Program

Enzyme Engineering XXVII

October 1-6, 2023
Singapore

Conference Chairs:

Ang Ee Lui
Singapore Institute of Food and Biotechnology Innovation, A*STAR, Singapore

Yan Feng
Shanghai Jiao Tong University, China

Li Zhi
National University of Singapore, Singapore

Engineering Conferences International
369 Lexington Avenue, 3rd Floor #389
New York, NY 10017, USA
www.engconfintl.org – info@engconfintl.org

ParkRoyal Hotel Beach Road
7500 Beach Road
Singapore 199591
+65 6505 5666
enquiry.prsin@parkroyalhotels.com

Engineering Conferences International (ECI) is a not-for-profit global engineering conferences program, originally established in 1962, that provides opportunities for the exploration of problems and issues of concern to engineers and scientists from many disciplines.

Enzyme Engineering Steering Committee

Chair: Jeff Moore, Merck & Co., Inc., USA

Yasuhisa Asano, Toyama Prefectural University, Japan

Yan Feng, Shanghai Jiao Tong University, China

Cheng Jin, Professor, President of Guangxi Academy of Sciences, Nanning, Guangxi, China

Byung-Gee Kim, Seoul National University, Korea

Andy Bommarius, Georgia Institute of Technology, USA

Doug Fuerst, GSK, USA

Vesna Mitchell, Codexis, USA

Pierre Monson, Toulouse White Biotechnology, France

Magali Remaud-Simeon, INSA-University of Toulouse, France

John Wong, Pfizer, retired, USA

Huimin Zhao, University of Illinois, Urbana-Champaign, USA

Stefan Lutz, Codexis, USA

Wen Ping Wu, Senior Director, Novozymes, China

John Woodley, Technical University of Denmark, Denmark

Ditte Hededam Welner, Technical University of Denmark, Denmark

Jens Erik Nielsen, Novozymes A/S, Denmark

Uwe Bornscheuer, University of Greifswald, Germany

Enzyme Engineering Organizing Committee

Andy Bommarius, Georgia Institute of Technology, USA

Vesna Mitchell, Codexis, USA

Doug Fuerst, GSK, USA

Magali Remaud-Simeon,INSA-University of Toulouse, France

Pierre Monson, Toulouse White Biotechnology, France

John Wong, Pfizer, retired, USA

Huimin Zhao, University of Illinois, Urbana-Champaign, USA

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 XXVI
May 22-27, 2022
Dallas/Fort Worth, Texas
Conference Chairs:
Andy Bommarius, Georgia Institute of Technology, USA
Vesna Mitchell, Codexis, USA
Doug Fuerst, GSK, USA

Hak-Sung Kim – 2023 Enzyme Engineering Awardee

The 2023 Enzyme Engineering Award is given to Professor Hak-Sung Kim of the Korea Advanced Institute of Science and Technology (KAIST). Prof. Kim is honored with this award for his sustained groundbreaking research in the field of enzyme technology with a focus on the design of new biocatalysts, development of tools for advancing enzyme engineering, a role of conformational dynamics of enzyme, and integrating biocatalysis with metabolic engineering. His work has led to commercial processes among a large number of innovations, and he has been a leading figure in Korea, across Asia and in the worldwide enzyme technology/biocatalysis community in driving new discoveries and technologies.

Prof. Kim is a key driver in integrating biocatalysis with a wide range of disciplines, including synthetic and analytical chemistry, molecular biology and biochemistry, and metabolic pathway engineering. His publications are of both substance and impact, leading to revolutionary advances in enzyme engineering. He developed a unique methodology to graft functional elements onto enzymes to alter enzyme function, demonstrating the natural evolution process of enzymes. He also integrated molecular dynamics simulations and directed evolution into rational protein design, greatly enhancing the efficiency and success rate beyond independent rational and molecular evolution techniques. In addition, Prof. Kim has developed a wide array of important tools for the enzyme engineer. To advance molecular evolution and enzyme design, he developed an antisense RNA-based high-throughput screening system for directed evolution of quorum-quenching enzymes. This resulted in a significant reduction in false-positive rates, a critical problem in such screening methodologies. This approach resulted in advancing the integration of enzyme engineering with metabolic engineering, particularly the ability to rationally design a specific enzyme in a metabolic pathway to improve product yield.

