Program

Enzyme Engineering XXVI

May 22 - 27, 2022

Dallas/Fort Worth, TX, USA

Conference Chairs

Andy Bommarius, Georgia Institute of Technology, USA
Vesna Mitchell, Codexis, USA
Doug Fuerst, GSK, USA

Engineering Conference International
32 Broadway, Suite 314 - New York, NY 10004, USA
www.engconfintl.org – info@engconfintl.org

Dallas/Fort Worth Marriott Hotel and Golf Club

3000 Championship Parkway, Roanoke, TX 76177

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Yan Feng, Shanghai Jiao Tong University, China
Wen Ping Wu, Senior Director, Novozymes, China
Cheng Jin, Professor, President of Guangxi Academy of Sciences, Nanning, Guangxi, China

Previous conferences in this series:

Enzyme Engineering
August 9-13, 1971
New England College, Henniker, New Hampshire
Conference Chair:
L.B. Wingard, Jr., SUNY Buffalo

Enzyme Engineering II
August 5-10, 1973
New England College, Henniker, New Hampshire
Conference Chairs:
L. B. Wingard, Jr., University of Pittsburgh
E. K. Pye, University of Pennsylvania

Enzyme Engineering III
August 3-8, 1975
Reed College, Portland, Oregon
Conference Chairs:
E. K. Pye, University of Pennsylvania
Howard H. Weetall, Corning Glass Works

Enzyme Engineering IV
September 25–30, 1977
Bad Neuenahr, W. Germany
Conference Chairs:
G. Manecke, der Freie Universität Berlin
L. B. Wingard, Jr., University of Pittsburgh

Enzyme Engineering V
July 29-August 3, 1979
New England College, Henniker, New Hampshire
Conference Chairs:
Howard H. Weetall, Corning Glass Works
G. P. Royer, University of Delaware

Enzyme Engineering VI
September 20-26, 1981
Kashikojima, Japan
Conference Chairs:
S. Fukui, Kyoto University
I. Chibata, Tanabe Seiyaku Co.

Enzyme Engineering VII
September 25-30, 1983
White Haven, Pennsylvania
Conference Chair:
Allen I. Laskin, Exxon Research & Eng. Co.

Previous conferences in this series:

Enzyme Engineering VIII
September 22-27, 1985
Elsinor, Denmark
Conference Chair:
Klaus Mosbach, University of Lund

Enzyme Engineering IX
October 4-9, 1987
Santa Barbara, California
Conference Chairs:
Harvey W. Blanch, University of California, Berkeley
Alexander M. Klibanov, Massachusetts Institute of Technology

Enzyme Engineering X
September 24-29, 1989
Kashikojima, Japan
Conference Chair:
H. Okada, University of Osaka

Enzyme Engineering XI
September 22-27, 1991
Kona, Hawaii
Conference Chairs:
David A. Estell, Genencor
Douglas S. Clark, University of California, Berkeley

Enzyme Engineering XII
September 19-24, 1993
Deauville, France
Conference Chairs:
Daniel Thomas, University of Technology of Compiègne
Marie Dominique Legoy, University of Technology of Compiègne

Enzyme Engineering XIII
October 15-20, 1995
San Diego, California
Conference Chairs:
Jon Dordick, University of Iowa
Alan Russell, University of Pittsburgh

Enzyme Engineering XIV
October 12-17, 1997
Beijing, China
Conference Chairs:
Yao-Ting Yu, Nankai University
Gao-Xiang Li, Academia Sinica

Previous conferences in this series:

Enzyme Engineering XV
October 10-15, 1999
Kailua-Kona, Hawaii
Conference Chairs:
David Anton, DuPont
Frances H. Arnold, California Institute of Technology
Robert Kelly, North Carolina State University

Enzyme Engineering XVI
October 7-12, 2001
Potsdam, Germany
Conference Chairs:
Frieder W. Scheller, University of Potsdam
Christian Wandrey, Research Center Jülich
Oreste Ghisalba, Novartis Pharma AG

Enzyme Engineering XVII
November 9-14, 2003
Santa Fe, New Mexico
Conference Chairs:
Stephen Benkovic, Pennsylvania State University
Chi-Huey Wong, Scripps Research Institute
Jeffrey Moore, Merck & Co., Inc.
Birgit Kosjek, Merck & Co., Inc.

