Program

Biochemical and Molecular Engineering XXI

July 14-18, 2019
Fairmont Tremblant Hotel
Mont Tremblant, Quebec, Canada

Conference Co-Chairs
Christina Chan
Michigan State University, USA

Mattheos Koffas
Rensselaer Polytechnic Institute, USA

Steffen Schaffer
Evonik Industries, Germany

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Biogen, USA

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Engineering Conferences International (ECI) is a not-for-profit global engineering conferences program, originally established in 1962, that provides opportunities for the exploration of problems and issues of concern to engineers and scientists from many disciplines.

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Timothy Whitehead, University of Colorado-Boulder
Marcella Yu, Boehringer-Ingelheim

Jonathan S. Dordick to receive the Amgen Biochemical and Molecular Engineering Award

The **Amgen Award** (supported by Amgen, Inc., Thousand Oaks, CA, a leading biotechnology company with pioneering human therapeutic products) is given in memory **of James E. Bailey** to recognize research excellence and leadership in Biochemical and Molecular Engineering. An award of $5000 cash and a commemorative plaque from Amgen will be presented at the ECI Conference on Biochemical and Molecular Engineering in Mont Tremblant, Quebec, Canada.

The 2019 awardee is **Jonathan S. Dordick**.

Jonathan S. Dordick is the Howard P. Isermann Professor of Chemical and Biological Engineering at Rensselaer Polytechnic Institute, with joint appointments in the Departments of Biomedical Engineering and Biological Sciences, and an adjunct appointment at the Rockefeller University. He received his B.A. degree in Biochemistry and Chemistry from Brandeis University and his Ph.D. in Biochemical Engineering from the Massachusetts Institute of Technology. At Rensselaer, he served as the Vice President for Research, the Director of the Center for Biotechnology & Interdisciplinary Studies, and Department Chair. Prior to joining Rensselaer, he was Professor of Chemical and Biochemical Engineering at the University of Iowa, where he also served as the founding Associate Director of the Center for Biocatalysis and Bioprocessing. Dr. Dordick's research group includes chemical engineers, bioengineers, materials scientists, biologists, chemists, microbiologists and computational scientists all focused on gaining a quantitative understanding of biological principles and applying them to advance bioengineering and biomanufacturing. He has served the biochemical engineering community as a previous chairman of the Biotechnology Division of the American Chemical Society and as an Associate Editor of Biotechnology & Bioengineering.

Dr. Dordick has made foundational contributions to enzyme technology, microscale cell culture engineering, drug discovery and human toxicology, and biomanufacturing. He pioneered the development of enzymatic and chemoenzymatic methods for new materials synthesis, initiated the new field of molecular bioprocessing, which combines biocatalytic molecular diversity and in vitro metabolic pathway engineering with high-throughput and high-content microfluidic- and microarray-based tools to generate biologically active compounds, and greatly expanded the fundamental understanding of enzymatic catalysis in abiotic environments critical for chemical and pharmaceutical processing. Finally, he has used biomolecular discovery and engineering to address clinical translation in areas of infectious disease, neurological diseases and anticoagulant therapy.

Prof. Dordick has received numerous awards, including the Food, Pharmaceutical and Bioengineering Award of the American Institute of Chemical Engineers, Marvin J. Johnson Award and the Elmer Gaden Award both of the American Chemical Society, the International Enzyme Engineering Award, and an NSF Presidential Young Investigator Award. He is an elected Fellow of the National Academy of Inventors, the American Chemical Society, the American Association for the Advancement of Science, and the American Institute of Medical and Biological Engineers. He has cofounded several companies, including EnzyMed (now part of Albany Molecular Research, Inc.), Solidus Biosciences, Inc., and Redpin Therapeutics.

Previous conferences in this series:

Biochemical Engineering
August 20-25, 1978
New England College, Henniker, New Hampshire
Conference Chairs:
W. R. Vieth, Rutgers University
A. Constantinides, Rutgers University

Biochemical Engineering II
July 13-18, 1980
New England College, Henniker, New Hampshire
Conference Chair:
A. Constantinides, Rutgers University

Biochemical Engineering III
Sept. 19-24, 1982
Santa Barbara, California
Conference Chair:
K. Venkatsubramanian, H.J. Heinz Co. and Rutgers University

Biochemical Engineering IV
Sept. 30 - Oct. 5,1984
Galway, Ireland
Conference Chairs:
H. Lim , Purdue University
Patrick Fottrell, University of Galway

Biochemical Engineering V
July 27-Aug 1,1986
New England College, Henniker, New Hampshire
Conference Chair:
W.A. Weigand, Illinois Institute Of Technology

Biochemical Engineering VI
October 2-7,1989
Santa Barbara, California
Conference Chair:
Walter E. Goldstein, ESCA Genetic Corp.

