

Preliminary Program

(May 22, 2022)

BIOCHEMICAL AND MOLECULAR ENGINEERING XXII: THE DAWN OF A NEW ERA

June 26-30, 2022

Grand Fiesta Americana Coral Beach Hotel
Cancun, Mexico

Conference Co-Chairs

Michael Jewett
Northwestern University, USA

Kristala Prather
MIT, USA

Michael Köpke
LanzaTech, USA

Diane Hatton
AstraZeneca, USA



Engineering Conferences International

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Sunday, June 26, 2022

11:30 – 14:00	Lunch
12:00 – 18:00	Check-in
14:45 – 15:00	Welcome and conference overview Conference co-chairs: ECI Technical Liaison:
15:00	<u>Session 1: Innovations in medicine</u> Session Chairs: Peyton Greenside, BigHatBio, USA Peter Tessier, University of Michigan, USA
15:00 – 15:30	Invited Talk TBA Sumana Chandramouli, Moderna
15:30 – 16:00	High throughput quality control assays to support RNA vaccine manufacturing Karen Polizzi, Imperial College London, UK
16:00 – 16:30	Creating a niche for live biotherapeutics by expanding the privilege of prebiotic compounds Thomas Mansell, Iowa State University, USA
16:30 – 17:15	Coffee break
17:15 – 17:45	Advancing therapeutics by reprogramming cells to direct cell fate outcomes Tara Deans, University of Utah, USA
17:45 – 18:15	TBA Debra Auguste, Northeastern University, USA
18:15 – 19:00	<u>Rapid-fire Poster Talks 1</u> Chairs: Karen Polizzi and TBD
19:00 – 20:00	<u>Keynote Speaker I</u> TBA Eliana Clark, Intellia Tx, USA
20:00 – 21:30	Dinner

Monday, June 27, 2022

07:00 – 08:30 Breakfast Buffet

Session 2: Accelerating therapeutics time to market and new therapeutics

Session Chairs: **Thomas Mansell, Iowa State University, USA**
Sumana Chandramouli, Moderna, USA

08:30 – 09:00 Invited Talk
TBA
Marion Brunck, Tecnológico de Monterrey, Mexico

09:00 – 09:30 **Saturated fatty acids are involved in DNA damage response, mediated by IRE1alpha, to promote chemotolerance**
Christina Chan, Michigan State University, USA

09:30 – 10:00 **Avidity-based approach for the engineering of broad-spectrum antiviral against SARS-CoV-2**
Zhilei Chen, Texas A&M, USA

10:00 – 10:45 Coffee Break

10:45 – 11:15 **Precision library generation and functional screening for highly efficient antibody discovery**
Brandon DeKosky, MIT, USA

11:15 – 11:45 **SOLUPRO® *E. coli* as a high-performance chassis for drug discovery and scalable production of protein therapeutics**
Matthew Blankschien, Absci, USA

11:45 – 13:30 Lunch

Session 3: Machine learning-guided design and automation

Session Chairs: **Claudia Vickers, Provectus Algae, Australia**
Costas Maranas, Pennsylvania State University, USA

13:30 – 14:00 **Pareto optimal antibody engineering using machine learning models that generalize to novel mutational space**
Peter Tessier, University of Michigan, USA

14:00 – 14:30 **Example-based automated strategies for AI model-aided peptide design to generate peptide sequences with desired combinations of functional, physicochemical and production properties**
Alvaro Olivera-Nappa, University of Chile, Chile

14:30 – 15:00 Invited Talk
TBA
Peyton Greenside, BigHatBio, USA

15:00 – 15:30 Invited Talk
A Self-driving Biofoundry for Biosystems Design
Huimin Zhao, University of Illinois, Urbana-Champaign, USA

15:30 – 16:15 Coffee Break

Monday, June 27, 2022 (continued)

- 16:15 – 16:45 Invited Talk
TBA
Erin Shellman, Ginkgo, USA
- 16:45 – 17:15 **Machine learning techniques for dynamical studies of metabolism**
Ljubisa Miskovic, EPFL, Switzerland
- 17:15 – 17:45 Invited Talk
TBA
Victor Holmes, Amyris, USA
- 17:45 – 18:45 **Panel/Workshop 1**
Machine learning-guided design and automation
Moderator: Huimin Zhao, University of Illinois, Urbana-Champaign, USA
Panelists: Peyton Greenside, Erin Shellman, Victor Holmes
- 18:45 – 20:30 Dinner
- 20:30 – 22:30 **Poster Session 1**
Poster Chairs: **Karen Polizzi and TBD**

Tuesday, June 28, 2022

07:00 – 08:30 Breakfast Buffet

Session 4: Microbiome Engineering

Session Chairs: **TBD**

08:30 – 09:00 Invited Talk
From trash to treasure: Bioprospecting nature's microbial communities for biotechnology
Michelle O'Malley, University of California-Santa Barbara, USA

