Preliminary Program
(July 9, 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

12:30 – 14:30  Conference Check-in

14:30 – 14:45  Opening Remarks (Conference Chairs and ECI Liaison)

14:45 – 16:25  **Session 1: Building Sustainability in Biomanufacturing and the Workforce**

*Sponsored by Inscripta*

Chairs: Natalie Farny, Worcester Polytechnic Institute, USA  
Zengyi Shao, Iowa State University, USA

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

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**

*Next generation bioproducts: Accelerating the path from innovation to commercialization*

Henk Noorman, DSM, the Netherlands

18:00 – 19:30  Dinner

19:30 – 22:00  **Poster Session I and Social Hour**

*Sponsored by Astrazeneca*

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

Chair: Ian Wheeldon, University of California, Riverside, USA  
Co-Chairs: Wilfred Chen, University of Delaware, USA  
Carolyn Mills, University of California, Santa Barbara, USA  
Ben Woolston, Northeastern University, USA
Monday, July 22, 2024

07:00 – 08:30  Breakfast

08:30 – 09:30  **Keynote**
Biochemical Engineering: Tales at the Intersection of Technology, Fundamental Research, and Application
Kelvin Lee, NIIMBL/University of Delaware, USA

09:30 – 12:30  **Session 2: In vitro models & Emerging Cell Therapies**
Chairs: Laura Segatori, Rice University, USA
Tim Whitehead (University of Colorado, USA)

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  **Programming cellular sensors with genetic control systems**
Laura Segatori, Rice University, 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**
*Sponsored by Genentech*
*(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**
*Sponsored by Accenture*
Chairs: Carrie Eckert, Oak Ridge National Laboratory, USA
Markus Mund, Sanofi-Aventis Deutschland GmbH, Germany

15:30 – 15:50  **A Journey Towards the Development of a Cloud Biofoundry**
Huimin Zhao, University of Illinois at Urbana-Champaign, USA
Monday, July 22, 2024 (continued)

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

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
Chairs: John Kim, University of Alabama, USA
Aindrila Mukhapadhay, Lawrence Berkeley National Laboratory, USA

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 (1358 Dame Street, near Temple Bar neighbourhood) 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
Chairs: Chris Lawson, University of Toronto, Canada
Gozde Demirer, California Institute of Technology, USA

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  Unravelling the impact of climate change on Arctic diatom-cyanobacteria symbiosis and the global carbon cycle
Ranjan Srivastava, University of Connecticut, USA

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
Chairs: Ben Hackel, University of Minnesota, USA
Han Li, University of California, Irvine, USA

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 Raeeszadeh-Sarmazdeh, University of Nevada, Reno, USA

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

14:00 – 14:20  Bioengineering of cancer stem cells for improved disease modelling
John Kim, University of Alabama, 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, California Institute of Technology, USA

17:00 – 18:00  Amgen Award Lecture
   BROADENING THE BIOELECTRONICS BANDWIDTH: 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**  
**Hidden Figures: Gut microbes that promise efficient carbon cycling for sustainable biomanufacturing**  
Kevin Solomon, University of Delaware, USA

09:30 – 13:00  **Session 7: Sustainable Biomanufacturing via Microbial Systems**  
Chairs: Maryam Raeeszadeh-Sarmazdeh, University of Nevada, Reno, USA  
Leonardo Rios Solis, University College London, UK

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 Mukhapadhay, Lawrence Berkeley National Laboratory, USA

11:20 – 11:40  **Spatial and temporal control of metabolic pathways for increased biosynthesis in the emerging yeast Kluyveromyces marxianus**  
Nancy Da Silva, University of California, Irvine, USA

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