Biochemical and Molecular Engineering XIX

July 12 – 16, 2015

Hyatt Ziva
Puerto Vallarta, Mexico

Conference Co-Chairs

Theresa Good
National Science Foundation
USA

Gargi Seth
Intas Pharmaceuticals Ltd.
India

Engineering Conferences International
32 Broadway, Suite 314
New York, NY 10004, USA
Phone: 1-212-514-6760 -www.engconfintl.org – info@engconfintl.org
Sunday, July 12, 2015

13:00 – 15:30  Conference Check-in

15:30 – 16:00  Welcome from Conference Chairs
Theresa Good and Gargi Seth

16:00 – 18:30  Session I: Genome Instability and Evolution
Session Chairs: Katy Kao, Texas A&M University
Lisa Laffend, DuPont

16:00 – 16:25  Long- and short-term genomic and epigenetic changes in CHO cell lines
Nicole Borth, University of Natural Resources and Life Sciences, Austria

16:25 – 16:50  Genome evolution and engineering for elucidating and improving isobutanol
tolerance in *Escherichia Coli*
Xiaoxia (Nina) Lin, University of Michigan, USA

16:50 – 17:15  Stable long-term bioreactor production of anabolic products: Process & genetic
solutions
Kirsten R. Benjamin, Amyris Biotechnologies, USA

17:15 – 17:40  Reinforcing synthetic biology against evolutionary failure
Jeff Barrick, University of Texas, USA

17:40 – 18:10  How to cope with unwanted evolutions of industrial production strains
Wanda Dischert, METabolic Explorer, France

18:30 – 19:30  Key Note: Bacterial immunity/ CRISPRi
Jennifer Doudna, HHMI & University of California Berkeley, USA

19:30 – 20:30  Opening Reception

20:30 - 22:00  Dinner
Monday, July 13, 2015

06:30 – 08:00  Breakfast Buffet

08:00 – 10:00  **Session II: Next Generation Biologics**

  Session Chairs: Jennifer Maynard, University of Texas
  Pranhita Reddy, Seattle Genetics

08:00 – 08:30  High-throughput conformational epitope mapping to guide design of structure-based vaccines
Timothy A. Whitehead, Michigan State University, USA

08:30 – 09:00  SYN-004, a novel, clinical-stage oral beta-lactamase therapy to protect the microbiome from antibiotic-mediated damage
Michael Kaleko, Synthetic Biologics, Inc., USA

09:00 – 09:30  **Microbiome**
John Aunins, Seres, USA

09:30 – 10:00  E. coli and CHO protein expression technology to advance new therapeutics at Genentech
Dorothea Reilly, Genentech, USA

10:00 – 10:20  Coffee Break

10:20 – 12:30  **Session III: Metabolic Engineering & Synthetic Biology**

  Session Chairs: Wilfred Chen, University of Delaware
  Ramon Gonzalez, Rice University/DOE
  Darlene Solomon, Agilent

10:20 – 10:45  Xylodextrin conversion to biofuels: A new pathway with new challenges
Jamie H. D. Cate, University of California, Berkeley, USA

10:45 – 11:10  Understanding and exploiting enzyme promiscuity for metabolic engineering
Keith Tyo, Northwestern University, USA

11:10 – 11:35  High-efficiency multiplexed integration of synergistic alleles and metabolic pathways in yeasts using CRISPR-Cas9
Jessica M. Walter, Amyris Biotechnologies, USA

11:35 – 12:00  Development of genome-scale kinetic models and their use for metabolic engineering and synthetic biology
Vassily Hatzimanikatis, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland

12:00 – 12:30  Metabolite valves: Dynamic control of metabolic flux for pathway engineering
Kristala L. J. Prather, Massachusetts Institute of Technology, USA

12:30 – 13:45  Lunch

13:45 – 14:30  **Engineered Polyketide Synthases for Production of Commodity & Specialty Chemicals**
Jay Keasling, University of California, Berkeley, USA

14:30 – 16:20  **Session IV: Biorenewable Chemicals**

  Session Chairs: Brian Pfleger, University of Wisconsin
  Keith Tyo, Northwestern University
14:30 – 15:00  Rethinking the logic of biological activation of short-chain hydrocarbons and their conversion to liquid fuels  
Ramon Gonzalez, Rice University, USA

15:00 – 15:30  Commercial-scale production of fuels and commodities from waste and low cost resources via gas fermentation  
Michael Koepke, Lanza Tech Inc., USA

15:30 – 15:55  Fuels from the wind or rocks: Engineering the iron-oxidizing chemolithoautotroph Acidithiobacillus ferrooxidans for biochemical production  
Scott Banta, Columbia University, USA

