

Microbial Engineering

Santa Fe, New Mexico, USA
4 – 8 March 2018

Editors:

Eli Keshavarz-Moore
Barry Buckland

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Sunday, March 4, 2018

16:00 – 18:00	Conference Check-in
17:45 – 18:00	Welcoming Remarks Barry Buckland and Eli Keshavarz-Moore, Conference Chairs Beth Junker, ECI Technical Liaison
18:00 – 18:50	<u>Plenary Lectures</u> Manufacturing biopharmaceuticals in the age of acceleration Chris Love, Massachusetts Institute of Technology, USA
18:50 – 19:40	Development of live bacterial therapeutics John Aunins, Seres Therapeutics, USA
19:40 – 19:45	Concluding Remarks
19:45 – 20:30	Reception
20:30 – 23:00	Dinner

NOTES

- *Technical Sessions will be held in the Ballroom South.*
- *Poster Sessions will be held in the Ballroom North.*
- *The ECI office will be in the Stiha Room.*
- *Meals will be in La Terraza*
- *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 discussion time as previously directed by your session chair.*
- *Please do not smoke at any conference functions.*
- *Turn your mobile telephones to vibrate or off during technical sessions.*
- *Please write your name on your program so that it can be returned to you if lost or misplaced.*
- *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.*

Monday, March 5, 2018

- 07:00 – 08:30 Breakfast
- 08:30 – 11:25 **Session I: Primary Metabolites**
Session Chairs: Arindam Bose (AbiologicsB, LLC, USA)
Brigitte Gasser (BOKU, Austria)
- 08:30 – 08:35 Session Introduction
- 08:35 – 09:10 **Metabolic engineering strategies for producing oleochemicals in bacteria**
Brian F. Pfleger, University of Wisconsin-Madison, USA
- 09:10 – 09:45 **Improving biochemical yields with MixoFerm**
Shawn W. Jones, White Dogs Labs, USA
- 09:45 – 10:00 **Cyanobacteria as photosynthetic factories: Synthetic biology methods in the development of next-generation production platforms**
Hariharan Dandapani, University of Turku, Finland
- 10:00 – 10:30 Coffee break
- 10:30 – 10:55 **Systems metabolic engineering of *Corynebacterium glutamicum* and *Bacillus methanolicus* for production of new products from alternative carbon sources**
Volker F. Wendisch, Bielefeld University, Germany
- 10:55 – 11:20 **MOMENTUM: Microbial Optimization via Metabolic Network Minimization**
Zhixia Ye, Duke University, USA
- 11:20 – 11:25 Concluding Remarks
- 11:25 – 11:30 Introduction of Plenary Lecture – Barry Buckland
- 11:30 – 12:20 **Plenary Lecture**
New bio-based supply chains for plant-based medicines Christina Smolke, Antheia, USA
- 12:20 – 12:25 Concluding Remarks
- 12:30 – 14:30 Lunch
- 14:30 – 16:25 **Session II: Therapeutic Proteins (Part 1)**
(Sponsored by Sartorius Stedim Biotech GmbH)
Session Chairs: Karen Polizzi (Imperial College London, United Kingdom)
Eli Keshavarz-Moore (UCL, United Kingdom) Michael Hohn (Merck, USA)
- 14:30 – 14:35 Session Introduction
- 14:35 – 15:10 **Learning from the mammalian expression system to develop a high titer-half antibody process in *E. coli***
Emily Dong, Genentech, USA
- 15:10 – 15:35 **Matching secretion capacity via translation control**
Neil Dixon, Manchester University, United Kingdom

Monday, March 5, 2018 (continued)

- 15:35 – 16:00 **C1: How the C1 platform will change the production approach for therapeutic proteins**
Ronen Tchelet, Dyadic, USA
- 16:00 – 16:20 **Gram Level scFv expression platform of *Pichia pastoris***
Jen-Wei Chang, Development Center for Biotechnology, Taiwan
- 16:20 – 16:25 Concluding Remarks
- 16:25 – 16:55 Coffee/Tea break
- 16:55 – 17:00 Introduction of Plenary Lecture – Eli Keshavarz-Moore
- 17:00 – 17:50 **Plenary Lecture**
mRNA vaccines and therapeutics: On the progress from promise to reality
Hari Pujar, Moderna, USA
- 19:00 – 20:30 Dinner
- 20:30 – 23:00 **Poster Session I** (with social hour and dessert)
Session Chairs: Stefanie Frank (UCL, United Kingdom)
Eli Keshavarz-Moore (UCL, United Kingdom)

