

Preliminary Program

(May 25, 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
32 Broadway, Suite 314 - New York, NY 10004, USA
www.engconfintl.org – info@engconfintl.org

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 **Session 1: Innovations in medicine**
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 Invited Talk
Advancing therapeutics by reprogramming cells to direct cell fate outcomes
Tara Deans, University of Utah, USA
- 17:45 – 18:15 Invited Talk
TBA
Debra Auguste, Northeastern University, USA
- 18:15 – 19:00 **Rapid-fire Poster Talks 1**
Chairs: **Karen Polizzi, Imperial College London, UK**
Mark Blenner, University of Delaware, USA
- 19:00 – 20:00 **Keynote Speaker I**
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, Imperial College London, UK**
Mark Blenner, University of Delaware, USA

Tuesday, June 28, 2022

07:00 – 08:30 Breakfast Buffet

Session 4: Microbiome Engineering

Session Chairs: **Kevin Solomon, University of Delaware, USA**
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: **Marion Brunck, Tecnológico de Monterrey, Mexico**
Eric Young, WPI, USA

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 **TBD**

16:15 – 17:00 Coffee Break

Tuesday, June 28, 2022 (continued)

- 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 **Rapid-fire Poster Talks 2**
Chairs: **Karen Polizzi, Imperial College London, UK**
Mark Blenner, University of Delaware, USA
- 19:00 – 20:30 Dinner
- 20:30 – 22:00 **Poster Session 2**
Poster Chairs: **Karen Polizzi, Imperial College London, UK**
Mark Blenner, University of Delaware, USA

Wednesday, June 29, 2022

- 07:00 – 08:30 Breakfast Buffet
- Session 6: Carbon-negative manufacturing**
Session Chairs: **Michelle O'Malley, University of California-Santa Barbara, USA**
Victor Holmes, Amyris, USA
- 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 – 13:15 **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**
Going to extremes: Life in boiling water, hot acid, and (probably) on other solar bodies
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

Keynote 2

TBA

Jay Keasling, University of California, USA

Session 7: Sustainability and nutrition

Session Chairs: **Christina Chan, Michigan State University, USA**

Séan Simpson, LanzaTech, USA

09:00 – 09:30

Invited Talk

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