Program

Biochemical and Molecular Engineering XX
The Next Generation of Biochemical Engineering: From Nanoscale to Industrial Scale

July 16 - 20, 2017
The Duke Marriott Newport Beach
Newport Beach, CA, USA

Conference Co-Chairs

Wilfred Chen
University of Delaware, USA

Nicole Borth
Universität für Bodenkultur, Vienna, Austria

Stefanos Grammatikos
UCB Pharma, Belgium

Engineering Conferences International
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Gargi Seth (Intas Pharmaceuticals Ltd.)
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Weichang Zhou (WuXi AppTec Co., Ltd.)
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.
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 Newport Beach, California.

The 2017 awardee is Jay Keasling.

Jay Keasling is the Hubbard Howe Jr. Distinguished Professor of Biochemical Engineering at the University of California, Berkeley, in the Departments of Bioengineering and Chemical and Biomolecular Engineering, a senior faculty scientist and Associate Laboratory Director for Biosciences at Lawrence Berkeley National Laboratory, and Chief Executive Officer of the Joint BioEnergy Institute (JBEI).

Dr. Keasling’s research focuses on the metabolic engineering of microorganisms for degradation of environmental contaminants or for environmentally friendly synthesis of drugs, chemicals, and fuels. Keasling received a B.S. in Chemistry and Biology from the University of Nebraska and M.S. and Ph.D. in Chemical Engineering from the University of Michigan, and did post-doctoral research in biochemistry at Stanford University.

He is a member of the National Academy of Engineering and the National Academy of Inventors. Keasling has won numerous awards, including:

- the 2015 Eric and Sheila Samson Prime Minister’s Prize in Innovation in Alternative Fuels for Transportation;
- the Innovator Award – Biosciences from the Economist Magazine in 2014;
the George Washington Carver Award for Innovation in Industrial Biotechnology from the Biotechnology Industry Organization in 2013;
the Promega Biotechnology Research Award from the American Society for Microbiology in 2013;
the Heinz Award for Technology, the Economy and Employment from the Heinz Family Foundation in 2012;
International Metabolic Engineering Award from the Metabolic Engineering Society in 2012;
Presidential Green Chemistry Challenge Award from the United States Environmental Protection Agency in 2010;
the Inaugural Biotech Humanitarian Award from the Biotechnology Industry Organization (BIO) in 2009;
Scientist of the Year from Discover Magazine in 2006; and
the Technology Pioneer Award from the World Economic Forum in 2005.

Keasling is the founder of Amyris, LS9, Lygos, Constructive Biology, and Demetrix.
2017 Biochemical Engineering Journal Young Investigator Award Winner:

Radhakrishnan Mahadevan

Launched in 2009, this now annual award recognizes outstanding excellence in research and practice contributed to the field of biochemical engineering by a young community member. The award winner receives a cash prize of US $2,500 and presents a Keynote Lecture at the Biochemical and Molecular Engineering conference (odd years) or the European Symposium on Biochemical Engineering Sciences (even years).

Radhakrishnan Mahadevan is a Professor in the Department of Chemical Engineering and Applied Chemistry and the Institute of Biomaterials and Biomedical Engineering at the University of Toronto.

He obtained his B.Tech from the Indian Institute of Technology, Madras, in Chemical Engineering in 1997, and then obtained his PhD. Degree from the University of Delaware in Chemical Engineering in 2002. He was a research scientist at Genomatica Inc., San Diego from 2002-2006 and has also held appointments as a visiting scholar and a guest lecturer at the Department of Bioengineering at the University of California, San Diego, and in the Department of Microbiology, University of Massachusetts, Amherst.

His research interests are in the area of modeling, analysis and optimization of metabolism for applications in bioremediations, biochemicals production and medicine.

He has received the David W. Smith Jr. Best Paper Award in 2006, the Jay Bailey Young Investigator Award in Metabolic Engineering in 2010, the Society of Industrial Microbiology and Biotechnology’s Young Investigator Award in 2012, the University of Toronto FASE Research Leaders Award in 2013, the Alexander von Humboldt Fellowship in 2014, and the Syncrude Innovation Award in 2014.