Biochemical Engineering VII
March 3-8, 1991
Santa Barbara, California
Conference Chairs:
H. Pedersen, Rutgers University
D. DiBiasio, Worcester Polytechnic

Biochemical Engineering VIII
July 11-16, 1993
Princeton, New Jersey
Conference Chairs:
Subhash Karkare, Amgen
Robert M. Kelly, North Carolina State University

Previous conferences in this series:

Biochemical Engineering IX
May 21-26,1995
Davos, Switzerland
Conference Chairs:
J. Bailey, ETH
D. Zabriskie, SmithKline Beecham

Biochemical Engineering X
May 18-23,1997
Kananaskis, Alberta, Canada
Conference Chairs:
W-S. Hu, University of Minnesota
J. Swartz, Genentech

Biochemical Engineering XI
July 25-30,1999
Salt Lake City, Utah
Conference Chairs:
George Georgiou, University of Texas
Steven Lee, Merck & Co., Inc.

Biochemical Engineering XII
June 10-15, 2001
Rohnert Park, California
Conference Chairs:
Doug Clark, University of California-Berkeley
Jay Keasling, University of California-Berkeley
David Robinson, Merck

Biochemical Engineering XIII
July 19-23, 2003
Boulder, Colorado
Conference Chairs:
Eleftherios Terry Papoutsakis, Northwestern University
Dr Weichang Zhou, Protein Design Labs

Biochemical Engineering XIV
July 10-14, 2005
Harrison Hot Springs, B.C., Canada
Conference Chairs:
William Bentley, University of Maryland
Hendrik J. Meerman, Genencor International, Inc.
Mike Betenbaugh, Johns Hopkins University
Vijay Yabannavar, Chiron

Biochemical Engineering XV
July 15-19, 2007
Quebec City, Quebec, Canada
Conference Chairs:
M. Betenbaugh, Johns Hopkins University
V. Yabannavar, Trubion Pharmaceuticals
A. Robinson, University of Delaware
E. Schaefer, BMS

Previous conferences in this series:

Biochemical Engineering XVI
July 5-9, 2009
Burlington, Vermont, USA
Conference Chairs:
A. Robinson, University of Delaware
E. Schaefer, BMS

Biochemical Engineering XVII
June 26-30, 2011
Seattle, Washington, USA
Conference Chairs:
F. Baneyz, University of Washington
C. Maranas, Penn State University
B. Junker, Merck Research

Biochemical Engineering XVIII
June 16-20, 2013
Beijing, China
Conference Chairs:
David Robinson, Merck
Tianwei Tan, Beijing University of Chemical Technology
Huimin Zhao, University of Illinois at Urbana-Champaign

Biochemical Engineering XIX
July 12-16, 2015
Puerto Vallarta, Mexico
Conference Chairs:
Theresa Good, National Science Foundation
Gargi Seth, Intas Pharmaceuticals Ltd.

Biochemical Engineering XX
July 16-20, 2017
Newport Beach, CA, USA
Conference Chairs:
Wilfred Chen, University of Delaware, USA
Nicole Borth, Universität für Bodenkultur, Vienna, Austria
Stefanos Grammatikos, UCB Pharma, Belgium

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National Science Foundation

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Pall Biotech

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UCB Pharma S.A.

Seattle Genetics

Room locations and notes

- General Sessions and Workshops will be held in Mali III-IV.
- Poster Sessions will be in Mali I-II.
- Meals will be in Soutana 1-2. The conference banquet location will be announced on site.
- The ECI office is the Meeting Planner Office.
- 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.
- 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.

