Preliminary Program
(June 17, 2024)

Biochemical and Molecular Engineering XXIII: Accelerating Biotech Solutions to aid a Changing World

July 21 – 25, 2024
Royal Marine Hotel
Dublin, Ireland

Conference Co-Chairs
Michelle O’Malley
University of California at Santa Barbara, USA
Brian Pfleger
University of Wisconsin, USA
Varnika Roy
GSK, USA

Engineering Conferences International
369 Lexington Avenue, 3rd Floor #389, New York, NY 10017, USA
www.engconfintl.org – info@engconfintl.org
**Sunday, July 21, 2024**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:30 – 14:30</td>
<td>Conference Check-in</td>
</tr>
<tr>
<td>14:30 – 14:45</td>
<td>Opening Remarks (Conference Chairs and ECI Liaison)</td>
</tr>
<tr>
<td>14:45 – 16:25</td>
<td><strong>Session 1: Building Sustainability in Biomanufacturing and the Workforce</strong></td>
</tr>
</tbody>
</table>
| 14:45 – 15:05 | **How Biotechnology Innovation Drives Benefits to Patients and the Planet: Case Studies from Medicine Design & Manufacturing**  
Philip Dellorco, GSK, USA |
| 15:05 – 15:25 | **Optimized manufacturing of Adeno-associated Virus for gene therapy**  
Nicholas Donohue, APC Ltd, Ireland |
| 15:25 – 15:45 | **Deconstructing synthetic biology: a conceptual approach for training synthetic biologists**  
Ashty Karim, Northwestern University, USA |
| 15:45 – 16:05 | **Unravelling the impact of climate change on Arctic diatom-cyanobacteria symbiosis and the global carbon cycle**  
Ranjan Srivastava, University of Connecticut, USA |
| 16:05 – 16:25 | **Transferring lab innovation into large scale application by thorough understanding of strains and processes**  
Ralf Takors, University of Stuttgart, Germany |
| 16:25 – 17:00 | Coffee Break in Poster Area                                         |
| 17:00 – 18:00 | **Keynote**  
TBA  
Henk Noorman, DSM |
| 18:00 – 19:30 | Dinner                                                               |
| 19:30 – 22:00 | **Poster Session I and Social Hour**  
*(Authors of odd-numbered posters are asked to stay with their presentations)* |
Monday, July 22, 2024

07:00 – 08:30  Breakfast

08:30 – 09:30  **Keynote**

TBA
Kelvin Lee, NIIMBL/University of Delaware, USA

09:30 – 12:30  **Session 2: In vitro models & Emerging Cell Therapies**

09:30 – 09:50  **NRSF plays a central role in controlling µ-opioid receptor**
Christina Chan, Michigan State University, USA

09:50 – 10:10  **Predicting outcomes of cardiac progenitor cell differentiation to cardiomyocytes based on integrated transcriptomics and epigenomics**
Sean Palecek, University of Wisconsin – Madison, USA

10:10 – 10:30  **Bioengineering of cancer stem cells for improved disease modelling**
John Kim, University of Alabama, USA

10:30 – 11:00  Coffee Break in Poster Area

11:00 – 11:20  **Engineering high-precision, dynamic genetic control systems for cellular reprogramming**
Katie Galloway, Massachusetts Institute of Technology, USA

11:20 – 11:40  **Optogenetic intensification of insulin secretion in pancreatic beta-cells for diabetes**
Emmanuel Tzanakakis, Tufts University, USA

11:40 – 12:00  **Design of feeder-free processes for natural killer cell expansion**
Samira Azarin, University of Minnesota, USA

12:00 – 13:00  Buffet Lunch

13:00 – 15:30  **Poster Session II with dessert**

*(Authors of even-numbered posters are asked to stay with their presentations)*

15:00 – 15:30  Coffee Break in Poster Area

15:30 – 17:30  **Session 3: Democratizing Biotechnology with Automation & Artificial Intelligence**