His award lecture, scheduled for July 18, 2017 at 11:00 am, is entitled Design principles for control of metabolism: Role of enzymatic regulation, redundancy and orthogonality.
Conference Sponsors

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Visit Newport Beach
Notes and room locations

- Technical sessions will be in the Bay Laurel Central and South rooms.
- Poster Sessions will be in the Sequoia Ballroom and Bay Laurel North rooms.
- Workshop locations are listed in the program.
- Breakfasts and lunches will be in the Bamboo Garden.
- Dinner on Sunday will be in the Bamboo Garden.
- Dinners on Monday and Wednesday will be in the Orchid Terrace.
- The ECI office will be in the Catalina Boardroom.
- Audiotaping, videotaping and photography of presentations are prohibited.
- Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).
- Speakers – Please leave at least 3-5 minutes for questions and discussion.
- 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.
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<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>13:00 – 15:30</td>
<td><strong>Conference check-in</strong> (Bay Laurel Foyer)</td>
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<tr>
<td>15:30 – 15:50</td>
<td><strong>Welcome from Conference Chairs and ECI Liaison</strong></td>
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<tr>
<td></td>
<td>Wilfred Chen, University of Delaware, USA</td>
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<td>Nicole Borth, Universität für Bodenkultur, Vienna, Austria</td>
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<td>Stefanos Grammatikos, UCB Pharma, Belgium</td>
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<td></td>
<td>Beth Junker, ECI Conferences Committee Liaison</td>
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<td>15:50 – 19:00</td>
<td><strong>Protein Design, Expression, Processing and Formulation</strong></td>
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<td></td>
<td><strong>Session Chairs:</strong> Anne Robinson, Tulane University, USA</td>
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<td>Chris Oostenbrink, University of Natural Resources and Life Sciences, Vienna, Austria</td>
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<td>William Bentley, University of Maryland, USA</td>
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<tr>
<td>15:50 – 15:55</td>
<td>Introduction</td>
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<tr>
<td>15:55 – 16:25</td>
<td><strong>Engineered ligand and receptor based fusion proteins as next generation cancer therapeutics (Invited)</strong></td>
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<td>Jennifer Cochran, Stanford University, USA</td>
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<td>16:25 – 16:45</td>
<td><strong>Nature inspired antibody design and optimization</strong></td>
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<td>Peter Tessier, Rensselaer Polytechnic Institute, USA</td>
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<td>16:45 – 17:05</td>
<td><strong>Application of phage display and plasmid display to broaden the specificity of human Fbs1 for capture of N-glycosylated peptides</strong></td>
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<td>James C Samuelson, New England Biolabs, USA</td>
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<td>17:05 – 17:15</td>
<td><strong>Computational redesign of acyl-ACP thioesterase with improved selectivity towards medium chain fatty acids at high production levels</strong></td>
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<td>Costas Maranas, The Pennsylvania State University, USA</td>
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<tr>
<td>17:15 – 17:45</td>
<td>Coffee break</td>
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<tr>
<td>17:45 – 18:05</td>
<td><strong>Computational prediction of expression and solubility of recombinant biopharmaceuticals</strong></td>
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<td>Alan Dickson, University of Manchester, United Kingdom</td>
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<tr>
<td>18:05 – 18:20</td>
<td><strong>Engineering high titer heterologous protein secretion in bacteria</strong></td>
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<td>Danielle Tullman-Ercek, Northwestern University, USA</td>
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<tr>
<td>18:20 – 18:35</td>
<td><strong>Intended insoluble expression of recombinant protein with a pull-down tag in E. coli for simplifying product purification and increasing yield</strong></td>
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<td>Daniel Hoffmann, University of Applied Sciences Mittelhessen, Germany</td>
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<td>18:35 – 19:00</td>
<td><strong>Establishing cell-free synthetic biology for the production of therapeutic glycoproteins and chemicals</strong></td>
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<td>Mike Jewett, Northwestern University, USA</td>
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<td>19:00 – 20:00</td>
<td><strong>Keynote Presentation</strong></td>
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<td>DNA damage, neurodegeneration and mitochondrial dysfunction</td>
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<td>Vilhelm A. Bohr, National Institutes of Health (NIH), USA</td>
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<tr>
<td>20:00 – 21:30</td>
<td>Dinner</td>
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</tbody>
</table>
Monday, July 17, 2017

06:00 – 08:00 Breakfast

08:00 – 10:05 **Vaccine Design: From Prevention to Therapeutic Approaches**
Session Chairs: Paula Alves, IBET & ITQB NOVA, Portugal  
**Ravi Kane**, Georgia Institute of Technology, USA

08:00 – 08:05 Introduction

08:05 – 08:45 **Respiratory Syncytial Virus (RSV)-Vaccines: Engineering immunogenicity (Invited)**
Marty Moore, Emory University, USA

