Program

Enzyme Engineering XXII:
Emerging Topics in Enzyme Engineering

An ECI Conference Series

September 22-26, 2013
Toyama, Japan

Chair
Yasuhisa Asano (Toyama Prefectural University, Japan)

Vice Chairs
Jun Ogawa (Kyoto University, Japan)
Yoshihiko Yasohara (Kaneka Corporation, Japan)

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Toyama, Japan　930-0084

http://www.ticc.co.jp/english/

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Professor Yasuhisa Asano

Winner of the 2013 Enzyme Engineering Award

Since 1983 the Enzyme Engineering Award has been presented at ECI's biennial International Enzyme Engineering Conference. The 2013 Award will be presented at the 22nd Enzyme Engineering Conference in Toyama, Japan. This award recognizes outstanding achievement in the field of enzyme engineering, through basic or applied research in academia or industry.

The 2013 Enzyme Engineering Award, presented in the name of Engineering Conferences International and Genencor, will be awarded to **Professor Yasuhisa Asano**.

Professor Asano earned his B.S. degree in Organic Chemistry from Kyoto University (1975) and his M.S. (1977) and Ph.D. (1982) degrees in Applied Microbiology also from Kyoto University. His Ph.D. research was focused on the microbial degradation and transformation of nitrile compounds, where he worked under Professor Hideaki Yamada, a former Enzyme Engineering Award winner. Following postdoctoral research in Japan and the Ohio State University in the United States, Professor Asano began his career as a research chemist at the Sagami Chemical Research Center in Kanagawa, Japan. He moved to academia in 1990 as an associate professor at Toyama Prefectural University where he quickly rose through the ranks to become full professor in 1995. He currently serves as the Director of the university's Biotechnology Research Center. His current research is broadly in the fields of Applied Microbiology, Biochemistry, Molecular Enzymology, and Organic Chemistry.

Dr. Asano has made profound contributions to our understanding and utilization of microbial and plant reactions and enzymes as biotechnological tools for practical large-scale production of amino acids, nucleic acids, amides, and cyanohydrins. He has engineered enzymes for biotransformations at large scale, thereby enhancing the commercial adoption of enzymes for a wide range of processes in the food, chemical, and pharmaceutical industries. His work on enzymatic phosphorylation of inosine has been adopted by Ajinimoto for the production of inosinic acid and guanylic acid in 10,000 tons/year scale. This work serves one of the first examples of the industrial use of enzymes developed by directed evolution. He was a co-discoverer of nitrile hydratase in the laboratory of Professor Yamada for the production of acrylamide. This process (>400,000 ton/year) remains a benchmark against which large scale enzymatic transformations are measured. Similar large scale biocatalytic acrylamide processes are now routine throughout the world. Professor Asano has also been a pioneer in the development of microscale assays for amino acids and their analogs, and in particular, his rapid and microscale detection of phenylketonuria in newborns is now used routinely in Japan.

Prof. Asano has over 220 publications and has 90 patents.

ENZYME ENGINEERING AWARDEES
and
LOCATIONS OF ECI ENZYME ENGINEERING CONFERENCES

1971 - Henniker, New Hampshire, USA

1973 - Henniker, New Hampshire, USA

1975 - Portland, Oregon, USA

1977 - Bad Neuenahr, Germany

1979 – Henniker, New Hampshire, USA

1981 – Kashikojima, Japan

1983 – White Haven, Pennsylvania, USA - **ICHIRO CHIBATA**

1985 – Helsingor, Denmark - **KLAUS MOSBACH**

1987 – Santa Barbara, California, USA - **EPHRIAM KATCHALSKI-KATZIR**

1989 – Kashikojima, Japan - **SABURO FUKUI**

1991 – Kona, Hawaii, USA - **ALEX KLIBANOV**

1993 – Deauville, France - **MALCOLM LILLY**

1995 – San Diego, California, USA **MARIA-REGINA KULA** and **CHRISTIAN WANDREY**