He is the discoverer of “repebody”, which is a repeat protein scaffold consisting of varying numbers of consecutive homologous-structural modules of 20–40 amino acid residues with characteristic secondary structures. Armed with this structural knowledge, Prof. Kim developed repebody-drug conjugates with high selectivity and efficacy toward tumor cells, an immensely important field of emerging therapeutics today. Extending this approach, Prof. Kim targeted very specific disease-based proteins, and recently founded a start-up ProEn Therapeutics, which is targeting disease-related enzymes and tumor associated antigens for developing potential therapeutic agents against various diseases and cancers.

Prof. Kim also integrated enzyme design with complex molecular dynamics tools and demonstrated how protein dynamics dictate the binding and dissociation of a ligand through a single-molecule kinetic analysis of specific enzyme engineered mutants. Such a discovery provided direct evidence that protein conformational dynamics plays a crucial role in ligand binding and dissociation. Based on this finding, Prof. Kim engineered the **chorismate-pyruvate lyase** to relieve product inhibition by increasing the intrinsic dynamics of the enzyme. Sever product inhibition of the enzyme has limited its practical applications. The engineered enzyme has been successfully integrated into the shikimate pathway of Corynebacterium glutamicum to produce diverse aromatic compounds. Because the role of conformational dynamics in enzyme catalysis is still in early stage of study, those approaches are highly noteworthy in practice.
Prof. Kim has been extremely productive, with 235 peer-reviewed publications and an inventor on 45 international patents/patent applications, many of which have been licensed to companies in Korea and elsewhere, and several leading to commercial processes.

He has graduated 62 Ph.D. students, thereby providing a pipeline of researchers in Korea and elsewhere in both academia and industry. Indeed, around 15 of his former Ph.D. students are now faculty members at top universities worldwide, and many former students are CEOs or senior directors at start-up ventures or large corporations. He has also made great contributions to the enzyme engineering profession. He organized the Enzyme Engineering XVIII meeting in 2005, which was the first of such meetings in Korea, and indeed, this meeting resulted in the tremendous growth of biocatalysis in Korea. He has served as president of the Korean Society of Enzyme Engineering. He served as chair of the 13th China-Japan-Korea Joint Symposium on Enzyme Engineering, which promotes collaboration and communication among East Asian enzyme engineering communities and between academia and industry. Finally, closer to home, he has taken on a series of critical leadership roles at KAIST, including serving as Dean of the College of Life Sciences and Bioengineering. Prof. Kim has received a great many awards of recognition from Korean government and KAIST as well as Korea scientific communities.

For these contributions, Engineering Conferences International is proud to award the 2023 Enzyme Engineering Award to Prof. Hak-Sung Kim of KAIST.

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 – WHISTLER, CANADA – HUIMIN ZHAO

2021 – DALLAS, TX, USA - UWE T. BORNSCHEUER

Conference Sponsors

ACS Synthetic Biology

Allozymes

Amano Enzyme Inc.

Aminoverse

Basecamp Research Limited

Biomatter Designs, UAB

Central Glass Co., Ltd.

Codexis, Inc.

Enzymaster (Ningbo) Bio-Engineering Co., Ltd.

Hzymes Biotechnology Co., Ltd

Inscripta

Japanese Society of Enzyme Engineering

Kcat Enzymatic Pvt. Ltd.