15:55 – 16:20  Biobased production of mechanically tunable polyesters  
Kechun Zhang, University of Minnesota, USA

16:20 – 16:40  Coffee Break

16:40 – 18:40  Session V: Protein Aggregation, Engineering and Design  
Session Chairs: Jeff Gray, Johns Hopkins University  
Michelle O’Malley, University of California, Santa Barbara  
Dana Anderson, Genentech

16:40 – 17:10  Massive protein superfamily data integration applied to smart library design  
Henk-Jan Joosten, Bio-Prodict, The Netherlands

17:10 – 17:40  Computational tools for enzyme and antibody design  
Costas Maranas, Pennsylvania State University, USA

17:40 – 18:10  In silico predictive tools to aid in development of therapeutic antibodies  
Vikas Sharma, Genentech, USA

18:10 – 18:40  A transcription activator-like effector repressor-induction system mediated by proteolytic deggregation  
Brian Pfleger, University of Wisconsin, USA

19:00 – 20:00  Key Note  
TBD  
James Roberts, Fred Hutchinson Cancer Research Center, USA

20:00 – 21:00  Dinner

21:00 – 22:30  Poster Session/Social Hour
07:00 – 08:00  Breakfast

08:00 – 10:30  **Session VI: Engineering at the Micro- and Nanoscale**
Session Chairs: William Bentley, University of Maryland
Laura Palomares, IBT/UNAM
Chong Yung, Agilent

08:00 – 08:25  **Switchable protein sensors and therapeutics based on dynamic DNA assembly**
Wilfred Chen, University of Delaware, USA

08:25 – 08:50  **Engineering protein nanocontainers: Altering permeability and size of MS2 viral capsids**
Danielle Tullman-Ercek, University of California Berkeley, USA

08:50 – 09:15  **Microparticles (MPs) as cellular communicators to control cell fate and empower therapies: The case of megakaryocytic MPs**
Eleftherios (Terry) Papoutsakis, University of Delaware, USA

09:15 – 09:45  **Biomimetic protein nanoparticles for modulation of immune response towards cancer**
Szu-Wen Wang, University of California, Irvine, USA

09:45 – 10:10  **Efficient nuclear and cytoplasmic proteins delivery using HIV-1-based-virus-like particles**
Marc-Andre Robert, Universite Laval, Canada

10:10 – 10:30  Coffee Break

10:30 – 13:00  **Session VII: Advances in BioProcessing**
Session Chairs: Alois Jungbauer, Boku
Irina Ramos, MedImmune
Anita Shaw, Merck

10:30 – 11:00  **Integrated bioprocess development for a agronomically relevant secondary metabolite natural product**
Mark Mikola, Dow AgroSciences LLC, USA

11:00 – 11:30  **Emerging technologies for the development and operation of continuous processing of viral vaccines and vectors**
Jose P. B. Mota, FCT-UNL & IBET-ITQB, Portugal

11:30 – 12:00  **Point of Care Bioprocessing**
Govind Rao, University of Maryland Baltimore County, USA

12:00 – 12:30  **Advances in understanding protein unfolding and aggregation in ion exchange chromatography columns**
Giorgio Carta, University of Virginia, USA

12:30 – 13:00  **A comparison of multimodal chromatographic resins: Protein binding and selectivity**
Carnley L. Norman, KBI Biopharma, USA

13:00 – 14:00  Lunch

14:00 – 16:00  Free Time
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenter/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:00 – 17:30</td>
<td><strong>Session VIII: Metabolic Engineering &amp; Synthetic Biology</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Session Chairs: Wilfred Chen, University of Delaware</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ramon Gonzalez, Rice University/DOE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Darlene Solomon, Agilent</td>
<td></td>
</tr>
<tr>
<td>16:00 – 16:20</td>
<td><strong>Designing synthetic anaerobic communities based on syntrophy</strong></td>
<td>Michelle A. O'Malley, University of California, Santa Barbara, USA</td>
</tr>
<tr>
<td>16:20 – 16:40</td>
<td><strong>Transforming synthetic biology with designer translation systems</strong></td>
<td>Michael C. Jewett, Northwestern University, USA</td>
</tr>
<tr>
<td>16:40 – 17:00</td>
<td><strong>Finding a needle in a haystack: Parsing large-scale data to define regulatory networks for strain engineering</strong></td>
<td>Lydia Contreras, University of Texas, Austin, USA</td>
</tr>
<tr>
<td>17:00 – 17:30</td>
<td><strong>Measuring metabolism of individual cell populations in mixed microbial cultures: A novel approach</strong></td>
<td>Maciek R. Antoniewicz, University of Delaware, USA</td>
</tr>
<tr>
<td>17:45 – 18:30</td>
<td><strong>Designing biology for a healthy world</strong></td>
<td>Pamela Silver, Harvard University, USA</td>
</tr>
<tr>
<td>18:30 – 19:15</td>
<td><strong>BEJ Young Investigator Award</strong></td>
<td>Tim Lu, MIT</td>
</tr>
<tr>
<td>19:15 – 20:30</td>
<td><strong>Dinner</strong></td>
<td></td>
</tr>
<tr>
<td>20:30 – 22:30</td>
<td><strong>Poster Session/Social Hour</strong></td>
<td></td>
</tr>
</tbody>
</table>
Wednesday, July 15, 2015