Sunday, July 14, 2019

13:30 – 15:30	Conference Check-in (Mali Foyer)
15:30 – 15:50	**Welcome from the conference chairs**
	Session I: Discovery, Development and Production of Emerging and Current Products: Biologic Therapeutic Products Session Chairs: Corinne Hoesli, McGill University, Canada Sandra Rios, Merck, USA
15:50 – 15:55	Introduction by Session Chairs
15:55 – 16:15	**Back to the future: A back and forth manufacturing process journey from monoclonal antibodies to viral vectors for cell and gene therapy** Rene Gantier, Pall Biotech, USA
16:15 – 16:40	**Living Bacterial Hydrogels as Therapeutic Biomaterials** Noemie-Manuelle Dorval Courchesne, McGill University, Canada
16:40 – 17:00	**Optimization of *E. coli* SoluProTM using synthetic biology to a generate a high performance chassis microbe for scalable production of protein therapeutics** Johan A. Kers, AbSci, USA
17:00 – 17:30	Coffee Break
17:30 – 17:55	**Computational methods for cell culture media optimization and product quality control (Invited)** Wai Lam Ling, Merck, USA
17:55 – 18:15	**The separation of red blood cells based solely on intrinsic magnetization: Clinical and commercial implications** Jeff Chalmers, Ohio State University, USA
18:15 – 18:35	**Encapsulation bioprocesses for diabetes cellular therapy** Corinne Hoesli, McGill University, Canada
18:35 – 18:55	**Development of phospho-tau specific antibodies: Validation and engineering of specificity** Yongku P. Cho, University of Connecticut, USA
18:55 – 19:00	Remarks by Session Chairs
19:00 – 20:00	**Keynote 1** **Lessons from the Iron Ring** Sandra Poole, Independent Director, USA
20:00 – 22:00	Buffet Dinner

Monday, July 15, 2019

06:30 – 08:00 Buffet Breakfast

Session II: Current Technology Challenges and Opportunities: Fitting Biology into a Technological World

Chairs: Gargi Seth, Genentech, USA
Nicole Borth, University of Natural Resources and Life Sciences, Austria

08:00 – 08:05 Introduction by Session Chairs

08:05 – 08:30 **Engineering next generation therapeutics to combat infectious diseases (Invited)**
Jennifer Maynard, The University of Texas at Austin, USA

08:30 – 08:50 **Designing an artificial Golgi reactor for cell-free glycosylation**
Ignacio Moya Ramírez, Imperial College London, United Kingdom

08:50 – 09:10 **Inhibition of productive/competitive endocytic pathways enhances siRNA delivery and cell specific targeting**
S. Patrick Walton, Michigan State University, USA

09:10 – 09:30 **Developing the calcium-dependent conformational behavior of the RTX peptide domain for novel protein capture and recovery applications**
Scott Banta, Columbia University, USA

09:30 – 09:35 Remarks by Session Chairs

09:35 – 09:50 Remarks by Panel Chairs (Mike Betenbaugh and Kristala Jones Prather)

09:50 – 10:20 Coffee Break

Session III: Systems Metabolic Engineering: From Systems Biology To Synthetic Evolution

Chairs: Julia Frunzke, Forschungszentrum Jülich, Germany
Radhakrishnan Mahadevan, University of Toronto, Canada
Kyongbum Lee, Tufts University, USA

10:20 – 10:25 Introduction by Session Chairs

10:25 – 10:50 **CRISPR-guided DNA polymerase enabling diversification of all nucleotides in a tunable window (Invited)**
John Dueber, University of California, Berkeley, USA

10:50 – 11:15 **Small-molecule biosensors for high-throughput metabolic engineering (Invited)**
Michael K. Jensen, Novo Nordisk Center at Technical University of Denmark, Denmark

11:15 – 11:35 **High-throughput enzyme engineering for commercial-scale production of natural products**
Jacy Humphries, Amyris, Inc., USA

11:35 – 11:55 **Engineering *Corynebacterium glutamicum* to produce the biogasoline isopentenol from plant biomass hydrolysates**
Thomas T. Eng, Lawrence Berkeley Labs, USA

Monday, July 15, 2019 (continued)

11:55 – 12:15	**Yarrowia lipolytica: A versatile microbial workhorse for expanding nature's biosynthetic capacity** Peng Xu, University of Maryland, USA
12:15 – 12:20	Remarks by Session Chairs
12:20 – 13:50	Lunch
	Session IV: Discovery, Development and Production of Emerging and Current Products: Molecular Engineering of Plants and Plant-Derived Products Chairs: Christie Peebles, Colorado State University, USA Tim Whitehead, University of Colorado Boulder, USA
13:50 – 13:55	Introduction by Session Chairs
13:55 – 14:20	**Solution of the multi-step assembly of catharanthus roseus anticancer alkaloids (Invited)** Vincenzo De Luca, Brock University, Canada
14:20 – 14:45	**Plant cell culture platforms for production of bioscavengers for biodefense (Invited)** Karen McDonald, University of California at Davis, USA
14:45 – 15:05	**Metabolic engineering of *Saccharomyces cerevisiae* for high level production of aromatic chemicals** Yun Chen, Chalmers University of Technology, Sweden
15:05 – 15:25	**Engineered metabolic pathways for the microbial synthesis of plant natural products** Ramon Gonzalez, University of South Florida, USA
15:25 – 15:45	**Tailoring *Corynebacterium glutamicum* towards efficient production of plant polyphenols** Jan Marienhagen, Forschungszentrum Jülich GmbH, Germany
15:45 – 15:50	Remarks by Session Chairs
15:50 – 16:20	Coffee Break
16:20 – 17:20	**Keynote 2** **A Novel Anti-diabetic Metabolite from Plants: Biosynthesis, Gene Discovery, and Metabolic Engineering of Montbretin A** Jörg Bohlmann**,** Professor and Distinguished University Scholar, Michael Smith Laboratories, University of British Columbia, Canada
	Session V: Current Technology Challenges and Opportunities: Sophisticated Technology to Understand and Make Use of Biology Chairs: Mike Betenbaugh, Johns Hopkins University, USA Himadri Pakrashi, Washington University in St. Louis, USA
17:20 – 17:25	Introduction by Session Chairs