Enzyme Engineering XVIII
October 9-14, 2005
Gyeong-ju, Korea
Conference Chairs:
Hak-Sung Kim, KAIST, Korea
Ji-Yong Song, LG Life Sciences, Ltd, Korea
Tae-Kwang Oh, Korea Research Inst.of Biosciences & Biotech, Korea
Moon-Hee Sung, Kookmin University, Korea

Enzyme Engineering XIX
September 23-28, 2007
British Columbia, Canada
Conference Chairs:
Romas Kazlauskas, University of Minnesota
Stefan Lutz, Emory University
David Estell, Danisco/Genencor

Enzyme Engineering XX
September 20-24, 2009
Groningen, the Netherlands
Conference Chairs:
Dick Janssen, University of Groningen
Oliver May, DSM Pharmaceutical Products
Andreas Bommarius, Georgia Institute of Technology

Previous conferences in this series:

Enzyme Engineering XXI
September 18-22, 2011
Vail, Colorado
Conference Chairs:
Lori Giver, Codexis
Steve Withers, University of British Columbia

Enzyme Engineering XXII
September 22-26, 2013
Toyama, Japan
Conference Chairs:
Yasuhisa Asano, Toyama Prefectural University
Jun Ogawa, Kyoto University
Yoshihiko Yasohara, Keneka Corp.

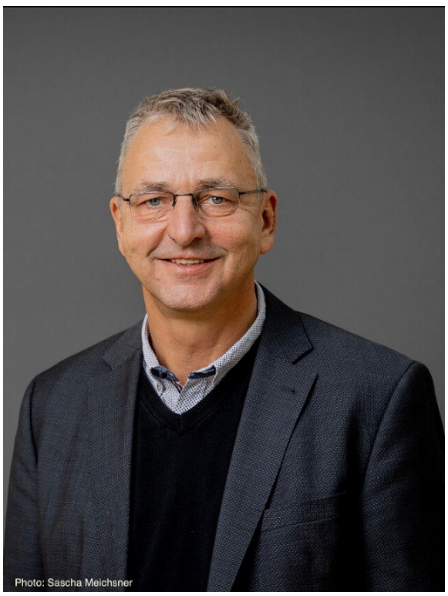
Enzyme Engineering XXIII
September 6-11, 2015
St. Petersburg, Florida, USA
Conference Chairs:
Jon Dale Stewart, University of Florida
Robert DiCosimo, DuPont Industrial Biosciences

Enzyme Engineering XXIV
September 24-28, 2017
Toulouse, France
Conference Chairs:
Pierre Monsan, Toulouse White Biotechnology, France
Magali Remaud-Simeon, LISBP-INSA, University of Toulouse, France

Enzyme Engineering XXV
October 15-19, 2019
Whistler, British Columbia, Canada
Conference Chairs:
Huimin Zhao, University of Illinois at Urbana-Champaign, USA
John Wong, Pfizer, USA

Enzyme Engineering Award Winner

Uwe T. Bornscheuer



Professor Uwe Bornscheuer is full professor at the University of Greifswald (Greifswald, Germany) at the Institute of Biochemistry and is head of the Dept. of Biotechnology & Enzyme Catalysis. He received his diploma degree in chemistry in 1990 and his Ph.D. degree in Technical Chemistry in 1993 both from the University of Hannover. In 1994 he performed postdoctoral studies at the University of Nagoya (Nagoya, Japan), then moved to the University of Stuttgart, where he finished his habilitation in Technical Biochemistry in 1998. He has been a professor in Greifswald since 1999. Uwe Bornscheuer has published over 500 peer-reviewed research articles, more than 40 book chapters and has filed 50 patent applications. He has written two seminal teaching books (Hydrolases in Organic Synthesis with Romas Kazlauskas, Biocatalysts and Enzyme Technology with Volker Kasche and Klaus Buchholz) and coedited several other books such as the Protein Engineering Handbook (with Stefan Lutz).

Prof. Bornscheuer has supervised >150 B.Sc./M.Sc./diploma students and 70 Ph.D. students have graduated from his group (currently: 18 Ph.D. students). He has given more than 600 presentations at national and international conferences. Prof. Bornscheuer has received numerous awards such as the European Lipid Technology Award (2021), Chemistry Europe Fellow (2020), Greifswald Research Award (2018), Stephen S. Chang Award (2015), Normann Medal (2014), Chevreul Medal (2012) and the Biocat2008 Award (2008). He is currently member of the Scientific Advisory Boards of the Toulouse White Biotechnology center and of the company Carbios. Bornscheuer is a cofounder and Chairman of the Advisory Board of the company Enzymicals AG in Greifswald. He also served as president of the German Society for Fat Science (DGF), he was Editor-in-Chief of a lipid science journal and is currently head of the

Senate of the University of Greifswald. He is also member of the review board for biochemistry of the German Research Foundation (DFG) and of the Novo Nordisk Foundation.