08:45 – 09:05 **Bioprocess engineering of insect cells for accelerating vaccines development**
Paula Alves, iBET & ITQB-NOVA, Portugal

09:05 – 09:25 **AAV gene therapy for alcoholism: Inhibition of mitochondrial aldehyde dehydrogenase enzyme expression in hepatoma cells**
Anamaria Sanchez, University of Chile, Chile

09:25 – 09:45 **Novel approaches to prevent and treat pertussis**
Jennifer Maynard, University of Texas at Austin, USA

09:45 – 09:50 **Engineering the adenylate cyclase toxin for use as a Bordetella pertussis vaccine antigen** (Poster Spotlights: 5 minutes – 3 slides no questions)
Andrea M. DiVenere, University of Texas at Austin, USA

09:50 – 09:55 **Toward the identification of cellular mechanisms behind the lethal phenotypes in malaria parasites blood stages with PlasmoGEM and metabolic modeling** (Poster Spotlights: 5 minutes – 3 slides no questions)
Anush Chiappino-Pepe, Swiss Federal Institute of Technology (EPFL), Switzerland

09:55 – 10:00 **Next generation antibody and TCR therapeutics for infectious disease** (Poster Spotlights: 5 minutes – 3 slides no questions)
Ellen K. Wagner, The University of Texas at Austin, USA

10:00 – 10:05 **Overcoming challenges in the production of Hepatitis C virus like particles** (Poster Spotlights: 5 minutes – 3 slides no questions)
Manuel Carrondo, IBET & ITQB NOVA, Portugal

10:05 – 10:35 Coffee break

10:35 – 12:55 **Visions for Biochemical and Molecular Engineering**
Session Chairs: **George Georgiou**, University of Texas, USA  
E. Terry Papoutsakis, University of Delaware, USA

10:35 – 10:40 Introduction

10:40 – 11:15 **From physics to synthetic biology & entrepreneurship**
Noah Helman, Industrial Microbes, Emeryville, USA

11:15 – 11:40 **Viral vectorology for gene therapy**
Paula Alves, IBET & ITQB NOVA, Portugal
Monday, July 17, 2017 (continued)

11:40 – 12:05 Opportunities and challenges in therapeutics discovery and development
George Georgiou, University of Texas, USA

12:05 – 12:30 Opportunities for collective advancement in the biopharmaceutical manufacturing community
Kelvin H Lee, University of Delaware, USA

Stefanos Grammatikos, UCB Pharma, Belgium

12:55 – 14:00 Lunch

14:00 – 16:55 Advances in Bioprocessing
Sponsored by UCB Pharma S.A.
Session Chairs: Thomas Ryll, Immunogen, USA
Martin Gawlitzek, Genentech, Inc., USA

14:00 – 14:05 Introduction

14:05 – 14:35 Exosome-based Biotherapeutics: Opportunities, development and path to commercialization (Invited)
Konstantin Konstantinov, Codia BioSciences, USA

14:35 – 14:55 A continuous loop of bioreactors to provide for life support in space
Francesc Godia, Universitat Autonoma de Barcelona, Spain

14:55 – 15:15 Acoustic cell concentration, washing & perfusion for cellular therapy manufacturing
James Piret, University of British Columbia, Canada

15:15 – 15:35 A disruptive alternative to semi-continuous multi-column chromatography processes
Michael Rose, UCB, United Kingdom

15:35 – 16:05 Coffee break

16:05 – 16:25 Sensitive cells: Enabling tools for static and dynamic control of microbial pathways
Mattheos Koffas, Rensselaer Polytechnic Institute, USA

16:25 – 16:45 Advancing downstream purification of cell and gene therapy medicinal products
Manuel Carrondo, iBET, Portugal

16:45 – 16:50 Glucocorticoids modulate CHO cell glycosylation in chemically-defined media (Poster Spotlights: 5 minutes – 3 slides no questions)
Brian Kwan, Merck & Co., Inc., USA

16:50 – 16:55 Process intensification for production of a peste des petites ruminants virus (PPRV) vaccine (Poster Spotlights: 5 minutes – 3 slides no questions)
Paula Alves, IBET & ITQB NOVA, Portugal
**Monday, July 17, 2017 (continued)**