1997 – Beijing, China - **HARVEY BLANCH**

1999 – Kona, Hawaii, USA - **CHI HUEY WONG**

2001 – Potsdam, Germany - **HIDEAKI YAMADA**

2003 – Santa Fe, New Mexico, USA - **JON DORDICK** and **DOUG CLARK**

2005 – Gyeongju, Korea - **DEWEY RYU**

2007 - Harrison Hot Springs, British Columbia, Canada - **FRANCES H. ARNOLD**

2009 – Groningen, The Netherlands - **SAKAYU SHIMIZU**

2011 – Vail, Colorado, USA – **DAVID ESTELL**

2013 – Toyama, Japan – **YASUHISA ASANO**

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Sunday, September 22, 2013

14:00 – 17:00	Conference Check-in (3rd Floor of the Conference Center)
17:00 – 17:50	Welcome Drinks (3rd Floor of the Conference Center)
17:50 – 18:00	Opening Remarks (Main Hall, 3rd Floor)
18:00 – 19:00	**Keynote Address** **Chair: Yasuhisa Asano** (Toyama Prefectural University, Biotechnology Research Center & Department of Biotechnology / JST, ERATO, Japan) **David Rice** (The University of Sheffield, United Kingdom) Exploiting an invisible world
19:00 – 21:00	Dinner (3rd Floor of the Conference Center)

NOTES

- Audiotaping, videotaping and photography of presentations are strictly prohibited.
- Please do not smoke at any conference functions.
- Turn your mobile phones to vibrate or off during technical sessions.
- All non-parallel technical sessions will take place in the Main Hall on the 3rd Floor. Parallel technical sessions will be in the rooms indicated in the program. Please refer to the map insert for further details.
- Posters Sessions will be in the foyer on the 3rd Floor of the Conference Center.
- Poster presenters can hang their posters after 12pm on Monday, September 23. Posters should be removed before the end of the day on Wednesday, September 25.
- Be sure to check your contact information on the Participant List in this program and make any corrections to your name/contact information online. A corrected copy will be sent to all participants after the conference.
- Speakers – Please leave at least 5 minutes for questions and discussion. Be available for discussion during meals and social periods

Monday, September 23, 2013

08:45 – 10:10	**ERATO Session** (ERATO Asano Active Enzyme Molecule Project Special Session) **Chair: Yasuhisa Asano** (Toyama Prefectural University, Biotechnology Research Center & Department of Biotechnology / JST, ERATO, Japan)
08:45 – 09:00	**Yasuhisa Asano** (Toyama Prefectural University, Biotechnology Research Center & Department of Biotechnology / JST, ERATO, Japan) Development of enzymes for industrial and diagnostic uses
09:00 – 09:40	**Uwe Bornscheuer** (University of Greifswald, Germany) Protein engineering tools to improve enzymes for biocatalysis
09:40 – 10:10	**Tianwei Tan** (Beijing University of Chemical Technology, China) Improvements of lipase Lip2 from *Yarrowia lipolytica* in its thermostability, immobilization and biosynthesis applications
10:10 – 10:40	Coffee/Tea Break
10:40 – 12:10	**ERATO Session (continued)** (ERATO Asano Active Enzyme Molecule Project Special Session) **Chair: Robert DiCosimo** (DuPont-Central Research & Development, USA)
10:40 – 11:10	**Harald Groeger** (University of Bielefeld, Germany) Combination of chemo- and biocatalytic reactions towards efficient chemoenzymatic one-pot processes in water
11:10 – 11:40	**Hak-Sung Kim** (KAIST, Korea) Transcription activator-based high-throughput screening systems for directed evolution of enzymes
11:40 – 12:10	**Romas Kazlauskas** (University of Minnesota, USA) Reconstruction of ancestral enzymes as starting points for engineering new enzymes
12:10 – 13:10	Lunch (2nd Floor)
13:10 – 14:50	**ERATO Session (continued)** (ERATO Asano Active Enzyme Molecule Project Special Session) **Chair: Harald Groeger** (University of Bielefeld, Germany)
13:10 – 13:50	**Jonathan Dordick** (Rensselaer Polytechnic Institute, USA) Biocatalytic nanocomposites: Engineering form, function, and protection from disease
13:50 – 14:20	**Vesna Mitchell** (Codexis Inc. USA) Using the CodeEvolver® directed evolution platform to create novel enzymes for commercial applications
14:20 – 14:50	**Andreas Bommarius** (Georgia Institute of Technology, USA) Evolution of properties and process engineering of amine dehydrogenases
14:50 – 15:20	Coffee/Tea Break

Monday, September 23, 2013 (continued)