09:00 – 09:30 **Programming gene expression in multicellular organisms for physiology modulation through engineered bacteria**
Qing Sun, Texas A&M University, USA

09:30 – 10:00 **Redox-linked synthetic biology and electrogenetics opens lines of communication for organizing consortia**
Bill Bentley, University of Maryland, USA

10:00 – 10:45 Coffee Break

10:45 – 11:15 **Fungal highways enable migration and communication of engineered bacteria in soil**
Eric Young WPI, USA

11:15 – 11:45 **Production of anticancer drug taxol intermediaries using microbial consortia under a continuous flow system**
Leonardo Rios-Solis, University of Edinburgh, UK

11:45 – 12:15 **Challenges and opportunities in the mathematical modeling and computational design of microbial communities**
Vassily Hatzimanikatis, EPFL, Switzerland

12:15 – 13:30 Lunch

14:00 – 14:45 **BME Young Investigator Award Lecture**
TBA
Mark Blenner, University of Delaware, USA

Session 5: Gene editing / Evolution meets engineering design

Chairs: **TBD**

14:45 – 15:15 Invited Talk
TBA
Kevin Solomon, University of Delaware, USA

15:15 – 15:45 **Rapid biosensor development from repurposed plant hormone receptors**
Timothy Whitehead, University of Colorado, USA

15:45 – 16:15 **Deep mutational scanning expedites directed evolution and enzyme characterization**
Nikhil U. Nair, Tufts University, USA

16:15 – 17:00 Coffee Break

Tuesday, June 28, 2022 (continued)

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| 17:00 – 17:30 | Decoding antisense evolution to enhance and guide metabolic engineering
Ranjan Srivastava, University of Connecticut, USA |
| 17:30 – 18:00 | Enzyme engineering: Highlights from rational design
Alexandra Pires Carvalho, Almac Sciences, United Kingdom |
| 18:00 – 19:00 | <u>Rapid-fire Poster Talks 2</u>
Chairs: Karen Polizzi and TBD |
| 19:00 – 20:30 | Dinner |
| 20:30 – 22:00 | <u>Poster Session 2</u>
Poster Chairs: Karen Polizzi and TBD |

Wednesday, June 29, 2022

07:00 – 08:30 Breakfast Buffet

Session 6: Carbon-negative manufacturing

Session Chairs: **TBD**

08:30 – 09:00 Invited Talk
TBA
Séan Simpson, LanzaTech, USA

09:00 – 09:30 **Systems metabolic engineering for carbon recycling**
Esteban Marcellin, University of Queensland, Australia

09:30 – 10:00 **Faster growth enhances low carbon fuel and chemical production through gas fermentation**
Kaspar Valgepea, University of Tartu, Sweden

10:00 – 10:45 Coffee Break

10:45 – 11:15 **Model-based engineering of *Escherichia coli* for net-zero emission butane production**
Radhakrishnan Mahadevan, University of Toronto, Canada

11:15 – 11:45 **Developing a novel microbial host and synthetic biology tools for valorizing waste polyethylene terephthalate and lignin-derived compounds**
Tae Seok Moon, Washington University in St. Louis, USA

11:45 – 12:15 **Cell-free engineering approaches to enable carbon-negative manufacturing**
Ashty Karim, Northwestern University, USA

12:15 – 12:45 **Panel/Workshop 2: Moving beyond the bench - translation to biotech**
Moderator: Kristala Prather, MIT
Panelists: Sean Simpson, Claudia Vickers, Jay Keasling, Huan Yan

13:15 – 18:00 Lunch followed by time for networking or excursion (TBA)

18:00 – 19:00 **Amgen Award Lecture**
TBA
Robert Kelly, North Carolina State University, USA

19:00 – 20:00 Award reception

20:00 – 22:30 Gala Dinner

Thursday, June 30, 2022

07:00 – 08:00	Breakfast Buffet
08:00 – 09:00	<u>Keynote 2</u> TBA Jay Keasling, University of California, USA <u>Session 7: Sustainability and nutrition</u> Session Chairs: Séan Simpson, LanzaTech, USA TBD
09:00 – 09:30	TBA James Swartz, Stanford University, USA
09:30 – 10:00	Invited Talk TBA Claudia Vickers, Provectus Algae, Australia
10:00 – 10:45	Coffee Break
10:45 – 11:15	Development of a novel membrane-less ATP regeneration cascade using reversible NAD Kinase enzymes from bird or cat liver Scott Banta, Columbia University, USA
11:15 – 11:45	Invited Talk TBA Danielle Tullman-Ercek, Northwestern University, USA
11:45 – 12:15	Invited Talk TBA Huan Yan, Impossible Foods, USA
12:15	Lunch and Departures