Program

Enzyme Engineering XVIII

October 9 – 14, 2005

Hotel Hyundai on Bomun Lake
Gyeong-ju, Korea

Conference Chair:

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KAIST, Korea

Co-Chairs:

Ji-Yong Song
LG Life Sciences, Ltd., Korea

Tae-Kwang Oh
KRIBB, Korea

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ECI

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Microbial Genomics and Application Center

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The 2005 Award in Enzyme Engineering

The 2005 Award in Enzyme Engineering will be presented at this conference in the names of the Engineering Conferences Foundation and the financial sponsor, Genencor. The award consists of an appropriately engraved piece of Steuben glassware and a certificate. The awardee will present a lecture.

The award is based on any or all of the following:

- New discoveries, research, process or device development or methodology relating to scientific or engineering achievements in the area of enzyme engineering.
- Outstanding contributions of a scientific or engineering nature in the design, operation or management of facilities, processes or devices based primarily on enzyme engineering.
- Distinguished service towards the development and growth of enzyme engineering.

Previous awardees are:

1983: Ichiro Chibata
1985: Klaus Mosbach
1987: Ephriam Katchalski-Katzir
1989: Saburo Fukui
1991: Alexander Klibanov
1993: Malcolm Lilly
1995: Maria-Regina Kula & Christian Wandrey
1997: Harvey Blanch
1999: Chi-Huey Wong
2001: Hideaki Yamada
2003: Jonathan Dordick & Douglas Clark.

We wish to thank the following institutions for their support, which has been essential to the success of this conference:

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Sunday, October 9, 2005

14:00	Registration
17:00 - 18:00	Welcome Reception
18:00 - 18:10	Opening Remarks
18:10 – 19:00	**Plenary Address** **Chair: Stephen Benkovic,** Penn State Univ., USA **A Global View of the Enzyme Universe** Sung-Hou Kim University of California – Berkeley, USA
19:00 - 21:00	Dinner

NOTES FOR CONFERENCE PARTICIPANTS

Participants should observe no smoking at ECI technical and social events.

During technical sessions please keep cell phones on vibrate or shut off. Take any telephone conversations out of the session room.

Presenters should leave time at the end of their talks for discussion and be available during breaks and meals for discussion.

Monday, October 10, 2005

07:00 – 08:10	Breakfast
	Session I: Design and Evolution of Enzymes **Chairs: Jeff Moore,** Merck, USA **Dick Janssen**, University of Groningen, The Netherlands
08:20 - 09:00	**A perspective on biological catalysis** Stephen Benkovic Pennsylvania State University, USA
09:00 - 09:30	**Natural and directed evolution of enzymes from hyperthermophiles** Reinhard Sterner University of Regensburg, Germany
09:30 - 10:00	**Optimizing the properties of industrial enzymes by protein engineering and directed evolution** Torben V. Borchert Novozymes, Denmark
10:00 – 10:30	Coffee Break
10:30 - 11:00	**Engineering and evolution of enzymes for glycoside synthesis: Glycosynthases, thioglycoligases and glycosyl transferases** Stephen G. Withers University of British Columbia, Canada
11:00 - 11:30	**Changing reaction mechanisms in hydrolases to create new reaction types for organic synthesis** Romas Kazlauskas University of Minnesota, USA
11:30 - 12:00	**Design of the active site architecture of enzymes for evolution of new catalytic function** Hee-Sung Park KAIST, Korea
12:00 – 12:30	Discussion
12:30 – 14:00	Luncheon
14:00 – 16:00	Free time and Set-up of Poster Session A
16:00 – 16:30	Afternoon Coffee

Monday, October 10, 2005 (continued)

Session II: Discovery and Structure-Function of Enzymes
Chairs: Robert Dicosimo, Dupont, USA
Young-Je Yoo, SNU, Korea

16:30 - 17:00 **New discovery routes to the origins and limits of biocatalysis**
Douglas Clark
University of California - Berkeley, USA

17:00 – 17:30 **Metagenomes from harsh environments: Screening novel enzymes with unique structural signatures for new processes**
Manuel Ferrer
CSIC, Spain

17:30 - 18:00 **Structure and function of a thermostable lipase from *Geobacillus sp*.**
Tae-Kwang Oh
KRIBB, Korea

18:00 - 18:30 **Structure and function of accessory proteins in biological catalysis**
Zygmunt Derewenda
University of Virginia, USA