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<th>Time</th>
<th>Session</th>
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<tr>
<td>17:00 – 19:10</td>
<td><strong>Genome Engineering</strong>&lt;br&gt;Session Chairs: <strong>Mike Betenbaugh</strong>, Johns Hopkins University, USA&lt;br&gt;<strong>Sang Yup Lee</strong>, KAIST, Korea</td>
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<tr>
<td>17:00 – 17:05</td>
<td>Introduction</td>
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<tr>
<td>17:05 – 17:35</td>
<td><strong>Development of CRISPR-derived technologies for genome regulation and applications</strong>&lt;br&gt;Stanley Qi, Stanford University, USA</td>
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<td>17:35 – 18:00</td>
<td><strong>Rational sRNA design for strain engineering</strong>&lt;br&gt;Lydia Contreras, University of Texas-Austin, USA</td>
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<td>18:00 – 18:25</td>
<td><strong>Elimination of the “essential” Warburg effect in mammalian cells through a multiplex genome engineering strategy</strong>&lt;br&gt;Nathan Lewis, University of California, San Diego, USA</td>
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<tr>
<td>18:25 – 18:30</td>
<td><strong>Host cell protein control via CHO genome engineering (Poster Spotlights: 5 minutes – 3 slides no questions)</strong>&lt;br&gt;Jong Youn Baik, University of Delaware, USA</td>
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<td>18:30 – 18:35</td>
<td><strong>Generation of a Chinese Hamster Ovary cell genome-wide deletion library (Poster Spotlights: 5 minutes – 3 slides no questions)</strong>&lt;br&gt;Valerie Schmieder, Austrian Center of Industrial Biotechnology, Austria</td>
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<td>18:35 – 18:40</td>
<td><strong>WITHDRAWN</strong></td>
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<td>18:45 – 19:10</td>
<td><strong>Genome engineering technologies for programming and recoding organisms (Invited)</strong>&lt;br&gt;Farren Isaacs, Yale University, USA</td>
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<td>19:15 – 20:30</td>
<td>Dinner</td>
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<tr>
<td>20:30 – 22:30</td>
<td><strong>Poster Session 1</strong>&lt;br&gt;Session Chairs: <strong>Astrid Duerauer</strong>, Universität für Bodenkultur, Vienna, Austria&lt;br&gt;<strong>Xiaoxia &quot;Nina&quot; Lin</strong>, University of Michigan, USA&lt;br&gt;<strong>Javier Femenia</strong>, Biomarin Pharmaceutical, USA</td>
</tr>
</tbody>
</table>
Tuesday, July 18, 2017

06:00 – 08:00  Breakfast

08:00 – 10:35  Challenges of Miniaturization and Automation in Bioprocess Development
Session Chairs: Alan Dickson, University of Manchester, UK
Laetitia Malphettes, UCB Pharma, Belgium

08:00 – 08:05  Introduction

08:05 – 08:35  From concept to implementation: How automation enables efficiency gains in cell culture process development (Invited)
Sven Markert, Roche Diagnostics GmbH, Germany

08:35 – 08:55  Alternative strategy enables automation of up- and downstream processes for recombinant production of an antimicrobial peptide in E. coli
Mathias Joachim, University of Applied Sciences Mittelhessen, Germany

08:55 – 09:15  High-throughput and miniaturized resin reuse studies
Razwan Hanif, UCB, United Kingdom

09:15 – 09:35  High throughput upstream ranging study using AMBR® 250 mini bioreactors with DOE and multivariate data analysis (MVDA)
Balrina Gupta, Merck & Co., USA

09:35 – 09:50  Facing the challenges – A miniaturized platform for integrated process development of products from microbial hosts
Astrid Dürauer, University of Natural Resources and Life Sciences Vienna, Austria

09:50 – 10:05  Use of AMBR250 as a small scale model for manufacturing-scale single-use bioreactors
Diana Ritz, GlaxoSmithKline, USA

10:05 – 10:20  Managing transfer and scale-up of a process with atypical impact of dissolved oxygen concentration on productivity and product quality
Gayle E. Derfus, Gilead Sciences, USA

10:20 – 10:35  An ultra-scale-down method to predict diafiltration performance during formulation of concentrated mAb solutions
Lara Fernandez-Cerezo, University College London, United Kingdom

10:35 – 11:05  Coffee break

11:05 – 12:05  The Biochemical Engineering Journal Young Investigator Award & Lecture
Award Presentation – Wilfred Chen, University of Delaware

Award Lecture
Design principles for control of metabolism: Role of enzymatic regulation, redundancy and orthogonality
Krishna Mahadevan, University of Toronto, Canada

12:05 – 15:00  Lunch and Poster Session 2
Session Chairs: Astrid Duerauer, Universität für Bodenkultur, Vienna, Austria
Xiaoxia "Nina" Lin, University of Michigan, USA
Javier Femenia, Biomarin Pharmaceutical, USA
Tuesday, July 18, 2017 (continued)

