Program

Microbial Engineering II

April 3-7, 2022

Albufeira, Portugal

Conference Chairs

Eli Keshavarz-Moore
University College London, United Kingdom

Barry Buckland
BiologicB, USA

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Natarajan Sethuraman (Previously GlycoFi ; now Consultant), USA

Daniel Smith (Cobra Biologics), UK

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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)

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Sunday, April 3, 2022

15:00 – 17:00	Conference Check-in
17:00 – 18:00	Reception – overlooking the sea
18:00 – 18:15	**Welcoming Remarks** Barry Buckland and Eli Keshavarz-Moore, Conference Chairs
	Plenary Lectures
18:15 – 19:00	**Engineering Microbial systems: potential to enable affordable and accessible interventions for global health** Stephen Hadley, The Bill & Melinda Gates Foundation, USA
19:00 – 19:45	**Refactoring yeast central metabolism to reverse growth phenotypes and Product formation** Diethard Mattanovich, BOKU, Austria
20:00 – 22:00	Dinner

Locations and Notes

- *Technical Sessions will be held in the Balaia Room.*
- *Poster Sessions will be in the Santa Eulália Room.*
- *The ECI office will be the Executive Room.*
- *Please wear your mask except when giving a presentation or actively eating or drinking. Please maintain physical distancing as much as possible.*
- *Audio, still photo and video recording by any device (e.g., cameras, mobile phones, tablets, laptops, smart watches) is strictly prohibited during the technical sessions, unless the author and ECI have granted prior permission.*
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- *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, April 4, 2022

07:30 – 08:30	Breakfast Buffet
	SESSION I: METABOLITES Session Chairs: Arindam Bose, AbiologicsB LLC, USA Brigitte Gasser, BOKU, Austria
08:30 – 08:35	Session Introduction
08:35 – 09:05	**Valorization of renewables into bio-based chemicals using metabolically engineered microbes** Christoph Wittmann, Saarland University, Germany
09:05 – 09:30	**Microbial engineering of new Streptomyces sp. from extreme environments for novel antibiotics, anticancer and antifungal Drugs** Juan Asenjo, University of Chile, Chile
09:30 – 09:55	**Pollution to products: Recycling of "above ground" carbon by gas fermentation** Michael Koepke, Lanzatech Engineering, USA
09:55 – 10:20	**Klebsiella pneumoniae as cell factory for chemicals production** Frank Baganz, University College London, United Kingdom
10:20 – 10:50	**Fermented pheromones – a sustainable solution for plant protection from insect pests** Irina Borodina, BIOPHERO ApS, Denmark
10:50 – 11:20	Coffee Break
	SESSION II: THERAPEUTIC PROTEINS AND PEPTIDES Session Chairs: Neil Dixon, University of Manchester, United Kingdom Tiffany Rau, Rau Consulting, USA
11.20 – 11.25	Session Introduction
11.25 – 11:55	**Expanding understanding and scope of Pichia pastoris for secreted protein expression** Nico Callewaert, University of Gent, Belgium
11:55 – 12:20	**Pichia production host engineering by systemic host changes** Christoph Kiziak, Lonza, Switzerland
12:20 – 12:45	**Flo8 – A versatile regulator for improving recombinant protein production in Pichia pastoris** Brigitte Gasser, BOKU, Austria
12:45 – 13:45	Lunch and Networking
	SESSION II: THERAPEUTIC PROTEINS AND PEPTIDES (continued)
13:45 – 14:10	**Characterization of homologous industrial strains using continuous cultivation techniques to understand process performance variation in a platform fed-batch production process** Anthony Grippe, Merck & Co., Inc., USA

Monday, April 4, 2022 (continued)