MSD

Mojia Biotech

Singapore Consortium for Synthetic Biology (SINERGY)

WuXi STA

Zymvol

Sunday, October 1, 2023

15:00	Conference check-in
18:00 – 21:00	Welcome Reception & Dinner

NOTES

- *Technical Sessions will be held in the Grand Ballroom 2-3.*
- *Poster Sessions will be held in Grand Ballroom 1.*
- *Dinners will be in Sky Ballroom 1-2.*
- *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.*
- *Please do not smoke at any conference functions.*
- *Turn your mobile telephones to vibrate or off during technical sessions.*
- *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.*
- *Audiotaping, videotaping and photography of presentations are prohibited*

Monday, October 2, 2023

06:00 – 08:00	Breakfast
08:30 – 08:45	Chairs welcome and opening remarks
08:45 – 09:30	**Opening Plenary Talk** Chair: Zhi Li **Bacterial Phosphorothioate DNA Modification: New Defense Systems and Perspective Uses** Zi Xin Deng, Shanghai Jiaotong University, China **Session 1: Computational Tools for Enzyme Engineering** Chair: Irmantas Rokaitis ***Sponsored by Biomatter Designs, UAB***
09:30 – 10:10	**Keynote** **Soluble expression of genes for enzymes in Escherichia coli** Yasuhisa Asano, Toyama Prefectural University, Japan
10:10 – 10:40	Coffee Break (Sponsored by Hzymes Biotechnology Co., Ltd)
10:40 – 11:10	**Invited Talk** **CATALYZING GREEN CHEMISTRY: In silico protocols for the efficient discovery and design of industrial enzymes** Marina Canellas, Zymvol Biomodeling, Spain
11:10 – 11:40	**Invited Talk** **Expanding the enzymatic toolbox with de novo protein design** Indrek Kalvet, University of Washington, USA
11:40 – 12:00	**Computational redesign of functional enzymes** Bian Wu, Institute of Microbiology, Chinese Academy of Sciences, China
12:00 – 12:20	**Machine-learning based prediction of glycosyltransferase substrates** Ditte Welner, Technical University of Denmark, Denmark
12:20 – 13:30	Lunch & Networking **Session 2: New Technologies for Enzyme Engineering** Chair: Vesna Mitchell ***Sponsored by Codexis***
13:30 – 14:10	**Keynote** **Enzymatic recycling of plastics** Uwe Bornscheuer, University of Greifswald, Germany
14:10 – 14:40	**Invited Talk** **Exploring transaminase stability for biocatalysis** Per Berglund, KTH Royal Institute of Technology, Sweden
14:40 – 15:00	**A growth selection system for the directed evolution of amine-forming or converting enzymes** Shuke Wu, Huazhong Agricultural University, China
15:00 – 15:30	Coffee Break

Monday, October 2, 2023 (continued)

15:30 – 16:00	**Invited Talk** **The Engineering of Directed Evolution** Jeff Moore, Merck & Co., Inc., USA
16:00 – 16:20	**Discovery and engineering of nylon hydrolases for PA66 recycling** Joshua Michener, Oak Ridge National Laboratory, USA
16:20 – 16:40	**Enzyme discovery and specificity fingerprints by analysis of correlated positions in CAZy family GH65** Emma De Beul, Ghent University, Belgium
16:40 – 17:00	**Molecular mechanisms of nucleases: A single-molecule perspective** Bo Sun, Shanghai University of Science and Technology, China
18:00 – 22:00	Standing Dinner & **Poster Session (Odd-numbered posters to be presented)**