Tuesday, March 6, 2018

- 07:00 – 08:30 Breakfast
- 08:30 – 12:30 **Session III: Secondary Metabolites**
Session Chairs: Beth Junker (Bioprocess Advantage, USA)
Yi Tang (University of California, Los Angeles, USA)
- 08:30 – 08:35 Session Introduction
- 08:35 – 09:05 **Natural products by synthetic biology and microbial engineering**
Ben Shen, The Scripps Research Institute, USA
- 09:05 – 09:35 **An integrated strain improvement and process development program for the production of UK-2A, the precursor of the fungicide Inatreq™ active**
Mark Mikola, Dow AgroSciences LLC, USA
- 09:35 – 10:05 **Scale up of low producing, potent secondary metabolites**
Scott Doncaster, BioVectra Inc., Canada
- 10:05 – 10:25 **One-pot synthesis of amino-alcohol using a *de novo* transketolase: Transaminase pathway in *Pichia pastoris* strain GS115**
Marie-Jose Henriquez, UCL, United Kingdom
- 10:25 – 10:55 Coffee/Tea break (*Sponsored by Amgen*)
- 10:55 – 11:25 **Microbial engineering of new *streptomyces sp.* from extreme environments for novel antibiotics and anticancer drugs**
Juan Asenjo, University of Chile, Chile
- 11:25 – 11:55 **Genome-guided methods for discovering new natural product from fungi**
Yi Tang, University of California, Los Angeles, USA
- 11:55 – 12:25 **An efficient commercial platform for microbial engineering of natural products**
Hsien-Chung Tseng, Manus Bio, USA
- 12:25 – 12:30 Concluding Remarks
- 12:30 – 14:00 Lunch
- 14:00 – 14:05 Introduction of Plenary Lecture – Barry Buckland
- 14:05 – 15:00 **Plenary Lecture**
Engineered polyketide synthases for production of commodity and specialty chemicals
Jay Keasling, University of California-Berkeley, USA
- 15:00 – 15:30 Coffee/Tea break (*Sponsored by Genentech*)
- 15:30 – 17:35 **Session IV: Biomaterials and Biofuels**
Session Chairs: Behnam Taidi (CentraleSupélec, LGPM, France)
Joel Cherry (Amyris Inc., USA)
- 15:30 – 15:35 Session Introduction

Tuesday, March 6, 2018 (continued)

- 15:35 – 16:05 **Integrated bioengineering: Genomatica’s approach to rapid commercialization**
Michael Japs, Genomatica, USA
- 16:05 – 16:45 **Automating bioengineering: First the hands, then the head**
Ben Kaufmann-Malaga, Amyris, USA
- 16:45 – 17:15 **The circular bioeconomy and the concept of biorefinery**
Behnam Taidi, CentraleSupélec, LGPM, France
- 17:15 – 17:30 **Exploiting fatty acid metabolic pathway for production of short chain fatty acids in *E. coli***
Kamran Jawed, ICGEB/Rensselaer Polytechnic Institute, USA
- 17:30 – 17:35 Concluding Remarks
- 17:35 – 20:30 “Dine Around” (free time for participants to experience Santa Fe dining)
- 20:30 – 23:00 **Poster Session II**
Session Chairs: Stefanie Frank (UCL, United Kingdom)
Eli Keshavarz-Moore (UCL, United Kingdom)