The major theme in the Bornscheuer group is identifying and optimizing enzymes through protein engineering for applications in organic synthesis (i.e., chiral intermediates for pharmaceuticals using hydrolases or transaminases), lipid modification (healthy fats/oils, oleochemistry), the enzymatic degradation of complex marine polysaccharides and more recently enzymatic recycling of plastics such as PET.

Professor Bornscheuer pioneered many methods of protein engineering, including a range of new high-throughput screening methods, computational tools to design libraries of protein variants and the application of these methods to alter the regio-, chemo- and stereoselectivity of enzymes for various applications. Many projects helped to establish novel environmentally friendly processes. He is recognized worldwide as a leader in enzyme engineering and biocatalysis, where he has developed important new concepts, technologies and biocatalysts.

Past Enzyme Engineering Awardees

1983–WHITE HAVEN, PA, USA — ICHIRO CHIBATA

1985–HELSINGOR, DENMARK — KLAUS MOSBACH

1987–SANTA BARBARA, CA, USA — EPHRIAM KATCHALSKI-KATZIR

1989–KASHIKOJIMA, JAPAN — SABURO FUKUI

1991–KONA, HAWAII, USA — ALEX KLIBANOV

1993–DEAUVILLE, FRANCE — MALCOLM LILLY

1995–SAN DIEGO, CA, USA — MARIA-REGINA KULA / CHRISTIAN WANDREY

1997–BEIJING, CHINA — HARVEY BLANCH

1999–KONA, HAWAII, USA — CHI HUEY WONG

2001–POTSDAM, GERMANY — HIDEAKI YAMADA

2003–SANTA FE, NM, USA — JON DORDICK / DOUG CLARK

2005—GYEONG-JU, KOREA — DEWEY RYU

2007—HARRISON HOT SPRINGS, BC, CANADA — FRANCES H. ARNOLD

2009 – GRONINGEN, THE NETHERLANDS — SAKAYU SHIMIZU

2011 – VAIL, COLORADO, USA — DAVID ESTELL

2013 – TOYAMA, JAPAN — YASUHISA ASANO

2015 – ST. PETERSBURG, FLORIDA, USA – DAN TAWFIK

2017 – TOULOUSE, FRANCE – PIERRE MONSAN

2019 – WHISTLE, CANADA – HUIMIN ZHAO

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Schedule

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Engineering Conference International

Locations and Notes

- *Sunday conference check-in will be in the Trinity Ballroom Foyer.*
- *Technical sessions will be in Trinity 2 and 3.*
- *Poster Sessions will be in Trinity 1.*
- *Meals will be in The Paddock.*
- *The ECI on site office will be in the Sabine Room.*
- *Please wear your mask except when giving a presentation or actively eating or drinking. Please maintain physical distancing as much as possible.*
- *Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, PDAs, watches) is strictly prohibited during the technical sessions, unless the author and ECI have granted prior permission.*
- *Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).*
- *Speakers – Please leave at least 3-5 minutes for questions and discussion.*
- *Questions will be submitted via the Guidebook app that we will be using for the conference. The app will be used in place of the roving microphones we normally have.*
- *Please do not smoke at any conference functions.*
- *Turn your mobile telephones to vibrate or off during technical sessions.*
- *Please write your name on your program so that it can be returned to you if lost or misplaced.*
- *After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.*
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Sunday, May 22, 2022

14:00	Conference check-in
	Opening Session
17:00 – 17:15	Chairs welcome and opening remarks Andy Bommarius, Georgia Institute of Technology, USA Vesna Mitchell, Codexis, USA Doug Fuerst, GSK, USA
17:15 – 18:15	**Plenary Talk** **Using machine learning to improve protein function** Andrew Ellington, The University of Texas at Austin, USA
19:00 – 20:30	Dinner