Tuesday, October 3, 2023

06:00 – 08:00	Breakfast
	Session 3: Novel Enzymes Chairs: Andy Bommarius & Jun Ogawa
08:30 – 09:10	**Keynote** **b-NAD as a Building Block in Natural Product Biosynthesis** Ikuro Abe, The University of Tokyo, Japan
09:10 – 09:40	**Invited Talk** **2-Hydroxyacyl-CoA synthases enable C1-based orthogonal biomanufacturing** Ramon Gonzalez, Mojia Biotech, Singapore
09:40 – 10:10	**Invited Talk** **Enzyme engineereing of glutamate dehydrogenase for production of L-amino acids** Li-Rong Yang, Zhejiang University, China
10:10 – 10:40	Coffee Break (Sponsored by the Japanese Society of Enzyme Engineering)
10:40 – 11:10	**Invited Talk** **Novel enzymes from the biosynthetic pathways of anthraquinone-fused enediynes** Zhaoxun Liang, Nanyang Technological University, Singapore
11:10 – 11:30	**Discovery, evolution and synthetic applications of enzymes for chiral oxygen-containing compounds** Yong-Zheng Chen, Zunyi Medical University, China
11:30 – 11:50	**Unlocking biocatalytic acylations by enzyme repurposing and engineering for amide synthesis** Christian Schnepel, KTH Royal Institute of Technology, Sweden
11:50 – 12:10	**Hydroxynitrile lyase engineering for promiscuous diastereoselective synthesis of β-nitroalcohols** Santosh Kumar Padhi, University of Hyderabad, India
12:10 – 13:30	Lunch & Networking
	Session 4: Enzyme Engineering in Synthetic Biology Chairs: Zhaoxun Liang and Robert Kourist
13:30 – 14:10	**Keynote** **Enzyme engineering for synthetic biology** Huimin Zhao, University of Illinois at Urbana-Champaign, USA
14:10 – 14:40	**Invited Talk** **Enzyme Engineering in Synthetic Biology** Pimchai Chaiyen, Vidyasirimedhi Inistitute of Science and Technology, Thailand
14:40 – 15:00	**Immobilized biocatalytic process to prepare enantiopure pregabalin intermediate using engineered hydantoinase** Haibin Chen, Enzymaster (Ningbo) Bio-Engineering Co., Ltd., China

Tuesday, October 3, 2023 (continued)

15:00 – 15:30	Coffee Break
15:30 – 16:10	**Keynote** **Engineering Hydroxylase and Ketoreductase Activity, Selectivity, and Stability for a Scalable Concise Synthesis of Belzutifan** Stephanie Galanie, Merck & Co., Inc., USA
16:10 – 16:40	**Invited Talk** **α,α-Disubstituted α-amino acid metabolism including a novel three-component non-heme diiron monooxygenase system** Jun Ogawa, Kyoto University, Japan
16:40 – 17:00	**Methanol-driven andnon-natural redox cofactor mediated biocatalysis** Zongbao Zhao, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China
18:00 – 22:00	Standing Dinner & **Poster Session (Even-numbered posters to be presented)**

Wednesday, October 4, 2023

06:00 – 08:00	Breakfast
	Session 5: Enzyme Engineering for Medical Application Chairs: Yongzheng Chen & Bian Wu
08:30 – 09:10	**Keynote** **Accelerating Discovery of Substrate Promiscuity in Biocatalyzed Oxidations** Joelle Pelletier, University of Montreal, Canada
09:10 – 09:40	**Invited Talk** **Evolution of higly efficient t7 Rna polymerase for Mrna production using aptamer-based fluorescence-activated droplet sorting** Guang-Yu Yang, Shanghai Jiao Tong University, China
09:40 – 10:00	**TBA** Wei Leong Chew, Genome Institute of Singapore, A*STAR, Singapore
10:00 – 10:30	Coffee Break
10:30 – 11:00	**Invited Talk** **Accessing bacterial dark matter for improved enzyme discovery and engineering** David Ackerley, Victoria University of Wellington, New Zealand
11:00 – 11:30	**The use of in silico analysis to engineer the best immunogenic epitope and produce the corresponding prophylactic antigen-based vaccines with C1 production platform in order to rapidly respond to viral pandemics** Ronen Tchelet, Dyadic International, Inc., USA
11:30 – 11:50	**An engineered gastrointestinally stable microbial leucine decarboxylase for potential treatment of maple syrup urine disease** Chinping Chng, Codexis, Inc., USA
11:50 – 13:10	Lunch and Networking
	Session 6: Process Engineering Chair: Pimchai Chaiyen
13:10 – 13:50	**Keynote** **Studying the effect of industrial operating conditions on enzyme kinetics and stability** John Woodley, Technical University of Denmark, Denmark
13:50 – 14:30	**Keynote** **Biocatalyst optimization for process conditions** Andreas Bommarius, Georgia Institute of Technology, USA
14:30 – 14:50	**Process enhancement of enzyme-catalyzed reactions based on micro- and nano-reactors** Yunpeng Bai, East China University of Science and Technology, China
14:50 – 15:15	Coffee Break