Monday, July 15, 2019 (continued)

17:25 – 17:50	**Evolution of a modular, multi-functional targeted delivery nanoparticle (Invited)** James Swartz, Stanford University, USA
17:50 – 18:10	**A platform technology for dynamic control of cell behavior** Laura Segatori, Rice University, USA
18:10 – 18:35	**New synthetic biology tools for dynamic modulation of cellular phenotypes (Invited)** Wilfred Chen, University of Delaware, USA
18:35 – 18:55	**Recording temporal data with minutes resolution into DNA** Keith Tyo, Northwestern University, USA
18:55 – 19:00	Remarks by Session Chairs
19:00 – 20:30	**Rapid-fire posters/** Dinner Chairs: Karin Anderson, Pfizer, USA S. Patrick Walton, Michigan State University, USA (Posters 7, 15, 16, 18, 24, 25, 31, 36, 38)
20:30 – 22:30	**Poster session**/Dessert, Social Period ***Sponsored by NIIMBL*** Chairs: Wendy Hsu, Genentech, USA Noemie-Manuelle Dorval Courchesne, McGill University, Canada

Tuesday, July 16, 2019

06:30 – 08:00 Breakfast

Session VI: Microbial Consortia: Novel Mechanisms and Applications
Chairs: Arul Jayaraman, Texas A&M University, USA
Volker F. Wendisch, Bielefeld University, Germany
Andrea Herold, BASF

08:00 – 08:05 Session Introduction by Session Chairs

08:05 – 08:30 **Developing and applying a microdroplet co-cultivation and omics toolbox for elucidating complex microbiomes (Invited)**
Nina Lin, University of Michigan, USA

08:30 – 08:55 **Exploiting anaerobic consortia as new tools for biomass breakdown and sustainable chemistry (Invited)**
Michelle O'Malley, University of California, Santa Barbara, USA

08:55 – 09:15 **Direct cell-to-cell exchange of matter in synthetic clostridium syntrophies enabling CO_2 fixation and an expanded metabolic space.**
Terry Papoutsakis, University of Delaware, USA

09:15 – 09:35 **Design, construction and application of *E. coli - C. glutamicum* synthetic consortia**
Volker Wendisch, Bielefeld University, Germany

09:35 – 09:40 Remarks by Session Chairs

09:40 – 10:10 Coffee Break

10:10 – 11:10 **Keynote 3**
Genome editing and synthesis platforms which facilitate the Construction of cell factories
Akihiko Kondo, Graduate School of Science, Technology and Innovation, Kobe University, RIKEN Center for Sustainable Resource Science

11:10 – 11:40 **Rapid-fire posters**
Chairs: Karin Anderson, Pfizer, USA
S. Patrick Walton, Michigan State University, USA

(Posters 43, 44, 46, 51, 53, 54, 56, 60, 68)

11:40 – 13:00 **Poster Session/** Lunch
Sponsored by Genentech, Inc., A Member of the Roche Group
Chairs: Wendy Hsu, Genentech, USA
Noemie-Manuelle Dorval Courchesne, McGill University, Canada

Session VII: Emerging Technologies: Applications of Knowledge Engineering and Big Data Approaches in Synthetic and Systems Biology
Chairs: Yinjie Tang, Washington University in St. Louis, USA
Marcella Yu, Boehringer-Ingelheim, Germany

13:00 – 13:05 Introduction by Session Chairs

Tuesday, July 16, 2019 (continued)