18:30 – 19:00 Discussion

19:00 – 21:00 Dinner

21:00 – 23:00 Poster Session A & Social Hour
Chairs: Stefan Lutz, Emory University, USA
Seung-Goo Lee, KRIBB, Korea

Tuesday, October 11, 2005

07:00 – 08:10	Breakfast
	Session III : Advances in Biocatalysis I **Sponsor: Tong-Suh Petrochemical Corp., Korea** **Chairs**: **Douglas Clark**, University of California-Berkeley, USA **Romas Kazlauskas**, University of Minnesota, USA
08:20 - 09:00	**High throughput biocatalyis for new compound discovery** Jonathan Dordick Rensselaer Polytechnic Institute, USA
09:00 - 09:30	**Combinatorial Bioengineering : A novel evolution and creation system of protein function in the post-genomic world** Mitsuyoshi Ueda Kyoto University, Japan
09:30 - 10:00	**Amylosucrase : From rational and combinatorial engineering to product synthesis** Pierre Monsan INSA, France
10:00 - 10:30	Coffee Break
10:30 – 11:00	**Asymmetric oxygenation reactions using whole cell biocatalysts: status and challenges** Andreas Schmid University of Dortmund, Germany
11:00 - 11:30	**Characterization and mechanism of transglycosylation reaction of the bacterial maltogenic amylase and its applications** Kwan-Hwa Park SNU, Korea
11:30 - 12:00	**Evolutionary and combinatorial design of biosynthetic reaction sequences** Claudia Schmidt-Dannert University of Minnesota, USA
12:00 - 12:30	Discussion
12:30 – 18:00	Conference Excursion – World Heritage Site of Gyeong-ju
19:00 - 21:00	Dinner

Tuesday, October 11, 2005 (continued)

21:00 -23:00	Poster Session A and Social Hour

Wednesday, October 12, 2005

07:00 – 08:10	Breakfast
	Session IV : Industrial Biocatalysis **Sponsor: LG Life Sciences Ltd.**
	Chairs: Christian Wandrey, Inst. Biotech., Germany Yong-Hyun Lee, Kyungpook Nat'l University, Korea
08:20 - 09: 00	**Industrial Biotechnology: Gateway to a more sustainable future** Marcel Wubbolts DSM, The Netherlands
09:00 - 09:30	**Comparative analysis of chemical and biocatalytic approaches to pharmaceuticals and strategies for enhancing industrial utilization of biocatalysis** Alex Zaks Schering-Plough, USA
09:30 - 10:00	**Development of industrial enzymatic process for a variety of valuable compounds** Akio Ozaki Kyowa Hakko, Japan
10:00 - 10:30	Coffee Break
10:30 - 11:00	**Production of polymer intermediates using nitrilases, nitril hydratases and lipases** Robert Dicosimo Dupont, USA
11:00 - 11:30	**Novel pathway of trehalose biosynthesis and the efficient production of trehalose** Kazuhiko Maruta Hayashibara Biochemical Laboratory, Japan
11:30 - 12:00	**Insights into pharmaceutical biocatalysis: Discovery and process development** Jeff Moore Merck, USA
12:00 - 12:30	Discussion
12:30 - 14:00	Luncheon
14:00 - 15:30	Free time and Set-up of Poster Session B

Wednesday, October 12, 2005 (continued)

14:00 - 16:00	**Workshop on Cell-surface Display Technology: Combinatorial Bioengineering** **Chairs: Mitsuyoshi Ueda,** Kyoto University, Japan **Moon-Hee Sung,** Bioleaders Co., Korea
14:00 - 14:10	**Opening remarks - Research trends of combinatorial bioengineering** Mitsuyoshi Ueda**,** Kyoto University, Japan
14:10 - 14:30	**Development of new microbial cell surface display systems for combinatorial biocatalysis** Akihiko Kondo Kobe University, Japan
14:30 - 14:50	**Mucosal vaccine candidate using a novel surface-display system on lactic acid bacteria** Chul-Joong Kim Chungnam National University, Korea
14:50 - 15:10	**New strategy for discovering receptor agonists and antagonists using yeast cells** Shunich Kuroda Osaka University, Japan
15:10 - 15:30	**In vitro selection of novel enzymes by mRNA-display** Burckhard Seelig Harvard University, USA
15:30 - 15:50	**Directed evolution of catalytic antibodies in phage-displayed combinatorial libraries** Takeshi Tsumuraya and Ikuo Fujii Osaka Prefecture University, Japan
15:50 - 16:00	**Closing remarks – Characteristics of combinatorial enzyme reactions** Kenji Soda Kansai University, Japan
16:00 – 16:30	Afternoon Coffee