14:10 – 14:22	**Combinatorial Fusion TAG yields powerful platform process for the production of pharmaceutically relevant proteins** Christoph Köppl, ACIB, Austria
14:22 – 14:34	**Developing methods for the production of antiviral VHH-Fc antibodies in *Pichia pastoris* for fast pandemic response** Chiara Lonigro, Gent University, Belgium
14:34 – 14:46	**Going beyond the limit: impact of increasing global translation activity on the productivity of recombinant secreted proteins in Pichia pastoris** Jennifer Staudacher, BOKU, Austria
14:46 – 15:11	**Accurate scaleable microfermentation screening for microbial cell line development of therapeutic proteins** Erik Nordwald, KBI Biopharma, USA
15:11 – 15:45	Coffee Break
	SESSION II: THERAPEUTIC PROTEINS AND PEPTIDES continued
15:45 – 16:10	**Optimization of *E. coli* SoluPro ® using synthetic biology to generate high-performance microbes for scalable production of protein therapeutics** Drew Tack, AbSci, USA
16:10 – 16:35	**Growth-decoupled recombinant protein production in *Escherichia coli*** Patrick Stargardt, enGenes Biotech, Austria
16:35 – 17:00	**Development of the filamentous fungus *Myceliophthora thermophila* C1 into a next-generation therapeutic protein production system** Andriy Kovalchuk, VTT, Finland
17:00 – 17:25	**Robust protein production and secretion in bacteria using type III secretion system** Danielle Tullman-Ereck, Northwestern University, USA
19:00 – 20:30	Dinner
20:30 – 22:00	**POSTER SESSION I** (with social hour and dessert) Session Chairs: Brenda Parker, University College London, United Kingdom Laura Stoffels, Syngenta, United Kingdom

Tuesday, April 5, 2022

07:30 – 08:30	Breakfast Buffet
	SESSION III: SUSTAINABILITY Session Chairs: Behnam Taidi, CentraleSupélec, France David Stuckey, Imperial College, United Kingdom
08:30 – 08:35	Session Introduction
08:35 – 09:00	**Robust, reliable and controlled bio-methane production** Behnam Taidi, CentraleSupélec, France
09:00 – 09:25	**Controlling the size and linkage type of biopolymers derived from sucrose** Magali Remaud-Siméon, INSA/University of Toulouse, France
09:25 – 10:00	**Biosensors and biocatalysis for biorefinery and bioremediation** Neil Dixon, University of Manchester, United Kingdom
10:00 – 10:30	Coffee Break
10:30 – 11:00	**A biotechnological strategy for the valorization of cellulose through Levoglucosenone** Louis Mouterde, Agro Paris Tech, France
11:00 – 11:25	**Unraveling acetogen gas fermentation using quantitative systems biology** Kaspar Valgepea, University of Tartu, Estonia
11:25 – 11:55	**Developing a novel microbial host and synthetic biology tools for valorizing waste polyethylene terephthalate and lignin-derived compounds** Tae Seok Moon, Washington University, USA
12:00 – 14:00	Lunch and Networking
	SESSION IV: MICROBIOME Session Chairs: John Aunins, Seres Therapeutics, USA Kristala Prather, Massachusetts Institute of Technology, USA
14:00 – 14:05	Session Introduction
14:05 – 14:35	**Fungal highways enable migration and communication of engineered bacteria in soil** Eric Young, Worcester Polytechnic, USA
14:35 – 15:05	**Treating microbial systems engineering as an inverse function problem to enhance production of biomolecules** Ranjan Srivastava, University of Connecticut, USA
15:05 – 15:35	**Metabolic modeling for the microbiome** Costas Maranas, Penn State University, USA
15:35 – 16:05	Coffee Break
16:05 – 16:35	**Engineering microbes and biology for communicating with electronics** William Bentley, University of Maryland, USA

Tuesday, April 5, 2022 (continued)

16:35 – 17:05	**Novel technologies are key for the development of live bacterial therapeutics** Christophe Lacroix, ETH Zurich, Switzerland
17:05 – 17:15	Stretch Break
17:15 – 18:00	**KEYNOTE** **Metabolic Engineering** Kristala Prather, Massachusetts Institute of Technology, USA
19:00 – 20:30	Dinner
20:30 – 22:30	**POSTER SESSION II** (with social hour and dessert) Session Chairs: Brenda Parker, University College London, United Kingdom Laura Stoffels, Syngenta, United Kingdom

Wednesday, April 6, 2022

07:30 – 08:30 Breakfast Buffet

SESSION V: CELL FREE MICROBIAL SYNTHESIS
Session Chair: Daniel Bracewell, University College London, United Kingdom

08:30 – 08:35 Session Introduction

08:35 – 09:15 **New kid on the block: Industrialization of cell-free synthesis for biotherapeutics development**
Marcella Yu, Sutro Biopharma, USA