13:05 – 13:30	**Metabolomics process modeling: A systems biology approach to understand variability in commercial biologics cell culture processes (Invited)** Amanda Lewis, Bristol-Myers Squibb, USA
13:30 – 13:50	**Applying metabolic models for control in order to enhance algal growth and lipid production** Mike Betenbaugh, Johns Hopkins University, USA
13:50 – 14:15	**An adaptive laboratory evolution platform for strain construction and engineering parts (Invited)** Adam Feist, University of California San Diego, USA
14:15 – 14:35	**Validation and stabilization of a prophage lysin of *Clostridium perfringens* by yeast surface display and co-evolutionary models** Ben Hackel, University of Minnesota, USA
14:35 – 14:55	**Unraveling the metabolic and machinery constraints on protein secretion through a novel systems biology framework** Nathan Lewis, University of California San Diego, USA
14:55 – 15:00	Remarks by Session Chairs
15:00	Free time for networking, recreation
	Dinner on your own

Wednesday, July 17, 2019

06:30 – 08:00	Breakfast
	Session VIII: Emerging Technologies: Optogenetic and Epigenetic Control Of Cell Function Chairs: Brigitte Gasser, University of Natural Resources and Life Sciences, Austria Ravi Kane, Georgia Institute of Technology, USA José L. Avalos, Princeton University, USA
08:00 – 08:05	Introduction by Session Chairs
08:05 – 08:30	**Optogenetics for intracellular codebreaking: How ERK dynamics control gene expression and cell fate (Invited)** Jared Toettcher, Princeton University, US**A**
08:30 – 08:55	**Manipulating phenotypes by epigenetic mechanism (Invited)** Nicole Borth, University of Natural Resources and Life Sciences, Austria
08:55 – 09:15	**High-throughput multicolor optogenetics for the systematic manipulation of cell behavior** Lukasz Bugaj, University of Pennsylvania, USA
09:15 – 09:35	**Optogenetic modulation of insulin function in pancreatic beta-cells** Emmanuel Tzanakakis, Tufts University, USA
09:35 – 09:55	**Towards electrogenetics: Integrating biofabrication, synthetic biology, and microelectronics** Bill Bentley, University of Maryland, USA
09:55 – 10:00	Remarks by Session Chairs
10:00 – 10:30	Coffee Break
	Workshop on Modeling and Analysis of Big Data Chairs: Ranjan Srivastava, University of Connecticut, USA Nathan Lewis, University of California San Diego, USA
10:30 – 11:15	**K-FIT: Parameterizing kinetic models of metabolism using multiple fluxomic datasets** Costa Maranas, Penn State University, USA
11:15 – 12:00	**The statistics of directed evolution: From library generation to high throughput screens** Keith Tyo, Northwestern University, USA
12:00 – 13:00	**Keynote 4** **Establishing a Novel Cell Therapy Platform: Synthetic Biology and Bioprocess Considerations for Rational Therapeutic Development** Spencer Fisk, Senior Vice President of Manufacturing, Rubius Therapeutics, USA
13:00 – 14:30	Lunch

Wednesday, July 17, 2019 (continued)

Workshop on Entrepreneurship and Commercialization
Chairs: Matthew DeLisa, Cornell University, USA
James Swartz, Stanford University, USA

14:30 – 14:50 **Personal reflections on an entrepreneurial path**
Jonathan Dordick, Rensselaer Polytechnic Institute, USA

14:50 – 15:10 **Adventures and lessons in start-up land**
Kenneth Reardon, Colorado State University, USA

15:10 – 15:30 **A tale of three companies**
James Swartz, Stanford University, USA

15:30 – 16:30 Discussion and Q&A

16:30 – 17:00 Coffee Break

17:00 – 18:30 **Panel discussion**
Chairs: Mike Betenbaugh, Johns Hopkins University, USA
Kristala Jones Prather, Massachusetts Institute of Technology, USA

18:30 – 19:30 Reception

19:30 – 22:00 Amgen Award Lecture/Dinner/Roast/Poster Awards/Next Conference Announcements

Amgen Award lecture
Biochemical engineering under stress: from plants to people to products
Jonathan Dordick, Rensselaer Polytechnic Institute, USA

Thursday, July 18, 2019

06:30 – 08:00 Breakfast

Session IX: Current Technology Challenges and Opportunities: Microbial Production of Bio-Based Chemicals, Fuels and Building Blocks
Chairs: Ching Leang, LanzaTech, USA
Andreas Liese, Hamburg University of Technology, Germany

08:00 – 08:05 Introduction by Session Chairs

08:05 – 08:30 **CO_2 as carbon source for microbial production of bio-based chemicals (Invited)**
Dirk Weuster-Botz, Technical University of Munich, Germany

08:30 – 08:50 **Increased yield and productivity for the conversion of algal biomass carbohydrates**
Kenneth F. Reardon, Colorado State University, USA

08:50 – 09:10 **Bioswitches and robotics for systems metabolic engineering and synthetic biology of hyper microbial production strain**
An-Ping Zeng, Institute of Bioprocess and Biosystems Engineering, Germany