15:00 – 17:20  **Synthetic Biology and Network Design**  
Session Chairs: Kristala Prather, Massachusetts Institute of Technology, USA  
Matias Zurbriggen, University of Düsseldorf, Germany

15:00 – 15:05  Introduction

15:05 – 15:35  **Engineering cyanobacteria for use as photosynthetic chemical factories (Invited)**  
Brian Pfleger, University of Wisconsin-Madison, USA

15:35 – 15:55  **Design of bioswitches for synthetic biology**  
An-Ping Zeng, Hamburg University of Technology, Germany

15:55 – 16:15  **Synthetic biology platforms for natural product biosynthesis and discovery**  
James Payne (Christina Smolke Lab), Stanford University, USA

16:15 – 16:35  **Post-translational strategies for enhancing biosynthetic pathway expression and activity**  
Ian Wheeldon, University of California Riverside, USA

16:35 – 16:55  **Engineering xylose metabolism in Thraustochytrid T18**  
Alexandra Merkx-Jacques, Mara Renewables Corporation, Canada

16:55 – 17:15  **Filling the knowledge gap in metabolism for analyzing biochemical reactions and designing synthetic pathways**  
Vassily Hatzimanikatis, Swiss Federal Institute of Technology (EPFL), Switzerland

17:15 – 17:20  **A CRISPR/Cas9 based engineering tool to activate expression of multiple genes individually or in any specific combination (Poster Spotlights: 5 minutes – 3 slides no questions)**  
Peter Eisenhut, Austrian Centre of Industrial Biotechnology, Austria

17:20  Free Time and Dinner on your own
Wednesday, July 19, 2017

06:00 – 08:00  Breakfast

08:00 – 10:00  Bionanotechnology
Session Chairs: Szu-Wen Wang, University of California, Irvine, USA
Sierin Lim, Nanyang Technological University, Singapore

08:00 – 08:05  Introduction

08:05 – 08:45  Introducing new functions into (and onto) virus-like particles (Invited)
M.G. Finn, Georgia Institute of Technology, USA

08:45 – 09:10  Human-cell microparticles for cell-therapy and cargo delivery to stem cells
Terry Papoutsakis, University of Delaware, USA

09:10 – 09:35  Design of nanoscale therapeutics and nanostructured materials
Ravi Kane, Georgia Institute of Technology, USA

09:35 – 10:00  Supramolecular bioenzyme ensemble: Widening of antioxidant protective potential
Alexander V. Maksimenko, Russian Cardiology Research and Production Complex, Moscow, Russia

10:00 – 10:30  Coffee break

10:30 – 10:55  Electrogenetic actuation of gene expression in bacteria: Towards programmable biological function based on molecular signaling
William Bentley, University of Maryland, USA

10:55 – 11:20  Protein nanocage: A versatile molecular carrier
Sierin Lim, Nanyang Technological University, Singapore

11:20 – 12:20  Keynote Presentation
Engineering human physiology: Discovery and preclinical/clinical development of therapeutic proteins in an academic setting
George Georgiou, University of Texas at Austin, USA

12:30 – 14:00  Lunch

14:00 – 16:35  Biorenewables and Biofuels
Session Chairs: Ramon Gonzalez, Rice University, USA
Vassily Hatzimanikatis, École Polytechnique Fédérale De Lausanne (EPFL), Switzerland

14:00 – 14:05  Introduction

14:05 – 14:35  Metabolic engineering of yeast for the synthesis of fatty acid and polyketide-based chemicals
Nancy Da Silva, University of California, Irvine, USA

14:35 – 14:55  Production of biochemicals and biofuels with no CO₂ production and improved product yields
Shawn W. Jones, White Dog Labs, USA
Wednesday, July 19, 2017 (continued)

14:55 – 15:15  **Genes to jeans: A green solution to blue denim**  
John E. Dueber, University of California, Berkeley, USA

15:15 – 15:35  **Cyclic triterpenoid production with tailored *Saccharomyces cerevisiae***  
Birgitta E. Ebert, RWTH Aachen University, Germany

15:35 – 15:55  **Succinic acid production from pulp and paper industry waste - A transcriptomic approach**  
Chrysanthi Pateraki, Agricultural University of Athens, Greece

15:55 – 16:15  **A synthetic regulon enhances the fitness of yeast on non-native nutrients**  
Nikhil Nair, Tufts University, USA