09:15 – 09:45 **Rapid iterative design of tandem-core virus-like particles using Escherichia Coli-based cell-free protein synthesis**
Beatrice Melinek, University College London, United Kingdom

09:45 – 09:50 Introduction to Plenary Lecture

09:50 – 10:35 **Plenary Lecture**
Next wave of microbially expressed Biologics – a step towards synthetic biology
Thomas Sauer, Sanofi, France

10:35 – 11:05 Coffee Break

11:05 – 11:10 Introduction to Plenary Lectures

11:10 – 11:55 **Plenary Lecture**
Continuous culture reborn or revived?
Charles Cooney, Massachusetts Institute of Technology, USA

11:55 – 12:40 **Plenary Lecture**
Reimagining biomanufacturing for equitable access to medicines: The Resilience Story
Rahul Singhvi, RESILIENCE, USA

12:40 – 17:30 Lunch and Networking (at hotel) or excursion/walking tour of Silves

18:00 – 19:00 **WORKSHOP: What is the vision of the future of biomanufacturing?**
Chair: Eli Keshavarz-Moore
Contributors: Aaron Pilling (KBI Biopharm. USA)
Vaughan Thomas (Tillingbourne Consulting, UK)

The COVID-19 pandemic paralysed many of the world's economies, but galvanised the scientific and engineering communities to produce vaccines and therapeutics in record time. As the world gradually emerges from COVID-19 into an uncertain future, which technologies will meet the challenges for the next ten years? The workshop will analyse the challenges facing the globe, including equitable access to pharmaceuticals, feeding the world, all wrapped together with low-carbon, sustainable targets. Discussion topics will include:

- Will the productivity advantages of microbial manufacturing win out over mammalian cells?
- Will continuous manufacture finally be adopted more widely?
- Is cell-free synthesis a viable alternative to bioreactor variability?

19:30 – 22:30 Reception, Conference Banquet and Poster Prizes

Thursday, April 7, 2022

07:30 – 08:30	Breakfast Buffet
	SESSION VI: VACCINES Session Chairs: Stefanie Frank, University College London, United Kingdom Barry Buckland, BiologicB, USA
08:30 – 08:35	Session Introduction
08:35 – 09:15	**Product and host engineering for low-cost manufacturing of therapeutic proteins in yeast** Neil Dalvie, Massachusetts Institute of Technology, USA
09:15 – 09:45	**Development of affordable recombinant glycoconjugate vaccines in bacterial cells** Brendan Wren, London School of Hygiene & Tropical Medicine, United Kingdom
09:45 – 10:10	**Late stage process development for a commercial streptococcus pneumoniae fermentation bioprocess** Matthew Woodling, Merck & Co, Inc., USA
10:10 – 10:35	**Optimising mRNA vaccines manufacturing by using Machine learning approaches** Marco PC Marques, University College London, United Kingdom
10:35 – 11:05	Coffee Break
11:05 – 11:30	**Challenges in implementing single-use processing for the purification of polysaccharides** Francis DiGennaro, Merck & Co, Inc., USA
11:30 – 11:55	**Microbial platform for vaccine production for low and medium income countries (LMICs): 2 case studies** Salome De Magalhaes, University College London, United Kingdom
11:55 – 12:20	**Bioengineering bacterial protein nanocompartments as modular platforms for vaccines and drug delivery** Stefanie Frank, University College London, United Kingdom
12:20 – 12:25	Introduction to Closing Plenary Lecture
12:25 – 13:10	**Plenary Lecture** **Engineering *Pichia pastoris* to make the impossible hamburger possible** Smita Shankar, Impossible Foods, USA
13:10 – 14:30	Lunch Buffet and Departures

Poster Presentations

1. **Yarrowia lipolytica as a chassis for isoprenoid production**
   Aleksander Kruis, Acies Bio, Slovenia

2. **Selective in vitro loading of proteins into protein nanocompartments for applications in the bioindustry**
   Alexander Van de Steen, University College London, United Kingdom

3. **Impact of oxygen availability on organelle-specific redox potentials and stress in recombinant protein producing Pichia pastoris**
   Aliki Kostopoulou, Austrian Center of Industrial Biotechnology (ACIB), University of Natural Resources and Life Sciences (BOKU), Austria