Wednesday, October 4, 2023 (continued)

Session 7: Industry Session
Chair: Kostas Vavitsas

15:15 – 15:35	**Next-Gen Enzyme Engineering – Fusing holistic wet lab data generation with artificial intelligence to identify and recombine key point mutations for superior enzyme performance** David Schönauer, Aminoverse, the Netherlands
15:35 – 15:55	**Transforming protein engineering: advanced integration of deep learning and 3DM technology for superior protein function predictions** Henk-Jan Joosten, Bio-Prodict BV, the Netherlands
15:55 – 16:15	**ENZYME ENGINEERING AT ALMAC: Case studies of enzyme discovery and engineering** Alexandra Carvalho, Almac Sciences, UK
16:15 – 17:00	**Panel Discussion (Hosted by Allozymes)**
17:30	Optional guided excursion to Night Safari with dinner and tour included or a night on your own to explore Singapore.

Thursday, October 5, 2023

06:00 – 08:00	Breakfast
	Session 8: Enzyme Engineering for Sustainability Chairs: David Ackerley, Per Berglund and Jeff Moore
08:30 – 09:10	**Keynote** **Pet recycling: From enzyme and process optimization to an industrial plant** Alain Marty, Carbios, France
09:10 – 09:40	**Invited Talk** **Sustainability and oxidase biocatalysis – An overview** Stephanie Burton, University of Pretoria, South Africa
09:40 – 10:00	**Engineering an artificial pathway for Cis-alpha-irone biosynthesis** Xixian Chen, Singapore Institute of Food and Biotechnology Innovation (SIFBI), Singapore
10:00 – 10:30	Coffee Break
10:30 – 11:10	**Keynote** **Enzyme reactions for biocolors** ByungGee Kim, Seoul National University, South Korea
11:10 – 11:40	**Invited Talk** **Repurposing Biology through Synthetic Enzymology – For Human and Planetary Health** Wen Shan Yew, National University of Singapore, Singapore
11:40 – 12:10	**Invited Talk** **Enzyme engineering of a membrane-bound monooxygenase as key step of an artificial metabolic pathway towards Tulipalin A** Robert Kourist, Austrian Centre of Industrial Biotechnology, Austria
12:10 – 13:30	Lunch & Networking
13:30 – 13:50	**Next-generation plastic degrading enzymes** Sierin Lim, Nanyang Technological University, Singapore
13:50 – 14:10	**Efficient synthesis of steroid drugs enabled by engineered P450 monooxygenases** Aitao Li, Hubei University, China
14:10 – 14:30	**Progressive enzyme engineering for rapid discovery of a detergent protease with enhanced sustainability and cleaning performance benefits** Thomas Graycar, International Flavors & Fragrances, USA
	Poster Talks
14:30 – 14:40	Announcement of Winners of the Poster Competition
14:40 – 14:55	Winner 1
14:55 – 15:10	Winner 2

Thursday, October 5, 2023 (continued)