16:15 – 16:35  **Rerouting acetyl-CoA and NADPH to improve lipid and oleochemical production in *Yarrowia lipolytica***  
Peng Xu, University of Maryland Baltimore County, USA

16:35 – 17:15  **Coffee Break**

17:15 – 18:45  **Parallel Workshops**

*Workshop 1* – *Integrated Continuous Manufacturing* (Torrey Pine Room)  
Chairs: Marcella Yu (Boehringer Ingelheim, USA) and Paul Wu (Bayer, USA)

*Workshop 2* – *Complexities and Challenges of Antibody-Drug Conjugates Development* (Bay Laurel Central Room)  
Chairs: Robert Herbst and Alex Lazar (Immunogen, USA)

*Workshop 3* – *Cell Technologies for Cell Therapies* (Bay Laurel South Room)  
Chairs: Manuel Carrondo (IBET, Portugal) and Jeff Chalmers (Ohio State University)

19:00  **Dinner, Poster Awards (sponsored by ECI and *Biotechnology Journal*) and Amgen Award Lecture**

**Amgen Award Presentation** – Nitya Jacob, Amgen

**Amgen Award Lecture**  
Engineered polyketide synthases: Molecular foundries for commodity chemicals, specialty chemicals, and biofuels  
Jay Keasling, Lawrence Berkeley National Laboratory, USA
Thursday, July 20, 2017

06:00 – 07:30  Breakfast

07:30 – 09:40  **Practical Applications of Modelling: From Protein Structures to Processes**
Session Chairs: Nathan E. Lewis, University of California, San Diego, USA
  Elmar Heinzle, Saarland University, Germany

07:30 – 07:35  Introduction

07:35 – 08:05  **ABC for GRASPing enzyme kinetics in metabolic models (Invited)**
Lars Keld Nielsen, Australian Institute for Bioengineering and Nanotechnology (AIBN), The University of Queensland, Australia

08:05 – 08:25  Predictive macroscopic models of cell growth, metabolism and monoclonal antibody production of fed-batch processes at various scales
Bassem Ben Yahia, Saarland University and UCB Pharma S.A., Belgium

08:25 – 08:45  **Novel stable isotope methods to identify flux bottlenecks in photosynthetic hosts**
Jamey Young, Vanderbilt University, USA

08:45 – 09:05  Genome-scale mapping models and algorithms for stationary and instationary MFA-based metabolic flux elucidation
Saratram Gopalakrishnan, The Pennsylvania State University, USA

09:05 – 09:25  **Automated, simulation-assisted and feedback-guided biomolecular engineering**
Uwe Jandt, Hamburg University of Technology, Germany

09:25 – 09:30  **Risk mitigation and resource savings for biological drug product with computational fluid dynamics simulation (Poster Spotlights: 5 minutes – 3 slides no questions)**
Weixian Shi, Bristol-Myers Squibb, USA

09:35 – 09:40  **WITHDRAWN**

09:40 – 10:00  Coffee Break

10:00 – 12:00  **Tissue and Stem Cell Engineering**
Sponsored by Biomarin
Session Chairs: William Miller, Northwestern University, USA
  Lars Keld Nielsen, Australian Institute for Bioengineering and Nanotechnology (AIBN), The University of Queensland, Australia

10:00 – 10:05  Introduction

10:05 – 10:35  **Synthetic pre-metastatic niches for detection and analysis of early metastatic cells (Invited)**
Lonnie D. Shea, University of Michigan, USA
<table>
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<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>10:35 – 10:55</td>
<td><strong>The use of intrinsic magnetization to define and separate glioblastoma cancer stem cells</strong>&lt;br&gt;Jeff Chalmers, The Ohio State University, USA</td>
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<td>10:55 – 11:00</td>
<td><strong>Isolation and characterization of cancer stem cells in esophagus squamous cell carcinoma (Poster Spotlights: 5 minutes – 3 slides no questions)</strong>&lt;br&gt;Pei-Jung Lu, National Cheng Kung University, Taiwan</td>
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<td>11:00 – 11:20</td>
<td><strong>Scalable manufacture of pluripotent stem cell derived therapeutics</strong>&lt;br&gt;Nick Timmins, CCRM, Canada</td>
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<td>11:20 – 11:40</td>
<td><strong>The differentiation of pluripotent stem cells to hepatic cells – Parallels between maturation status and metabolic state</strong>&lt;br&gt;Wei-Shou Hu, University of Minnesota, USA</td>
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<td>11:40 – 12:00</td>
<td><strong>Using computational fluid dynamics (CFD) to design and characterize a microfluidic bioreactor for rapid release of culture-derived platelets</strong>&lt;br&gt;William Miller, Northwestern University, USA</td>
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<td>12:00 – 12:05</td>
<td><strong>Wrap-up – Conference Closure</strong></td>
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<td>12:05</td>
<td><strong>Departure</strong></td>
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Poster Presentations