Wednesday, October 12, 2005 (continued)

Session V : Advances in Biocatalysis II
Chairs: Stephen G. Withers, Univ. of British Columbia, Canada
Nigel Dunn-Coleman, Genencor International, USA

16:30 - 17:00 **Directed evolution and other methods for efficient biocatalysis**
Uwe T. Bornscheuer
Greifswald University, Germany

17:00 - 17:30 **Screening and applications of unique microbial enzymes useful for the production of chiral compounds**
Sakayu Shimizu
Kyoto University, Japan

17:30 - 18:00 **Glycosylation pathway in *Aspergillus fumigatus***
Cheng Gin
Institute of Microbiology, China

18:00 - 18:30 **Enantioselective biocatalysis with engineered epoxide hydrolases and halohydrin dehalogenase**
Dick Janssen
University of Groningen, The Netherlands

18:30 - 19:00 Discussion

19:00 - 21:00 Dinner

21:00 - 23:00 Poster Session B & Social Hour
Chairs: **Stefan Lutz,** Emory University, USA
Seung-Goo Lee, KRIBB, Korea

Thursday, October 13, 2005

07:00 – 08:10	Breakfast
	Session VI: Novel approaches in Biocatalysis **Chairs: Jonathan Dordick,** RPI, USA **Andreas Schmid**, University of Dortmund, Germany
08:20 - 08:40	**Production of NADPH with hydrogen gas** Christian Wandrey Institute for Biotechnology - Juelich, Germany
08:40 - 09:00	**Computational thermo-stabilization of an enzyme** Aaron Korkegian Fred Hutchinson Cancer Research Center, USA
09:00 - 09:20	**Laccases : Blue enzymes for green chemistry** Sergio Riva CNR, Italy
09:20 - 09:40	**Dynamic kinetic resolution of amino acid amide catalyzed by D-aminopeptidase and amino-caprolactam racemase** Yasuhisa Asano Toyama Prefecture University, Japan
09:40 - 10:10	Coffee Break
10:10 - 10:30	**A simple method for randomly dissecting proteins into discrete fragments** Zhanglin Lin Tsinghua University, China
10:30 - 10:50	**Engineering enantioselective lipases by circular permutation** Stefan Lutz Emory University, USA
10:50 - 11:10	**Sequential application of oxidoreductases with different cofactor specificity for conversion of renewable carbohydrates to food and feed ingredients** Christian Leitner BOKU, Austria
11:10 - 11:30	**Spore display and biocatalysis** Jae-Gu Pan KRIBB, Korea

Thursday, October 13, 2005 (continued)

11:30 - 11:50	**Nanobiocatalysis** Ping Wang University of Akron, USA
11:50 - 12:20	Discussion
12:20 - 14:00	Luncheon Also: Steering Committee Meeting
14:00 - 15:30	Free time
	Session VII: New application of enzymes **Chairs: Ping Wang,** University of Akron, USA **Charles G. Hill,** University of Wisconsin, USA
15:30 - 16:00	**Nanostructures for enzyme stabilization** Jung Bae Kim PNNL, USA
16:00 - 16:30	**A site-specifically branched self-sufficient cytochrome P450** Nagamune Teruyuki Tokyo University, Japan
16:30 - 17:00	**Diffusion in nanoporous enzyme crystals** Adrie J.J. Straathof Delft University of Technology, The Netherlands
17:00 - 17:30	**Development of a novel phosphite dehydrogenase based NAD(P)H regeneration system for industrial biocatalysis** Huimin Zhao University of Illinois, USA
17:30 - 17: 50	Coffee break
17:50 - 18:00	**Best Posters Award**
18:00 – 18:45	**Enzyme Engineering Award Lecture** **Sponsor: Genencor International** **Award recipient to be announced**
19:00 - 22:00	**Banquet and Korean Night** **Sponsor: KAIST**

Friday, October 14, 2005

07:00 – 09:30	Breakfast and Departure