Monday, May 23, 2022

07:00 – 08:30	Breakfast
	Session 1: Enzyme Engineering in Synthetic Biology *(Sponsored by Illumina)* Chair: Daniela Grabs, Arzeda, USA
08:30 – 09:15	**Enzyme engineering for metabolic engineering** Kristala L.J. Prather, Massachusetts Institute of Technology, USA
09:15 – 09:45	**Exploring constraints of sequence space in search of optimal enzymes** Sridhar Govindarajan, ATUM, USA
09:45 – 10:05	***In silico* screening of transaminase using semi-empirical QM/MM approach** Marc Hayes, Enzymaster, USA
10:05 – 10:45	Coffee Break *(Sponsored by the Japanese Society of Enzyme Engineering)*
10:45 – 11:15	**Engineering enzymes to produce high purity synthetic DNA** Anders Knight, Codexis, USA
11:15 – 11:45	**A deep learning tool for protein engineering** Huimin Zhao, University of Illinois at Urbana-Champaign, USA
11:45 – 12:15	**Engineering enzymes for green manufacturing of noncanonical amino acids** David Romney, Aralez Bio, USA
12:15 – 13:45	Lunch & Networking
	Session 2: Computational Tools for Enzyme Engineering Chair: Sridhar Govindarajan, ATUM, USA
13:45 – 14:30	**Evaluation of sequence/activity relationships for more than 50 proteins: Implications for natural and directed evolution, protein engineering and machine learning algorithms** David Estell, Genencor International, Inc., USA
14:30 – 15:00	**Advanced database mining integrating sequence and structure bioinformatics with microfluidics challenges enzyme engineering** Zbynek Prokop, Masaryk University, Czech Republic
15:00 – 15:20	**Helix engineering: Combining the power of 3DM with AI to disrupt protein engineering** Stephan Heijl, Bio-Prodict, Netherlands
15:20 – 16:00	Coffee Break

Monday, May 23, 2022 (continued)

16:00 – 16:30	**Engineering a C4 fructose epimerase for production of tagatose** Kyle Roberts, Arzeda, USA
16:30 – 16:50	**Powering computational enzyme design with natural evolutionary information** Wenjun Xie, University of Southern California, USA
16:50 – 17:10	**Engineering proteins with 3D convolutional neural networks** Daniel Diaz, The University of Texas at Austin, USA
17:10 – 17:30	**The use of machine learning to navigate the sequence-activity landscape during directed evolution campaigns** Oscar Alvizo, Codexis, USA
18:00 – 19:30	Dinner & Networking
19:30 – 21:30	Poster Session & Chairs' Reception

Tuesday, May 24, 2022

07:00 – 08:30	Breakfast
	Session 3: New Technologies for Enzyme Engineering Chair: Misha Golynskiy, Illumina, USA
08:30 – 09:15	**Leveraging microfluidics for linking protein sequence to function in high-throughput** Polly Fordyce, Standard University, USA
09:15 – 09:45	**Fast evolution of active and/or enantioselective enzymes with a microfluidic enzyme screening platform** Zhi Li, National University of Singapore, Singapore
09:45 – 10:15	**GENOSCALER™: A Next-Generation high throughput enzyme, pathway, and genome engineering platform** Richard Fox, Infinome, USA
10:15 – 10:45	Coffee Break *(Sponsored by Purolite Ltd)*
10:45 – 11:05	**The impact of bioinformatics on industrial enzyme engineering** Andreas Vogel, c-LEcta GmbH, Germany
11:05 – 11:25	**High-throughput enzyme engineering for commercial-scale production of natural products** Irina Koryakina, Amyris, Inc., USA
11:25 – 11:45	**A hyperstable glycosyltransferase for blue denim dyeing** Gonzalo Bidart, Technical University of Denmark, Denmark
11:45 – 12:05	**Immobilized enzymes for green pharmaceutical applications** Fred Ghanem, Purolite, USA
12:05 – 13:45	Lunch & Networking
	Session 4: Novel Enzymes and Enzyme Activity Chair: Ee Lui Ang, Singapore Institute of Food and Biotechnology Innovation, Singapore
13:45 – 14:30	**Photoenzymatic Catalysis - Using light to reveal new enzyme functions** Todd Hyster, Cornell University, USA
14:30 – 15:00	**Design and evolution of enzymes with non-canonical catalytic mechanisms** Anthony Green, University of Manchester, United Kingdom
15:00 – 15:20	**Engineering substrates of transglutaminase using the Glutamine-Walk Strategy for specific modification of IgG1 antibodies** Joelle Pelletier, University of Montreal, Canada
15:20 – 16:00	Coffee Break

Tuesday, May 24, 2022 (continued)