09:10 – 09:30 **Scaling up *E. coli* from the lab to industrial conditions: Lessons learned to engineer robust processes and production hosts**
Ralf Takors, University of Stuttgart, Germany

09:30 – 09:55 **Challenges and successes in technology scale up (Invited)**
Jason Bromley, LanzaTech, USA

09:55 – 10:00 Remarks by Session Chairs

10:00 – 10:30 Coffee Break

Session X: Discovery, Development and Production of Emerging and Current Products: Microbial Production of Bio-Based Chemicals, Fuels and Building Blocks

Sponsored by Evonik Creavis GmbH

Chairs: Jan Marienhagen, Forschungszentrum Jülich, Germany
Itzel Ramos, REG Life Sciences, USA

10:30 – 10:35 Introduction by Session Chairs

10:35 – 11:00 **Engineering yeast for the high-level synthesis of polyketide biobased chemicals (Invited)**
Nancy DaSilva, University of California, Irvine, USA

11:00 – 11:25 **Engineering of an environmental isolate of *bacillus megaterium* for biochemical production under supercritical CO_2 (Invited)**
Kristala Jones Prather, Massachusetts Institute of Technology, USA

11:25 – 11:50 **Optogenetics as a new paradigm for dynamic control in metabolic engineering (Invited)**
Jose Avalos, Princeton University, USA

Thursday, July 18, 2019 (continued)

11:50 – 12:10	**Microbial synthetic biology** Sang Woo Seo, Seoul National University, South Korea
12:10 – 12:30	**Bioconversion of levulinic acid to methyl-ethyl ketone via a novel catabolic pathway** Brian Pfleger, University of Wisconsin-Madison, USA
12:30 – 12:35	Remarks by Session Chairs
12:35 – 13:00	Closing remarks by Conference Chairs / Lunch to go

Posters

Biochemical and Molecular Engineering XXI

July 14-18, 2019
Fairmont Tremblant Hotel
Mont Tremblant, Quebec, Canada

Engineering Conferences International

Poster Presentations

Monday Poster Session – July 15, 2019

Session I: Discovery, Development and Production of Emerging and Current Products: Biologic Therapeutic Products

1. **Much-efficient and cost-effective manufacturing of antibody biotherapeutics employing integrated negative chromatography technology**
   Mariangela Spitali, UCB S.A., United Kingdom

2. **WITHDRAWN**

3. **Effect of over expressing protective antigen on global gene transcription in Bacillus anthracis BH500**
   Joseph Shiloach, NIH/NIDDK, USA

4. **Inhibition of productive/competitive endocytic pathways enhances siRNA delivery and cell specific targeting**
   S. Patrick Walton, Michigan State University, USA

5. **Cell communication network factor 4 (ccn4/wisp1) shifts Melanoma cells from a fragile proliferative to a resilient metastatic state and suppresses immune surveillance**
   David Klinke, West Virginia University, USA

6. **Biologicalisation: A nature-based digital manufacturing revolution**
   William Whitford, GE Healthcare, USA

7. **Conditional protein rescue (CPR) by binding-induced protective shielding**
   Andrew Gaynor, University of Delaware, USA

8. **Utilizing CRISPR/Cas9 to identify chromosomal loci**
   Corey Kretzmer, MilliporeSigma, USA

9. **HOF freeze-thaw technology implementation for biologics bulk drug substance at Bristol-Myers Squibb (BMS)**
   Manoj Sharma, Bristol-Myers Squibb, USA

Session II: Current Technology Challenges and Opportunities: Fitting Biology into a Technological World

10. **Low-cost and user-friendly biosensor to test the integrity of mRNA molecules suitable for field applications**
    Ignacio Moya Ramírez, Imperial College London, United Kingdom

11. **Alternative transfection methods for Sf9 cells in vaccine development**
    Abasha Williams, VPPL, VRC, NIAID, NIH, USA

12. **Improving the efficiency of human neural stem cell differentiation by targeting transcription factors TBR1 and TBR2 with CRISPR-Cas9 genome editing**
    Kevin Chen, Michigan State University, USA

12.A **Automated high-throughput and miniaturized semi-continuous chromatography**
    Razwan Hanif, UCB, United Kingdom

Session III: Systems Metabolic Engineering: From Systems Biology to Synthetic Evolution

13. **High-throughput application of metabolic flux analysis for investigation of mammalian cell culture performance**
    Christine Davis, Shire HGT, Inc., a member of the Takeda group of companies, USA

