* as platform organism for the biosynthesis of natural products - Developing tools for efficient genetic manipulation**  
Marielle Driller, RWTH Aachen University, Germany
- 9. Use of radial flow chromatography for cost effective, large scale isolation of lactoferrin from skim milk or precision fermentation for infant nutrition**  
Sanjeev Saxena, Sepragen Corporation, USA
- 10. Exploiting *Aureobasidium* as platform organism for the circular bioeconomy**  
Karla Stein, RWTH Aachen University, Germany
- 11. Process design for enhanced polyol lipid production using bio-based substrates with *Aureobasidium pullulans***  
Philipp Kohl, RWTH Aachen University, Germany
- 12. Development of enzymes from extremophiles for the degradation of plastics and potential generation of useful metabolites**  
Juan A. Asenjo, University of Chile, Chile
- 13. Integrated decoupled bioprocess and cell recycling system of recombinant *Pseudomonas putida* KT2440 for *trans*-cinnamic production**  
Sompot Antimanon, Technical University of Denmark, Denmark
- 14. Identification and characterisation of aromatic acid transporters via combined syntenic analysis and genetically encoded biosensor screening**  
Philip Le Roy, University of Manchester, United Kingdom
- 15. A multifaceted approach for bioprocess optimization, modelling and integration: recombinant growth factor production on upcycled spent cell culture media**  
Dave Siak-Wei Ow, Bioprocessing Technology Institute, A\*STAR, Singapore

- 16. Maximizing the potential of SYNTHORIN™ technology: sterilization conditions impact fidelity of semi-synthetic proteins**  
Jacqueline Becker, Sanofi Deutschland GmbH, Germany
- 17. Application of a fluorescent H<sub>2</sub>O<sub>2</sub> biosensor to identify and mitigate intracellular redox stress**  
Jennifer Staudacher, Austrian Centre of Industrial Biotechnology, Austria
- 18. Engineering of a novel *E. coli* strain for sustainable, end-to-end continuous manufacturing of biomolecules**  
Florian Simon, enGenes Biotech GmbH, Austria
- 19. Preclinical development of a VHH-ADC using the PET platform**  
Diane Retallack, Primrose Bio, Inc., USA
- 20. Exhaust concept for scalable single-use fermenter and high-demanding microbial cultivations**  
Jens Rupprecht, Sartorius Stedim Biotech, Germany
- 21. POP-OUT-plasmid platform for antibiotic free production of recombinant protein**  
Ritu Ghosh, University of Tartu, Estonia
- 22. Accelerating plasmid production process development using a scale-down model of *E. coli* fermentation in the Ambr250**  
Tracey Dinh, Merck, USA
- 23. Encapsulins unpacked: a scalable bioprocess for high-yield production**  
Ferdinando Sereno, University College London, United Kingdom
- 24. Comparison of single-use and steel fermentors for malaria vaccine expression**  
Jason Brown, Thermo Fisher Scientific, USA
- 25. Development of a chemically defined media for *Escherichia coli*, leveraging learnings from traditional peptone-based media**  
Massimo Ferretti, Thermo Fisher Scientific, USA
- 26. Screening of *K. phaffii* using novel shake flask technology**  
Shannon Gulvin, Merck, USA
- 27. The future of microbial manufacturing: a chemically defined *E. coli*-based medium and feed for plasmid and protein production**  
Stacy Holdread, Thermo Fisher Scientific, USA
- 28. FinaXpress - The next generation *E. coli* platform for cost-effective production of hard-to-express, disulfide-bonded proteins**  
Renaud Jacquemart, Fina Biosolutions, Canada