15:30 – 15:50  **A Journey Towards the Development of a Cloud Biofoundry**
Huimin Zhao, University of Illinois at Urbana-Champaign, USA

15:50 – 16:10  **Overcoming the Risks in Biochemical Product Development and Manufacturing Through Rapid, Genome Scale Metabolic Engineering**
Richard Fox, Inscripta, Inc., USA

16:10 – 16:30  **Harnessing genome engineering and automation to engineer next-gen microbial production strains for biologics**
Markus Mund, Sanofi-Aventis Deutschland GmbH, Germany
Monday, July 22, 2024 (continued)

16:30 – 16:50  Accessible DNA construction from oligonucleotide pools using Golden Gate Assembly and Data-optimized Design
Sean Lund, New England Biolabs, USA

16:50 – 17:10  Growing global bioeconomies through perfusion fermentation
Kerry Love, Sunflower Therapeutics PBC, USA

17:10 – 17:30  Panel Discussion

17:30 – 19:00  Dinner

19:00 – 21:00  Special After Dinner Session (Alan Alda Center for Communicating Science)
Tuesday, July 23, 2024

07:00 – 08:30  Breakfast

08:30 – 09:15  Keynote
Evolution of the Irish Biotechnology Sector
Barry Heavey, Accenture, Ireland

09:15 – 13:00  Session 4: Advances in Protein & Metabolic Engineering

09:15 – 09:35  Hyperstable synthetic miniproteins as developable ligand scaffolds
Benjamin Hackel, University of Minnesota, USA

09:35 – 09:55  MAGMA-seq enables wide mutational scanning of human antibody libraries
Tim Whitehead, University of Colorado, Boulder, USA

09:55 – 10:15  Engineering the Redox Chemistry of Life
Han Li, University of California, Irvine, USA

10:15 – 10:35  Glycosylation of full-length antibodies in engineered bacteria
Matt DeLisa, Cornell University, USA

10:35 – 11:05  Coffee Break in Poster Area

11:05 – 11:25  Engineering enzymes by force: Modulating the catalytic activity of an alcohol dehydrogenase via mechanical forces applied by DNA springs
Scott Banta, Columbia University, USA

11:25 – 11:45  Determining membrane protein binding kinetics and stability in nanodiscs for improved drug development
Anne Robinson, Carnegie Mellon University, USA

11:45 – 12:05  Deconstructing and reconstructing polyethylene deconstruction pathways of mealworm gut microbiomes
Mark Blenner, University of Delaware, USA

12:05 – 12:25  Production of supply-limited natural product therapeutics using engineered yeast
Jay Keasling, University of California at Berkeley, USA

12:30 – 14:00  Lunch

14:15  Meet in lobby for excursion

14:30  Excursion to Guinness Storehouse (Bus transportation provided)

After the tour of the Guinness Storehouse, attendees will have a choice of returning to the hotel or being dropped off at a central point in Dublin for an evening on your own. Information on public transportation back to the hotel from Dublin will be provided.

Dinner on your own
**Wednesday, July 24, 2024**

07:00 – 08:30  Breakfast

08:30 – 09:30  **Keynote**  
**Rebuilding a More Diversified Carbon Economy with Biology**  
Corrine Scown, Lawrence Berkeley National Laboratory, USA

09:30 – 12:00  **Session 5: Synthetic & Systems Biology I**

09:30 – 09:50  CRISPR interference libraries for genome scale functional genomics  
Carrie Eckert, Oak Ridge National Laboratory, USA

09:50 – 10:10  Optogenetic control of protein production in Pichia pastoris replaces methanol induction with light  
Jose Avalos, Princeton University, USA

10:10 – 10:30  Teaching Old Dogs New Tricks — Elucidating Core Design Principles to Engineer Nonconventional Yeasts and Consortia as Microbial Factories  
Zengyi Shao, Iowa State University

10:30 – 11:00  Coffee Break in Poster Area

11:00 – 11:20  **The role of cofactor recycling in bacterial organelles for sustainable production of biochemicals**  
Danielle Tullman-Ercek, Northwestern University, USA