14. **Characterization of catalytic α-1,3-glucanase isozymes from *Paenibacillus glycanilyticus* FH11 by using *Brevibacillus* system; Essential for suppression of *Streptococcus mutans* biofilms**
    Rattanaporn Intuy, Ritsumeikan University, Japan

15. **Implementing dynamic formaldehyde regulation in E. coli for synthetic methylotrophy**
    Julia Rohlhill, University of Delaware, USA

16. **Modular design of heterologous pathways for portability across diverse microorganisms**
    Julie Chaves, ORNL, USA

Session IV: Discovery, Development and Production of Emerging and Current Products: Molecular Engineering of Plants and Plant-derived Products

17. **A cold-active rubisco without small subunit exhibits the highest turnover number towards CO2**
    Zhen Cai, Institute of Microbiology, Chinese Academy of Sciences, China

18. **Identifying functional roles of SNPs using metabolic networks for improved plant breeding**
    Costas Maranas, The Pennsylvania State University, USA

19. **Chemically induced dimerization modules as a platform for plant biosensor engineering**
    Paul J. Steiner, University of Colorado Boulder, USA

20. **Optimization of benzylisoquinoline alkaloid synthesis in yeast**
    Lauren Narcross, Concordia University, Canada

21. **Towards the development of a yeast-based opioid biosensor**
    Bjorn Bean, Concordia University, Canada

Session V: Current Technology Challenges and Opportunities: Sophisticated Technology to Understand and Make Use of Biology

22. **Utilisation of dielectric spectroscopy to measure live biomass as a PAT tool for continuous manufacturing and other applications**
    Aditya Bhat, Aber Instruments, USA

23. **Compartment-specific metabolome analysis reveals the tight link between IgG1 formation and necessarily high mitochondrial shuttle activities in Chinese Hamster Ovary cells**
    Ralf Takors, University of Stuttgart, Germany

24. **Advanced technologies and computational modeling in continuous bioprocessing**
    Heather Brooke, Pall Corporation, USA

25. **Engineering ClpS for enhanced N-terminal amino acid binding and use in peptide sequencing**
    Jennifer Tullman, National Institute of Standards and Technology, Institute for Bioscience and Biotechnology Research, USA

26. **WITHDRAWN**

27. **PoreDesigner: A computational tool for the design of membrane pores for separations**
    Costas Maranas, The Pennsylvania State University, USA

28. **Fermentative oxidation of butane in bubble column reactors**
    Andreas Liese, Hambuerg University of Technology, Germany

29. **High throughput investigation of vanillin toxicity to yeast using ambr15 microbioreactors and flow cytometry**
    Victoria Haritos, Monash University, Australia

30. **Using a multi-omics systems biology approach to enhance CHO platform process understanding**
    Laura Leahy, Biogen, USA

31. **Metabolomics approach for increasing CHO cell specific productivity**
    Grace Yao, Tufts University, USA

32. **An automated data-driven pipeline for improving heterologous enzyme expression**
    Tim Whitehead, University of Colorado, USA

33. **Proteinase K goes thermo-labile**
    Minyong Chen, New England Biolabs, USA

34. **Development of sensitive antigen-detection system using photoactivatable antibody-Fc binding protein capable introducing oriented antibody**
    Myung Kyu Lee, KRIBB, South Korea

35. **Facile interrogation of high-order epistasis between distal sites using next-generation sequencing**
    Justin I. Yoo, University of California Santa Barbara, USA

36. **Cellular responses to culture substrates with programmable anisotropy**
    Kelly A. Burke, University of Connecticut, USA

37. **Upstream microbial process characterization with single-use bioreactors from 15 mL to 50L**
    Vincent Lam, Sartorius Stedim Biotech, USA

38. **Efficient microbial bioconversion of brown macroalgae obtained through profitable high-density sea cultivation using modified microbial strains to produce commodity and specialty chemicals: A developing blue chemical industry in Chile**
    Alvaro Olivera-Nappa, Centre for Biotechnology and Bioengineering – CeBiB, University of Chile, Chile

Session VI: Microbial Consortia: Novel Mechanisms and Applications

39. **Temperature regulation as a tool for enabling and programming synthetic microbial communities**
    Adam G. Krieger, University of Michigan, USA

Tuesday Poster Session – July 16, 2019

Session VII: Emerging Technologies: Applications of Knowledge Engineering and Big Data Approaches in Synthetic and Systems Biology

40. **Accelerating throughput of analytics with one-click data analysis**
    Razwan Hanif, UCB, United Kingdom

41. **Applying metabolic models for control in order to enhance algal growth and lipid production**
    Chien-Ting Li, Johns Hopkins University, USA

