

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 Mukhopadhyay, 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	<u>BEJ Lecture</u> Hidden Figures: Gut microbes that promise efficient carbon cycling for sustainable biomanufacturing Kevin Solomon, University of Delaware, USA
09:30 – 13:00	<u>Session 7: Sustainable Biomanufacturing via Microbial Systems</u> 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 Mukhopadhyay, Lawrence Berkeley National Laboratory, USA
11:20 – 11:40	Spatial and temporal control of metabolic pathways for increased biosynthesis in the emerging yeast <i>Kluyveromyces marxianus</i> 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