Wednesday, March 7, 2018

- 07:00 – 08:30 Breakfast
- 08:30 – 10:30 **Session V: Therapeutics Proteins (Part II)**
Session Chairs: Karen Polizzi (Imperial College London, United Kingdom)
Eli Keshavarz-Moore (UCL, United Kingdom)
Michael Hohn (Merck, USA)
- 08:30 – 08:35 Session Introduction
- 08:35 – 09:10 **Antibody production in micro-organisms**
Hanxiao Jiang, Amyris Inc., USA
- 09:10 – 09:40 **Process optimization, manufacturing changes from early to late phase development, and comparability of Resolaris**
Ying Buechler, aTyr Pharma, USA
- 09:40 – 10:10 **Promoter and process engineering for recombinant protein production in *Pichia pastoris* towards simple, fast and methanol-free cultivation regimes and high product titers**
Roland Prielhofer, ACIB, Austria
- 10:10 – 10:25 **Towards extracellular release of recombinant proteins from *E.coli* using antisense technology**
Shahin Heshmatifar, UCL, United Kingdom
- 10:25 – 10:30 Concluding Remarks
- 10:30 – 11:00 Coffee/Tea break (*Sponsored by Biological E Limited*)
- 11:00 – 12:30 **Session VI: Vaccines**
(Sponsored by Pfizer)
Session Chairs: Barry Buckland (BiologicB, LLC, United Kingdom)
Tiffany Rau (BioProcess Technology Consultants (BPTC), USA)
- 11:00 – 11:05 Session Introduction
- 11:05 – 11:40 **Rational design of expression vectors for high quality biologics**
Kerry Love, Massachusetts Institute of Technology, USA
- 11:40 – 12:00 **High yield plasmid DNA production under oxygen limitation using microaerobically induced replication**
Alvaro Lara, Universidad Autónoma Metropolitana-Cuajimalpa, Mexico
- 12:00 – 12:30 **A *Pseudomonas fluorescens*- based platform for robust vaccine manufacturing**
Russell Coleman, Pfenex Inc, USA
- 12:30 – 14:00 Lunch
- 14:00 – 14:05 Introduction
- 14:05 – 14:30 **Enhancing the yield and quality of supercoiled plasmid through Plasmid Engineering**
Olusegun Folarin, UCL, UK

Wednesday, March 7, 2018 (continued)

- 14:30 – 15:00 **Computational fluid dynamics modeling for fermentation risk reduction during technology transfer and risk understanding**
Tracie Spangler, Merck & Co., Inc., USA
- 15:00 – 15:30 **Engineering of probiotic *E.coli* to treat metabolic disorders**
Paul Miller, Synlogic, USA
- 15:30 – 15:35 Concluding Remarks
- 15:35 – 16:00 Coffee/Tea break
- 16:00 – 18:15 **Conference Workshop**
Chair: Eli Keshavarz-Moore (UCL, United Kingdom)
- Topic: Leap-frogging microbial fermentation applications-what is needed, who can develop it, and how will it move the dial?**
- 16:00 – 16:05 Introduction
- 16:05 – 16:15 **Historical Perspective:** Barry Buckland (BiologicB, LLC)
- 16:15 – 16:35 **Present Day: Equipment - Vendors and CMOs**
Sartorius, GE
- 16:35 – 16:45 **Present Day: Cost models; Buy versus build**
Tiffany Rau, BioProcess Technology Consultants (BPTC), USA
- 16:45 – 16:55 **Present Day: Secondary metabolites and chemicals**
Joel Cherry, Amyris Inc., USA
- 16:55 – 17:05 **A vision for therapeutic proteins and vaccine protein antigens**
Chris Love, Massachusetts Institute of Technology, USA
- 17:05 – 17:15 **Impact on human health: The unmet medical need is often affordability**
Steve Hadley, Bill & Melinda Gates Foundation, USA
- 17:15 - 17:30 **Role of Academia/Government/Industry Partnership**
NIIMBL, UCL Biomanufacturing Hub
Barry Buckland, Eli Keshavarz-Moore
- 17:30 – 18:10 Open Discussion
- 18:10 – 18:15 Concluding Remarks
- 18:15 – 18:30 Short biobreak
- 18:30 – 18:35 Introduction to Closing Lecture - Eli Keshavarz-Moore

Wednesday, March 7, 2018 (continued)

- 18:35 – 19:10 **Closing Plenary Lecture**
Opening microbial cells expands their capabilities
Jim Swartz, Stanford University, USA
- 19:45 – 23:00 **Reception, Banquet Dinner and Poster Prizes**