42. **Genome scale model reconstruction of the methylotrophic yeast Ogataea polymorpha**
    Simone Schmitz, RWTH Aachen University, Germany

43. **Enhanced symbolic regression to infer biochemical network models**
    Nicole Beauregard, University of Connecticut, USA

Session VIII: Emerging Technologies: Optogenetic and Epigenetic Control of Cell Function

44. **Slow growth rate triggered transition to a pseudohyphal lifestyle of the protein production host Pichia pastoris**
    Sonakshi De, BOKU – University of Natural Resources and Life Sciences, Vienna, Austria

45. **Engineering a blue light inducible SpyCatcher system (BLISS) as a tool for protein photopatterning and optogenetics**
    Emily Hartzell, University of Delaware, USA

46. **Epigenetic modification of neural genes by the neuron restrictive silencer factor**
    Ryan Thompson, Michigan State University, USA

47. **Optical control of exopolysaccharide production in Sinorhizobium meliloti for studying biofilm formation and water retention**
    Yong Ku Cho, University of Connecticut, USA

Session IX: Current Technology Challenges and Opportunities: Microbial Production of Bio-based Chemicals, Fuels and Building Blocks II

48. **Rapid assays and continuous in-situ biosensors for bioprocess monitoring**
    Kenneth F. Reardon, OptiEnz Sensors LLC, USA

49. **Designer biosensors for engineered metabolic pathway optimization**
    Mohamed Nasr, Concordia University, Canada

50. **Improving 1,3-butanediol production in E. coli using a protein engineering approach**
    Radhakrishnan Mahadevan, University of Toronto, Canada

Session X: Discovery, Development and Production of Emerging and Current Products: Microbial Production of Bio-based Chemicals, Fuels and Building Blocks

51. **Access to N-alkylated amino acids by microbial fermentation**
    Melanie Mindt, University of Bielefeld, Germany

52. **Engineered metabolism for chemical production from one-carbon substrates**
    Ramon Gonzalez, University of South Florida, USA

53. **Metabolic engineering of yeast for increased production of cyclopropane fatty acids**
Victoria Haritos, Monash University, Australia

54. **Development of engineered chromatic acclimation sensor with strict and reverse response to light signal, and application to optogenetic control in cyanobacteria**
Shunichi Kobayashi, Tokyo University of Agriculture and Technology, Japan

55. **Phenotypic design choices for enhanced two-stage microbial production processes**
Radhakrishnan Mahadevan, University of Toronto, Canada

56. **Model-guided metabolic engineering of Pseudomonas taiwanensis VLB120 for the production of methyl ketones**
Salome Clarissa Nies, iAMB-Institute of Applied Microbiology, RWTH Aachen University, Germany

57. **Corynebacterium glutamicum as a platform strain for the production of a broad variety of terpenoids**
Petra Peters-Wendisch, Bielefeld University, Germany

58. **A genetic switch for stable, long-term fermentative production of anabolic products in yeast**
Penelope R. Chua, Amyris, USA

59. **Gene source screening as a metabolic engineering tool for flavonoid production**
Rita Mark, Nanyang Technological University, Singapore

60. **Designer rhamnolipid production**
Till Tiso, RWTH Aachen University, iAMB - Institute of Applied Microbiology, Germany

61. **Systems and synthetic biology advancements to improve Synechocystis sp. PCC 6803 strain engineering in the industrially-relevant condition of diurnal light-dark cycles**
Christie Peebles, Colorado State University, USA

62. **Coupling engineering of Saccharomyces cerevisiae with medium optimization for the production of ergothioneine**
Steven Axel van der Hoek, The Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark, Denmark

63. **Metabolic Engineering of Pseudomonas putida KT2440 for enhanced rhamnolipid production**
Isabel Bator, iAMB-Institute of Applied Microbiology, RWTH Aachen University, Germany

64. **Engineering sulfate donor accumulation in Escherichia coli for synthesis of sulfated glycosaminoglycans**
Abinaya Badri, Rensselaer Polytechnic Institute, USA

65. **3-hydroxypropionic acid production from crude glycerol with Lactobacillus diolivorans**
Stefan Ergoth, BOKU – University of Natural Resources and Life Sciences, Vienna, Austria

66. **Resolving genetic engineering signatures in yeast on-site with the MinION and iSeq**
Eric M. Young, Worcester Polytechnic Institute, USA

67. **Stringency of antisense regulation varies based on volatility of mRNA target region**
Christine E. Endicott, University of Connecticut, USA

68. **Using synthetic biology to engineer functional protein-based materials**
Noemie-Manuelle Dorval Courchesne, McGill University, Canada