Enzyme Engineering XXVI

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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** 33 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	3
09:45 – 10:05	***In silico* screening of transaminase using semi-empirical QM/MM approach** Marc Hayes, Enzymaster, USA	2
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	1
11:15 – 11:45	**A deep learning tool for protein engineering** Huimin Zhao, University of Illinois at Urbana-Champaign, USA	4
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	9
15:00 – 15:20	**Helix engineering: Combining the power of 3DM with AI to disrupt protein engineering** Stephan Heijl, Bio-Prodict, Netherlands	7
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	6
16:30 – 16:50	**Powering computational enzyme design with natural evolutionary information** Wenjun Xie, University of Southern California, USA	8
16:50 – 17:10	**Engineering proteins with 3D convolutional neural networks** Daniel Diaz, The University of Texas at Austin, USA	5
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	14
09:45 – 10:15	**GENOSCALER™: A Next-Generation high throughput enzyme, pathway, and genome engineering platform** Richard Fox, Infinome, USA	13
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	12
11:25 – 11:45	**A hyperstable glycosyltransferase for blue denim dyeing** Gonzalo Bidart, Technical University of Denmark, Denmark	11
11:45 – 12:05	**Immobilized enzymes for green pharmaceutical applications** Fred Ghanem, Purolite, USA	10
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
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	17
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	16
17:15 – 17:35	**New techniques for the production of high-performing industrial enzymes** Michael Liszka, BASF Enzymes LLC, USA	18
17:35 – 17:55	**Overcoming challenges in organofluorine biosynthesis by engineered fluorinases** Pravin Kumar, Kcat Enzymatic Private Limited, India	19
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	21
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	20
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	22
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	24
12:20 – 12:40	**Optimizing enzyme production to support commercial mRNA manufacturing** Juozas Siurkus, Thermo Fisher Scientific, Lithuania	23
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	25
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	26
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	29
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	32
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	31
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	30

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 27
16:30 – 17:00	**Making better proteins: Learning from the best** Olga Khersonsky, Weizmann Institute of Science, Israel 28
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