16:00 – 16:45	**Boosting squalene-hopene cyclase towards an industrial biocatalyst** Bernhard Hauer, University of Stuttgart, Germany
16:45 – 17:15	**Carboxyesterase-mediated amidation** James Morrison, GSK, USA
17:15 – 17:35	**New techniques for the production of high-performing industrial enzymes** Michael Liszka, BASF Enzymes LLC, USA
17:35 – 17:55	**Overcoming challenges in organofluorine biosynthesis by engineered fluorinases** Pravin Kumar, Kcat Enzymatic Private Limited, India
18:00 – 19:30	Dinner & Networking
19:30 – 21:30	Poster Session

Wednesday, May 25, 2022

07:00 – 08:30	Breakfast
	Session 5: Process Modeling in Enzyme Engineering Chair: Huimin Zhao, University of Illinois at Urbana-Champaign, USA
08:30 – 09:15	**Modelling biocatalytic processes to accelerate enzyme and process development** John Woodley, Technical University of Denmark, Denmark
09:15 – 09:45	**Benefits of reaction engineering in biocatalysis** Zvjezdana Findrik Blažević, University of Zagreb, Croatia
09:45 – 10:05	**Towards engineering an efficient and thermostable α-amino ester hydrolase (AEH): Minimizing substrate inhibition and deactivation for continuous production of cephalexin** Colton Lagerman, Georgia Institute of Technology, USA
10:05 – 10:45	Coffee Break *(Sponsored by Merck & Co., Inc.)*
	Session 6: Enzymes and Nucleic Acids Chair: Sonya Clark, 10xGenomics, USA
10:45 – 11:30	**Biocatalytic synthesis of nucleoside and nucleotide therapeutics** John McIntosh, Merck, USA
11:30 – 12:00	**Biocatalytic oligonucleotide synthesis technology-BOOST** Jill Caswell, Almac, USA
12:00 – 12:20	**Biocatalytic approaches to therapeutic oligonucleotide manufacture** Sarah Lovelock, University of Manchester, United Kingdom
12:20 – 12:40	**Optimizing enzyme production to support commercial mRNA manufacturing** Juozas Siurkus, Thermo Fisher Scientific, Lithuania
12:40	Lunch / Free afternoon for networking & sightseeing
	Dinner on your own

Thursday, May 26, 2022

07:00 – 08:30	Breakfast
	Session 7: Enzyme Engineering for Environmental Applications Chair: Michael Liszka, BASF Enzymes LLC, USA
08:30 – 09:15	**PET recycling: From enzyme engineering to a first industrial unit** Alain Marty, Carbios, France
09:15 – 09:35	**Engineering enzymes for microbial control: Cell-free methods for enhancing antimicrobial efficacy through directed evolution** Erika Milczek, Curie Co. Inc., USA
09:35 – 09:55	**Directed evolution of an efficient and thermostable PET depolymerase** Elizabeth Bell, University of Manchester, United Kingdom
09:55 – 10:15	**Engineering of a redox neutral enzyme cascade for production of aliphatic diamines** Hannah Valentino, Oak Ridge National Lab, USA
10:15 – 11:00	Coffee Break
	Poster Talks Chairs: Richard Fox, Infinome Biosciences, USA Zhi Li, National University of Singapore
11:00 – 11:05	Announcement of Winners of the Poster Competition
11:05 – 11:20	Winner 1
11:20 – 11:35	Winner 2
11:35 – 11:50	Winner 3
12:00 – 13:30	Lunch
	Session 8: In Memoriam - Hideaki Yamada Chair: Jun Ogawa, Kyoto University, Japan
13:30 – 14:10	**Memories of late professor Hideaki Yamada, a giant in enzyme engineering, and successive activities stemmed from his philosophy** Jun Ogawa, Kyoto University, Japan
14:10 – 14:50	**Continuity and change in screening for industrial enzymes and protein engineering- A tribute to the late Professor Hideaki Yamada** Yasuhisa Asano, Toyama Prefectural University; ERATO, JST, Japan
14:50 – 15:10	**Basics and applications of gut bacterial lipid-metabolizing enzymes- A tribute to the late Professor Hideaki Yamada** Shigenobu Kishino, Kyoto University, Japan
15:10 – 15:30	**Development of P450-BM3 using molecular dynamics simulations- A tribute to the late Professor Hideaki Yamada** Satoru Ishihara, Amano Enzyme Inc., Japan

Thursday, May 26, 2022 (continued)