15:10 – 15:25	Winner 3
15:25 – 16:00	Coffee Break
	Enzyme Engineering Award Presentation and Lecture
16:00 – 16:10	Introduction and Presentation of the Enzyme Engineering Award
16:10 – 17:00	**Enzyme Engineering Award Lecture** Hak Sung Kim, Korea Advanced Institute of Science and Technology (KAIST), South Korea
18:00 – 21:00	Reception and Banquet

Friday, October 6, 2023

06:00 – 08:00 Breakfast

Poster Presentations

1. **Engineering bacterial nitroreductases for anticancer gene therapy and targeted cell ablation**
   Abigail Sharrock, Victoria University of Wellington, New Zealand

2. **Basecamp Research: Predictive enzyme development through nature and AI**
   Ahir Pushpanath, Basecamp Research, United Kingdom

3. **Metagenomic discovery and directed evolution of genes that defend against chemotherapeutics**
   Alexandria Linton-de Boer, Victoria University of Wellington, New Zealand

4. **The effect of ionic strength on the kinetic stability of NADH oxidase in a bubble column**
   Amalie Vang Høst, Technical University of Denmark, Denmark

5. **Engineering a biocatalytic platform for modified oligonucleotide production**
   Anders Knight, Codexis, USA

6. **Improving KMO via enzyme engineering for industrally competitive oxidases**
   Ariadna Pié Porta, Technical University of Denmark, Denmark

7. **Flavin-N5OOH: A most powerful nucleophile and base in nature**
   Binju Wang, Xiamen University, China

8. **Engineering a hyperactive TcBuster transposase for efficient gene delivery for cell therapy applications**
   Bryan Jones, Bio-Techne, USA

9. **Laboratory evolution of a fungal heme-thiolate enzyme promoting peroxidase or peroxygenase activity**
   Carsten Pichler, Graz Univerisity of Technology, Austria

10. **Post-transcriptional association of proteins to study spatial organisation within multi-enzyme complexes**
    Cédric Montanier, TBI, Université de Toulouse, CNRS, INRAE, INSA, France

11. **Nature-inspired engineering of an artificial RNA ligase created by in vitro selection**
    Cher Ling Tong, University of Minnesota Twin Cities, USA

12. **Controlling enantioselectivity of limonene synthases by exploring natural diversity combined to molecular engineering**
    Clement Pierre Marcel Scipion, CNRS@CREATE, Singapore

13. **Next-gen enzyme engineering – A wet lab data-driven approach to identify and recombine key point mutations with EnzyMAP AI and EnzyREC AI for superior enzyme performance**
    David Schoenauer, Aminoverse B.V., Netherlands

14. **Molecular docking and kinetic study of transglycosylation reaction for naringenin using amylosucrase from Deinococcus wulumuqiensis**
    Dong-Ho Seo, Kyung Hee University, South Korea

15. **Synthetic biology for combinatorial biosynthesis of novel alkylating agents**
    Edward McGuinniety, Victoria University of Wellington, New Zealand

16. **Understanding the effect of Air-liquid interface on enzyme stability in the presence of hydrophobins**
Elif Erdem, Technical University of Denmark, Denmark

17. **Improved thermostability of a plant sucrose synthase for the sustainable recycling of UDP-glucose**
Felipe Mejia Otalvaro, Technical University of Denmark, Denmark

18. **Precision in medicinal chemistry: Harnessing enzymes for advanced halogenation**
Fong Tian Wong, Institute of Molecular and Cell Biology, Singapore

19. **7d-grid-ai technology: A technology that translates enzymes from a computer to business with limited lab experiments**
Gladstone Sigamani, Kcat Enzymatic Private Limited, India

20. **Putting the spotlight on toluene o-xylene monooxygenase "A good biocatalyst candidate for biotechnological applications"**
Gonul Schara, California State University Stanislaus, USA

21. **A growth selection system for the directed evolution of Sucrose Synthases**
Gonzalo Bidart, DTU Biosustain, Denmark