07:00 – 08:00  Breakfast Buffet

08:00 – 10:00  **Session IX: Advances in Rapid BioManufacturing**
Michael Lynch, Duke University
Raghavan Venkat, Medimmune

08:00 – 08:30  **Rapid production of a biodefense agent by transient agroinfiltration in nicotiana benthamiana**
Karen A. McDonald, University of California, Davis, USA

08:30 – 09:00  **Technologies to enable the genome design-build-test cycle**
Ryan T. Gill, University of Colorado, USA

09:00 – 09:30  **Rapid production of recombinant proteins via scalable transient gene expression and stable cell line by MaxCyte flow transfection technology**
Weili Wang, MaxCyte, Inc., USA

09:30 – 10:00  **Engineering of scalable technologies for pluripotent stem cell biomanufacturing**
Todd C. McDevitt, Gladstone Institutes, USA

10:00 – 10:20  Coffee Break

10:20 – 12:20  **Session X: Controlling Cell Fate**
Session Chairs: Chris Rao, University of Illinois, Urbana Champaign
            Todd McDevitt, Gladstone
            Rashim Kshirsagar, Biogen Idec

10:20 – 10:50  **Dynamic metabolic control using synthetic metabolic valves in two-stage fermentations**
Michael Lynch, Duke University, USA

10:50 – 11:20  **Recellularization of bioengineered kidney scaffolds in perfused bioreactors using ΔP and metabolic profiles as surrogate markers for tissue and scaffold integrity**
William M. Miller, Northwestern University, USA

11:20 – 11:50  **Directed differentiation of human pluripotent stem cells to cardiovascular lineages via stage-specific modulation of canonical Wnt signaling**
Sean P. Palecek, University of Wisconsin - Madison, USA

11:50 – 12:20  **Neural differentiation of MSCs is dependent on downregulation of Nrsf**
Christina Chan, Michigan State University, USA

12:20 – 13:30  Lunch

13:30 – 16:30  **Session XI: Biosimilars**
Session Chairs: Sergio Valentionotti, Liomont
            David Robinson, Merck

13:30 – 14:00  **Challenges and Achievements in the scale-up of trastuzumab - Integrating protein quality into early development**
Claudia Berdugo-Davis, Cook Pharmica LLC, USA

14:00 – 14:30  **Development and business fundamentals of biosimilar CMC**
Martin Mueller, MSD Merck, Switzerland
Wednesday, July 15, 2015 (continued)

14:30 – 15:00  Key aspects for the development and commercialization of biosimilar products
Laura Palomares, Universidad Nacional Autonoma De Mexico, Mexico

15:00 – 15:30  Impact of biosimilar drugs in the public health sector
Eduardo González Pier, Undersecretary of Health, Mexico

16:00 – 19:00  Concurrent Workshops
Rapid Response to Global Health Crisis
Karen McDonald, University of California, Davis
Emerging Trends in Biomanufacturing
Ekta Mahajan, Genentech and Kumar Dhanasekharan
Biochemical and Molecular Engineering Education
Claire Komives, San Jose State University

19:30 – 22:00  Dinner and Amgen Award
Thursday, July 16, 2015

07:00 – 08:00  Breakfast Buffet

08:00 – 10:00  **Session XI: Disease Models**
Jamey Young, Vanderbilt
Elebeoba (Chi Chi) May, University of Houston

08:00 – 08:30  **Integrative physiological analysis of adipose tissue metabolism in the context of obesity**
Christian Metallo, University of California, San Diego, USA

08:30 – 09:00  **Oxidative stress and adenosine receptors: A cytoprotective role in neurodegeneration?**
Anne S. Robinson, Tulane University, USA

09:00 – 09:30  **Identifying altered intercellular signaling networks associated with local immunosuppression in cancer: A quantitative and systems pharmacology approach**
David J. Klinke, West Virginia University, USA

09:30 – 10:00  **An engineering approach to discover antivirulence strategies**
Mark P. Brynildsen, Princeton University, USA

10:00 – 10:30  Coffee Break

10:30 – 11:30  Panel Discussion / Wrap Up

11:30  Lunch and Departures