15:30 – 16:00	Coffee Break
	Session 9: In Memoriam - Dan Tawfik Chair: David Baker, University of Washington, USA
16:00 – 16:30	**Protein design using deep learning** David Baker, University of Washington, USA
16:30 – 17:00	**Making better proteins: Learning from the best** Olga Khersonsky, Weizmann Institute of Science, Israel
17:00 – 17:30	**Adventures on the routes of enzyme evolution – In memoriam Dan Tawfik** Nobu Tokuriki, University of British Columbia, Canada
17:30 – 18:00	**Evolutionary-guided cofactor engineering** Paola Laurino, Okinawa Institute of Science and Technology Graduate University, Japan
	Enzyme Engineering Award Presentation and Lecture
18:00 – 18:10	**Introduction and Presentation of the Enzyme Engineering Award** David Estell, Genencor International, Inc., USA Jeff Moore, Merck & Co., Inc., USA Joelle Pelletier, University of Montreal, Canada
18:10 – 19:10	**Enzyme Engineering Award Lecture** **Biocatalysis and enzyme engineering – a personal view on the last three decades** Uwe Bornscheuer, Greifswald University, Germany
19:30 – 22:00	Reception and Banquet

Friday, May 27, 2022

07:00	Breakfast & Departure

Poster Presentations

1. **Design and evolution of enzymes for the Morita-Baylis-Hillman reaction**
   Amy Crossley, University of Manchester, United Kingdom

2. **An engineered cytidine deaminase for biocatalytic production of a key intermediate of the COVID-19 antiviral Molnupiravir**
   Ashleigh Burke, University of Manchester, United Kingdom

3. **Galectin-Anchored indoleamine 2,3-dioxygenase tissue-targeted therapeutic enzyme suppresses local inflammation in multiple animal models**
   Benjamin Keselowsky, University of Florida, USA

4. **Biocatalytical access to amides**
   Erna Zukic, acib, University of Graz, Austria

5. **Engineering of styrene oxide isomerase for enhanced production of (S)-2-arylpropionaldehydes**
   Joel Choo Ping Syong, National University of Singapore, Singapore

6. **Assessment of C-type halohydrin dehalogenase stability**
   Nevena Milčić, University of Zagreb, Croatia

7. **Screening millions of droplet-compartmentalized single cells with Xdrop®**
   Peter Mouritzen, Samplix Aps, Denmark

8. **Determination of the rate limiting step during zearalenone hydrolysis by ZenA**
   Sebastian Fruhauf, DSM - BIOMIN Research Center, Austria

9. **Efficient enzyme discovery from complex environmental microbiota using microbial single-cell sequencing**
   Soichiro Tsuda, bitBiome Inc., Japan

10. **A cell-free platform for the directed evolution of toxic enzymes and proteins**
    Will Shindel, Curie Co, USA

11. **FireProt ASR: Automated design of ancestral proteins**
    Zbynek Prokop, Masaryk University, Czech Republic

12. **EnzymeMiner: Exploration of sequence space of enzymes**
    Zbynek Prokop, Masaryk University, Czech Republic

13. **Unlocking the key to successful commercialization by coupling the power of biocatalysis, strain engineering, and application studies**
    Khin Oo, Fornia BioSolutions, Inc., USA

14. **Immobilized enzymes for green pharmaceutical applications**
    Fred Ghanem, Purolite, USA

15. ***In silico* screening of transaminase using semi-empirical QM/MM approach**
    Marc Hayes, Enzymaster, USA

16. **Toward engineering an efficient and thermostable α-Amino Ester Hydrolase (AEH): Minimizing substrate inhibition and deactivation for continuous production of cephalexin**
Colton Lagerman, Georgia Institute of Technology, USA

17. **Engineering of a redox neutral enzyme cascade for production of aliphatic diamines**
Hannah Valentino, Oak Ridge National Lab, USA

18. **Overcoming challenges in organofluorine biosynthesis by engineered fluorinases**
Pravin Kumar, KCAT Enzymatic Private Limited, India

19. **7D-Grid-AI-Technology: A technology that translates enzymes from a computer to business with limited lab experiments**
Pravin Kumar, KCAT Enzymatic Private Limited, India

20. **Insilico guided CRISPR-Cas driven enzyme engineering framework: An automated and efficient enzyme engineering method**
Pravin Kumar, KCAT Enzymatic Private Limited, India

21. **QM/MM Studies of The phenylalanine ammonia-lyase variants helped to understand the mechanistic role of the mutations**
Pravin Kumar, KCAT Enzymatic Private Limited, India

22. **discovery of CDX-6512, a gastrointestinal-stable methionine-gamma-lyase as a potential orally-administered enzyme therapy for homocystinuria**
Leann Teadt, Codexis, Inc., USA