22. **Assessing the evolutionary potential of novel resistance elements to the candidate antibacterial, niclosamide**
Hannah Lee-Harwood, Victoria University of Wellington, New Zealand

23. **Coupled molecular dynamics mediates interaction between long-range mutations and its application in enzyme engineering**
Haoran Yu, Zhejiang University, China

24. **Molecular basis for a toluene monooxygenase to govern substrate selectivity**
Huili Yu, Hubei University, China

25. **Unlocking the potential of enzyme engineering with Intelligent Architecture platform**
Irmantas Rokaitis, Biomatter Designs, Lithuania

26. **Discovery and evolution of primordial antibiotic resistance genes from soil microbes**
Jennifer Francis, Victoria University of Wellington, New Zealand

27. **The correlation between NAD(P)H oxidase kinetics and its stability exposed to gas-liquid interface**
Jingyu Wang, Technical University of Denmark, Denmark

28. **Structure-based self-supervised learning enables ultrafast prediction of stability changes upon mutation**
Jinyuan Sun, AIM center, Institute of Microbiology, Chinese Academy of Sciences, China

29. **Comparison of Sds-page to automated parallel capillary electrophoresis for enzyme size and purity assessments**
Kyle Luttgeharm, Agilent Technologies, USA

30. **Enzyme engineering for valorization of agrowaste-derived levulinic acid to versatile 4-hydroxyvaleric acid**
Kyoungseon Min, Korea Institute of Energy Research, South Korea

31. **Using Glucan Water Dikinase for in vitro glucan phosphorylation**
Magali Remaud-Simeon, Toulouse Biotechnology Institute, France

32. **Overcoming the risks in synthetic biology product development through rapid, genome scale metabolic engineering**
Matthew Biggs, Inscripta, USA

33. **An in-silico & in-vitro tournament for protein engineering**
Mohamed Hassan Kane, Medium Biosciences, USA

34. **Escaping patents using generative machine learning**
Mohamed Hassan Kane, Medium Biosciences, USA

35. **Non-covalent interactions based machine learning approach to build a second active site on an enzyme for increased KCAT and dual function**
Naveen Banchallihundi Krishna, Kcat Enzymatic Private Limited, India

36. **Design of engineered active zymogen of microbial transglutaminase**
Noriho Kamiya, Kyushu University, Japan

37. **Predictive modelling and machine learning-assisted engineering of AvPAL for improved thermal stability**
Pravin Kumar R, Kcat Enzymatic Private Limited, India

38. **Rationally controlling selective steroid hydroxylation via scaffold sampling of a P450 family**
Qian Li, Hubei University, China

39. **The use of in silico analysis to engineer the best immunogenic epitope and produce the corresponding prophylactic antigen-based vaccines with C1 production platform in order to rapidly respond to viral pandemics**
Ronen Tchelet, Dyadic International Inc, USA

40. **Biocatalytic synthesis of indigo and indican for blue denim dyeing**
Ruben Marcel de Boer, Technical University of Denmark, Denmark

41. **The efficient expression of nattokinase in Escherichia coli by sequence optimization**
Ruizhao Jiang, Tsinghua University, China

42. **Construction of artificial biosynthetic pathways for L-theanine production in Escherichia coli**
Ryota Hagihara, Kyowa Hakko Bio Co., Ltd., Japan

43. **Combinatorial engineering of PET and PLA degrading enzymes**
Santana Royan, CSIRO, Australia

44. **Metagenomic domain substitution for the high-throughput creation of non-ribosomal peptide analogues**
Sarah Messenger, Victoria University of Wellington, New Zealand

45. **Next-generation plastic degrading enzymes**
Sierin Lim, Nanyang Technological University, Singapore

46. **Improving thermostability of tryptophan 2-monooxygenase by semi-rational engineering**
Sirus Kongjaroon, Vidyasirimedhi institute of science and technology, Thailand