11:20 – 11:40  Unveiling Paclitaxel Biosynthesis: Integrating Engineered Microbial Consortia and Functional Genomics to discover a Crucial Taxane Hydroxylase  
Leonardo Rios Solis, University College London, UK

11:40 – 12:00  Strangers in a Strange Land: Challenges in the study of cellular interactions  
Vassily Hatzimanikatis, EPFL, Switzerland

12:00 – 13:00  Buffet Lunch

13:00 – 17:00  **Session 6: Synthetic & Systems Biology II**

13:00 – 13:20  Highly multiplexed design of an allosteric transcription factor to sense novel ligands  
Vatsan Raman, University of Wisconsin-Madison, USA

13:20 – 13:40  Engineering and Design of Multifunctional Metalloproteinase Inhibitors  
Maryam Raeesszadeh-Sarmazdeh, University of Nevada, Reno, USA

13:40 – 14:00  Rational design of effective CRISPR-Cas antifungals  
Cong Trinh, University of Tennessee, Knoxville, USA

14:00 – 14:20  Programming cellular sensors with genetic control systems  
Laura Segatori, Rice University, USA
Wednesday, July 24, 2024 (continued)

14:20 – 14:40  Harnessing a systems biology approach to unlock molecular processes behind cellular productivity between different Chinese Hamster Ovary cell hosts
Annie Harwood-Stamper, AstraZeneca, UK

14:40 – 15:15  Coffee Break in Poster Area

15:15 – 15:35  Adventures in biomanufacturing: Mixing chemical engineering, systems biology, and metabolic engineering for a fruitful cell culture broth
Mike Betenbaugh, Johns Hopkins University, USA

15:35 – 15:55  Into Darkness: Understanding non-coding regions of the CHO genome
Nicole Borth, BOKU University, Austria

15:55 – 16:15  Reprogramming plant hormone receptors as biosensors and chemically-inducible genetic circuits
Ian Wheeldon, University of California, Riverside, USA

16:15 – 16:35  SynBio in the Soil: Tools, Models, and Applications
Natalie Farny, Worcester Polytechnic Institute, USA

16:35 – 16:55  Targeted DNA insertion in plants by CRISPR-associated transposons
Gozde Demirer, Caltech, USA

17:00 – 18:00  Amgen Award Lecture
BROADENING THE BIOELECTRONICS BANDWITH: INTERESTING (hopefully) APPLICATIONS
William Bentley, University of Maryland, USA

18:30 – 19:45  Reception

19:45 – 22:30  Gala Dinner & Poster Awards
Thursday, July 25, 2024

07:00 – 08:30  Breakfast Buffet

08:30 – 09:30  **BEJ Lecture**
Kevin Solomon, University of Delaware, USA

09:30 – 13:00  **Session 7: Sustainable Biomanufacturing via Microbial Systems**

09:30 – 09:50  **Engineering synthetic anaerobic consortia by division of labour for sustainable biomanufacturing**
Christopher Lawson, University of Toronto, Canada

09:50 – 10:10  **Trash to Treasure: Converting Nitrogen Pollutants into Industrial Chemicals**
Keith Tyo, Northwestern University, USA

10:10 – 10:30  **Harnessing acetogenic bacteria for sustainable chemical production: a systems and synthetic biology approach**
Benjamin Woolston, Northeastern University, USA

10:30 – 11:00  Coffee Break

11:00 – 11:20  **Microbial strain engineering to advance biomanufacturing**
Aindrila Mukhopadhay, Lawrence Berkeley National Laboratory, USA

11:20 – 11:40  **TBA**
Nancy DaSilva

11:40 – 12:00  **Development of recombinant platforms for the upcycling of waste to protein-based biopolymers**
Mattheo Koffas, Rensselaer Polytechnic Institute, USA

12:00 – 12:20  **Towards sustainable, bio-sourced polymers**
Kristala Prather, Massachusetts Institute of Technology, USA

12:20 – 12:30  **Closing Remarks**

12:30  Lunch

Departures