1. **Process intensification for production of a Peste des Petites Ruminants Virus (PPRV) vaccine**
   Manuel Carrondo, IBET & ITQB NOVA, Portugal

2. **Glucocorticoids modulate CHO cell glycosylation in chemically-defined media**
   Brian Kwan, Merck & Co., Inc., USA

3. **Fractionation of human red blood cells based on intrinsic magnetization**
   Jeff Chalmers, The Ohio State University, USA

4. **Characterization of anaerobic biotransformation of β-hexachlorocyclohexane**
   Mohammad Numan Asad, Helmholtz Institute for Environmental Research, Germany

5. **Nanofiber based lentiviral vector production**
   Jelena Ruscic, University College London, United Kingdom

6. **Periodic counter-current chromatography for continuous purification of monoclonal antibody**
   Ho-Lung Jiang, Academia Sinica, Development Center for Biotechnology, Taiwan

7. **Application of 13C flux analysis to determine impacts of media alterations on industrial CHO cell metabolism**
   Allison G. McAtee Pereira, Vanderbilt University, USA

8. **Utilizing logic-gated DNA strand displacement to induce cancer prodrug activation**
   Rebecca P. Chen, University of Delaware, USA

9. **Interference of steroidogenesis by gold nanorod core/silver shell nanostructures: Implications for reproductive toxicity of silver nanomaterials**
   Xiumei Jiang, Center for Food Safety and Applied Nutrition, US Food and Drug Administration, USA

10. **Biosafety evaluation and anti-oxidative effects of ceria nanoparticles in vitro**
    Hui Zhang, Center for Food Safety and Applied Nutrition, US Food and Drug Administration, USA

11. **PP7 virus-like particle as a functional peptide carrying platform**
    Liangjun Zhao, Georgia Institute of Technology, USA

12. **Engineering of Klebsiella oxytoca capable of simultaneous utilization of multiple sugars for the production of 2, 3-Butanediol**
    Yong Jae Kim, KAIST, South Korea

13. **Complete biosynthesis of adipic acid in Saccharomyces cerevisiae**
    Kaushik Raj Venkatesan, University of Toronto, Canada

14. **Structural and biochemical studies of novel Aldo-keto Reductases (AKRs) for the biocatalytic conversion of 3-hydroxybutanal to 1,3-butanediol**
    Taeho Kim, University of Toronto, Canada

15. **Discovery and evaluation of novel pathways for production of methyl ethyl ketone**
    Milenko Tokic, Swiss Federal Institute of Technology (EPFL), Switzerland
16. **Optimization of the production of methyl ethyl ketone in recombinant Pseudomonas putida using large-scale kinetic models**  
Milenko Tokic, Swiss Federal Institute of Technology (EPFL), Switzerland

17. **Toward fully characterized knowledge gaps in metabolic networks: Discovery of missing biochemistry in Escherichia coli**  
Anush Chiappino-Pepe, Swiss Federal Institute of Technology (EPFL), Switzerland

18. **Synthetic methylotrophy: Engineering methanol metabolism in a nonnative host**  
R. Kyle Bennett, University of Delaware, USA

19. **Sustainable production of industrially relevant biomonomers: A photosynthetic consortia approach**  
David N. Carruthers, University of Michigan, USA

20. **The microbial antibodies secretion expression platform with scale down fermentors**  
Jen-Wei Chang, Academia Sinica, Development Center for Biotechnology, Taiwan

21. **The simplex algorithm in an automated high-throughput approach for the rapid screening of operating conditions during process understanding and development**  
Razwan Hanif, UCB, United Kingdom

22. **Novel clone selection technique reveals heterogeneity among HEK293T cells engineered to produce therapeutic extracellular vesicles**  
Jeffrey Chalmers, The Ohio State University, USA

23. **Investigating antibody reduction phenomenon observed in large scale cell culture harvests using a simple scale down model**  
Shaunak D. Uplekar, KBI Biopharma, USA

24. **Generation of a Chinese Hamster Ovary cell genome-wide deletion library**  
Valerie Schmieder, Austrian Center of Industrial Biotechnology, Austria

25. **Host cell protein control via CHO genome engineering**  
Jong Youn Baik, University of Delaware, USA