47. **Harnessing environmental microbiota for the discovery of novel biocatalytic enzymes using microbial single-cell genome sequencing**
Soichiro Tsuda, bitBiome Inc., Japan

48. **Enzymatic properties of a novel CYP152 fatty acid decarboxylase**
Suppalak Phaisan, Vidyasirimedhi Institute of Science and Technology, Thailand

49. **Thermophilic bioremediation of emerging pollutants using a recombinant thermophilic fungal peroxidase**
Syed Salman Ashraf, Khalifa University, United Arab Emirates

50. **The discovery and characterization of tungsten insertase in tungsten cofactor biosynthesis**
Uyen Thu Phan, UNIST, South Korea

51. **Oxidative biocatalysis without oxygen – Applying the less used side of hydrogenases**
Volker Sieber, Technical University of Munich, Germany

52. **Exploring diastereoselectivity mechanism of L-threonine aldolase**
Wenlong Zheng, Zhejiang University, China

53. **Engineering a carbonyl reductase to simultaneously increase activity toward bulky ketone and isopropanol for dynamic kinetic asymmetric reaction**
Xi Chen, Tianjin Institute of Industrial Biotechnology, Chinese Academy of Sciences, China

54. **Biochemical characterization of a SusD-like protein involved in glucooligosaccharide utilization by a cow rumen uncultured Bacteroidales**
Xiaoqian LI, TBI, INSA Toulouse, France

55. **Cannabinoid biosynthesis using non-canonical enzymes**
Yan Ping Lim, NUS SynCTI, Singapore

56. **Directed evolution and predictive modelling of galactose oxidase towards bulky benzylic and unactivated secondary alcohols**
Yee Hwee Lim, A*STAR ISCE2, Singapore

57. **Sugar transporter engineering in yeast to enable simultaneous co-utilization of sugars prevalent in cellulosic hydrolysates**
Yong-Su Jin, University of Illinois, USA

58. **Immobilization of dye-decolorizing peroxidase on magnetic nanoparticles: A dual-functional biocatalyst for mycotoxins degradation and hydrogen peroxide detection**
Yu Xia, Jiangnan University, China

59. **Engineering the substrate specificity of toluene degrading enzyme XylM using biosensor XylS and machine learning**
Yuki Ogawa, RIKEN, Japan

60. **Physical and chemical properties and beta carotene encapsulation of water soluble molecular rearrangement glucans synthesized by amylosucrase**
Yun-Sang So, Jeonbuk National University, South Korea

61. **Rational design of an (R)-selective transaminase improves enzymatic activity and stability using a computational virtual screening workflow**
Yuwen Wei, Tsinghua University, China

62. **Direct arene trifluoromethylation enabled by promiscuous activity of fungal laccase**
Zhennan Liu, Institute of Sustainability for Chemicals, Energy and Environment, Singapore

63. **Discovering and engineering novel prodrug activating and detoxifying enzymes to improve targeted cell ablation**
Thomas W. Skurr, Victoria University of Wellington, New Zealand

64. **Production of biobased ethylbenzene via cascade biocatalysis with an engineered photodecarboxylase**
Shuke Wu, Huazhong Agricultural University, China

65. **Structural understanding of fungal terpene synthases for terpene product cyclization**
Congqiang Zhang, Singapore Institute of Food and Biotechnology Innovation (SIFBI), Singapore

66. **A synthetic biology approach to Vitamin B3 production from coal tar using engineered enzymes**
Pravin Kumar R, Kcat Enzymatic Private Limited, India

67. **Engineering an artificial pathway for Cis-A-irone biosynthesis**
Xixian Chen, Singapore Institute of Food and Biotechnology Innovation (SIFBI), Singapore

68. **Spatial organisation of enzymes in the biosynthetic limonene production pathway in Escherichia coli**
Tiffany Chau, Singapore Institute of Food and Biotechnology Innovation (SIFBI), Agency for Science, Technology and Research (A*STAR), Singapore