Thursday, March 8, 2018

07.00 – 09.30

Breakfast and Departures

Poster Presentations

1. **Enlarging the synthetic biology toolbox for *Pichia pastoris*: Golden Gate cloning and CRISPR/Cas9**
Roland Prielhofer, ACIB - Austrian Centre of Industrial Biotechnology, BOKU/DBT, Austria
2. **Engineering vacuolar sorting pathways for efficient secretion of recombinant proteins**
Brigitte Gasser, BOKU/DBT, Austrian Centre for Industrial Biotechnology (ACIB), Austria
3. **Genome-scale reconstruction of *Salinispora tropica* metabolism; Microbial engineering and its applications in secondary metabolite production**
Barbara A. Andrews, Centre for Biotechnology and Bioengineering, University of Chile, Chile
4. **Using screening and classical strain improvement techniques to get the best performance of lactic acid bacteria**
Gunnar Øregaard, Chr Hansen, Denmark
5. **Combined engineering of disaccharide transport and phosphorolysis for enhanced ATP yield from sucrose fermentation in *Saccharomyces cerevisiae***
Wesley Marques, Delft University of Technology, The Netherlands
6. **Engineering of *Escherichia coli* protein expression process development**
Chih-Hsi Fan, Development Center for Biotechnology, Taiwan
7. **Gram level scFv expression platform of *Phichi pastoris***
Jen-Wei Chang, Development Center for Biotechnology / Institute of Biologics, Taiwan
8. **Redox potential control in anaerobic *Clostridium beijerinckii* fermentation using single-use vessels**
Ying Yang, Eppendorf Inc., USA
9. **Production, immobilization and synthesis of pharmacological derivatives of lipase B from *Candida antarctica* in *Pichia pastoris***
Julia Robert, Federal University of Rio de Janeiro, Brazil
10. **Improvement of retinoids production in recombinant *E. coli* using glyoxylic acid**
Ji-Bin Park, Gyeongsang National University, South Korea
11. **Sequential whole cell conversion process for production of D-psicose and D-mannitol from D-fructose**
Seong-Hee Jeong, Gyeongsang National University, South Korea
12. **Optimization of isoprene production using a metabolically engineered *Escherichia Coli***
Seon-Yeong Jo, Gyeongsang National University, South Korea
13. **Production of α -Bisabolol from metabolically engineered *Escherichia coli***
Ju-Eon Park, Gyeongsang National University, South Korea
14. **Engineering of *Corynebacterium glutamicum* for the secretory production of recombinant proteins via Tat-dependent pathway**
Jae Woong Choi, KAIST, South Korea

15. **Expression and downstream purification of insulin molecules in *Pichia pastoris***
Aster J. Escalante, Keck Graduate Institute, USA
16. **Replacing animal-based hydrolysates in biopharmaceutical processes with animal-free and chemically defined alternatives to reduce regulatory concerns**
Floyd L. Inman III, Kerry, USA
17. **Synthetic biocatalytic modules for enhanced transformation of biological waste products**
Peter L. Bergquist, Macquarie University, Australia
18. **Identifying the best *Pichia pastoris* base strain using functional genomics**
Joseph R. Brady, Massachusetts Institute of Technology, USA
19. **Case study: Raman implementation for process lifecycle management in fermentation based processes**
Roberto I. Ortiz, Merck & Co, USA
20. ***E. coli* strain engineering to minimize host cell protein contamination of recombinant target protein**
James Samuelson, New England Biolabs, Inc., USA
21. **Sustainable production of β -Xanthophylls in *Saccharomyces Cerevisiae***
Vicente Cataldo, Pontificia Universidad Católica de Chile, Chile
22. **Coenzyme Q production by metabolic engineered *Escherichia coli* strains**
Irene Martinez, Pontificia Universidad Católica de Valparaíso, Chile
23. **Automation and miniaturization of a microbial fermentation platform for the production of antibody fragments**
Geoff Brown, UCB, United Kingdom
24. **Genetically engineered probiotic *E. coli* Nissle to consume amino acids associated with orphan metabolic diseases**
Ning Li, Synlogic Inc., USA
25. **Towards extracellular release of recombinant proteins from *E.coli* using antisense technology**
Shahin Heshmatifar, UCL, United Kingdom
26. **Effect of the oxygen transfer rate on oxygen-limited production of plasmid DNA by *Escherichia coli***
Alvaro R. Lara, Universidad Autónoma Metropolitana-Cuajimalpa, Mexico
27. **Methodology to rapidly assess enzyme cascades in aid of metabolic engineering of host cells**
Maria Villegas-Torres, Icesi University and University College London, Colombia
28. **Enhancing the productivity of supercoiled plasmid upstream bioprocessing through plasmid engineering**
Olusegun Folarin, University College London, United Kingdom
29. **Developing bacterial microcompartments for the recombinant production of proteins**
Stefanie Frank, University College London, United Kingdom

30. **From screening to process optimization: AMBR technology to speed up microbial fermentation processes**
Kevin McHugh, Sartorius Stedim Biotech, USA
31. **Enumeration method and medium design for a mixed culture of *saccharomyces cerevisiae* and *chlorella vulgaris***
Behnam Taidi, CentraleSupélec, LGPM, France