26. **WITHDRAWN**

27. **Role of CD36 and free fatty acid uptake in epithelial-mesenchymal transition of hepatocellular carcinoma cells**  
Christina Chan, Michigan State University, USA

28. **Optimizing a bacterial sRNA scaffold for targeting multiple mRNAs, filtering off-target mRNA interactions, and balancing metabolic pathway flux**  
Richard A. Lease, The Ohio State University, USA

29. **Deciphering ambiguous control over fluxes through characterization and reduction of uncertainty**  
Ljubisa Miskovic, Swiss Federal Institute of Technology (EPFL), Switzerland

30. **Risk mitigation and resource savings for biological drug product with computational fluid dynamics simulation**  
Weixian Shi, Bristol-Myers Squibb, USA
31. Molecular modeling on HIF2α-ARNT dimer destabilization caused by HIF2α V192D and/or R171A mutations
Chia-Ning Yang, National University of Kaohsiung, Taiwan

32. WITHDRAWN

33. Generation and analysis of large-scale dynamic nonlinear models of metabolism
Georgios Fengos, Swiss Federal Institute of Technology (EPFL), Switzerland

34. Investigating crowded metabolism: A molecular particle approach
Daniel Robert Weilandt, Swiss Federal Institute of Technology (EPFL), Switzerland

35. Functional adaptation of mercuric reductases from the deep brine environment of Atlantis II in the Red Sea to high temperature
Mohamad Maged, American University in Cairo, Egypt

36. Characterization of a renoprotective AATF peptide in models of diabetic nephropathy
Qing Guo, University of Oklahoma Health Sciences Center, USA

37. Antibody engineering on the surface of CHO cells
Annalee W. Nguyen, The University of Texas at Austin, USA

38. WITHDRAWN

39. Strategies to engineer G protein-coupled receptor ligand binding properties
Justin I. Yoo, University of California, Santa Barbara, USA

40. Effects of the A2AR C-terminus on receptor stability
Kirsten N. Swonger, Tulane University, USA

41. Intracellular secretion analysis of therapeutic antibodies in engineered high-producible CHO cells
Kohei Kaneyoshi, Osaka University, Japan

42. A CRISPR/Cas9 based engineering tool to activate expression of multiple genes individually or in any specific combination
Ka-Hei Siu, University of Delaware, USA

43. Engineering the microbiota to treat metabolic disorders
Nikhil U. Nair, Tufts University, USA

44. Programmable control of CRISPR-Cas9 systems by engineering sgRNA as toehold-switchable riboregulators
Jasmin Hafner, Swiss Federal Institute of Technology (EPFL), Switzerland

45. Exploring chemodiversity in metabolism towards the selective integration of chemistry into biology
Maria Masid, Swiss Federal Institute of Technology (EPFL), Switzerland

46. Toward the identification of new cancer therapy targets using metabolic modeling in a human genome scale
Yves Berset, Swiss Federal Institute of Technology (EPFL), Switzerland
48. **Sort-seq approach to engineering an E. coli formaldehyde-inducible promoter**  
   Julia Rohllill, University of Delaware, USA

49. **Functional production of transporters from biomass-degrading anaerobic fungi for metabolic engineering**  
   Susanna Seppala, University of California, Santa Barbara, USA

50. **Design considerations to ensure accuracy when using the resazurin reduction assay to noninvasively quantify cell expansion within perfused extracellular matrix scaffolds**  
   William M. Miller, Northwestern University, USA

51. **Isolation and characterization of cancer stem cells in esophagus squamous cell carcinoma**  
   Pei-Jung Lu, National Cheng Kung University, Taiwan

52. **Engineering T cell receptors for improved therapeutic T regulatory cell (Treg) function**  
   Elissa K. Leonard, The University of Texas at Austin, USA

53. **Overcoming challenges in the production of Hepatitis C virus like particles**  
   Manuel Carrondo, IBET & ITQB NOVA, Portugal

54. **Next-generation antibody and TCR therapeutics for infectious disease**  
   Ellen K. Wagner, The University of Texas at Austin, USA

55. **Toward the identification of cellular mechanisms behind the lethal phenotypes in malaria parasites blood stages with PlasmoGEM and metabolic modeling**  
   Anush Chiappino-Pepe, Swiss Federal Institute of Technology (EPFL), Switzerland

56. **Engineering the adenylate cyclase toxin for use as a bordetella pertussis vaccine antigen**  
   Andrea M. DiVenere, The University of Texas at Austin, USA