4. **Use of Genome-scale Models to get new insights into the MarineActinomycete genus Salinispora: Microbial engineering and its application in secondary metabolite production**
   Barbara A. Andrews, University of Chile, Chile

5. **Hidden methanol assimilation pathways in the methylotrophic yeast Pichia pastoris**
   Bernd Mitic, Austrian Center of Industrial Biotechnology (ACIB), University of Natural Resources and Life Sciences (BOKU), Austria

6. **Caprylate production with lactate as electron donor using Megasphaera hexanoica**
   Byoung In Sang, Hanyang University, South Korea

7. **Semi-rational engineering of Adh2 for improved methanol utilization in Komagataella phaffii**
   Charles Moritz, Austrian Center of Industrial Biotechnology (ACIB), University of Natural Resources and Life Sciences (BOKU), Austria

8. **Baker's yeast breeding and engineering to improve biologics manufacturing**
   Chris Finnis, Phenotypeca Ltd, United Kingdom

9. **Rapid iterative design of tandem-core virus-like particles using Escherichia coli-based cell-free protein synthesis**
   Daniel G. Bracewell, University College London, United Kingdom

10. **A chalcone synthase-like bacterial protein catalyzes heterocyclic c-ring cleavage of naringenin to alter bioactivity against nuclear receptors in colonic epithelial cells**
    Ebru Ece Gulsan, Tufts University, USA

11. **Accurate, scalable microfermentation screening for microbial cell line development of therapeutic proteins**
    Erik Nordwald, KBI Biopharma, USA

12. **Increasing the carbon efficiency of citric acid production**
    Evelyn Carolina Vásquez Castro, Austrian Center of Industrial Biotechnology (ACIB), University of Natural Resources and Life Sciences (BOKU), Austria

13. **Towards a platform process for the manufacture of glycoconjugate vaccines for pneumococcal disease**
    Frank Baganz, University College London, United Kingdom

14. **Pathway design for mixotrophic production of biochemicals from CO2 and methanol in yeasts**
Golnaz Memari, Austrian Center of Industrial Biotechnology (ACIB), University of Natural Resources and Life Sciences (BOKU), Austria

15. **Method development, validation, and implementation of Raman spectroscopy as an in-situ process analytical technology for fermentation process development and commercial manufacturing**
Griffin Thomas, Merck & Co., Inc., USA

16. **Genetically encoded biosensors as tools for the up-cycling of aromatic-based feedstocks**
Guadalupe Alvarez Gonzalez, University of Manchester, United Kingdom

17. **Unfolded protein response biosensors for recombinant protein expression**
Helena Godon, ACIB, Austria

18. **High-throughput enzyme engineering for commercial-scale production of natural products**
Irina Koryakina, Amyris, Inc., USA

19. **mDOE for development of optimized fed-batch cultivation for the production of PET degrading enzymes in E. coli**
Lisa Fohler, Austrian Center of Industrial Biotechnology (ACIB), University of Natural Resources and Life Sciences (BOKU), Austria

20. **Lactic acid production in the synthetic autotroph Komagataella phaffii**
Michael Baumschabl, ACIB GmbH, Deparment for Biotechnology, Austria

21. **Clickable Shiga Toxin tracer for drug delivery**
Natalia Karolina Danielewicz, enGenes, Universitat fur Bodenkultur, Austria

22. **From flask to large scale high cell density production of ω-transaminase using auto-induction media**
Sofia Nunes, University College London, United Kingdom

23. **Genetically stable CRISPR-based kill switches for engineered microbes**
Tae Seok Moon, Washington University in St. Louis, USA

24. **Investigating the role of oxidative stress response genes in protein secretion using a novel combinatorial Golden Gate based approach**
Victor Mendes Honorato, Austrian Center of Industrial Biotechnology (ACIB), University of Natural Resources and Life Sciences (BOKU), Austria

25. **Novel Cold-Adapted Lipase from Marine Plankton, Salpa thompsoni**
Brenda Parker, University College London, United Kingdom

26. **Optimisation of an alkaline lysis process for a plug- and play plasmid DNA production**
Fatma Mohamed Ebrahim Alhamer Almulla, University College London, United Kingdom

27. **Enzymatic synthesis and immobilization of coenzymes of interest: the example of NADP(H) and Coenzyme A**
Celestin Bourgery, URD ABI – AgroParisTech, France