15:20 – 17:30	**Session 1: Bioinfomatics and systems biology** *Sponsored by Guangxi Academy of Sciences* **Chair: Ribo Huang** (Guangxi Academy of Sciences, China) **Co-Chair: Michihiro Araki** (Kobe University, Japan)
15:20 – 16:00	**Ribo Huang** (Guangxi Academy of Sciences, China) Finding glycerol dehydratase variants resistant to mechanism-based enzyme inactivation
16:00– 16:30	**Barbara Andrews** (University of Chile, Chile) Mutagenesis Objective Search and Selection Tool (MOSST): An algorithm to predict structure-function related mutations in proteins
16:30– 17:00	**Frederic Cadet** (University of La Reunion, France) Enzyme and process engineering based on in-silico modeling for improving H_2 production by synthetic metabolic pathway
17:00 – 17:30	**Michihiro Araki** (Kobe University, Japan) A knowledge-based approach for metabolic pathway design
17:30 – 19:00	Dinner (2nd Floor)
19:00 – 21:00	**Poster Session A** / Social Hour *Authors of odd-numbered posters are asked to stand by their presentations* **Chairs: Jun Ogawa** (Kyoto University, Japan) **Hidenobu Komeda** (Toyama Prefectural University, Japan)

Tuesday, September 24, 2013

08:45 – 10:35	**ERATO Session II** (ERATO Asano Active Enzyme Molecule Project Special Session) **Chair: Jonathan Dordick** (Rensselaer Polytechnic Institute, USA)
08:45 – 09:25	**Kai Baldenius** (BASF SE, Germany) Industrial Biocatalysis - how to widen the scope of enzymatic catalysis for chemical production
09:25 – 10:05	**Claudia Schmidt-Dannert** (University of Minnesota, USA) Building Microbes for Biosynthesis
10:05 – 10:35	**Joelle Pelletier** (Université de Montréal, Canada) Engineering enzyme function: From new substrates to protein dynamics
10:35 – 11:05	Coffee/Tea Break
11:05 – 12:05	**ERATO Session II (continued)** (ERATO Asano Active Enzyme Molecule Project Special Session) **Chair: Kristala Jones Prather** (Massachusetts Institute of Technology, USA)
11:05 – 11:35	**Wataru Mizunashi** (Mitsubishi Rayon Co., Ltd., Japan) Industrial application of Nitrile Hydratase ~ successive innovations for acrylamide production
11:35 – 12:05	**Jian-He Xu** (East China University of Science and Technology, China) Economic production of chiral chemicals using engineered enzymes
12:05 – 13:15	Lunch at ANA Crowne Plaza Hotel - next door

Parallel Session (Room A / Main Hall)

13:15 – 15:10	**Session 2: Cascade Chemo-Enzymatic Processes and Metabolic Engineering** **Chair: Claudia Schmidt-Dannert** (University of Minnesota, USA) **Co-chair: Daisuke Umeno** (Chiba University, Japan)
13:15 – 13:55	**Kristala Jones Prather** (Massachusetts Institute of Technology, USA) Design, assembly and evaluation of a novel pathway for 3-hydroxyalkanoic acid production in *E. coli* ** ERATO Asano Active Enzyme Molecule Project Invited Speaker*
13:55 – 14:20	**Volker Sieber** (Technical University of Munich, Germany) Synthetic cascade biomanufacturing - production of chemicals via minimized reaction cascades
14:20 – 14:45	**Daisuke Umeno** (Chiba University, Japan) Construction of the highly specific pathways out of promiscuous activity of engineered enzymes
14:45 – 15:10	**Ikuro Abe** (The University of Tokyo, Japan) Expanding the catalytic repertoires of biosynthetic enzymes
15:10 – 15:40	Coffee/Tea Break

Tuesday, September 24, 2013 (continued)

15:40 – 17:35 **Session 3: Chemistry, Protein Engineering and Application of Oxidoreductases I**
Chair: Toshiyuki Sakaki (Toyama Prefectural University, Japan)
Co-Chair: Vlada B. Urlacher (Institute of Biochemistry, Germany)

15:40 – 16:20 **Stefan Lutz** (Emory University, USA)
New tricks with old yellow - multidimensional engineering of enoate reductases
**ERATO Asano Active Enzyme Molecule Project Invited Speaker*

16:20 – 16:45 **Michihiko Kataoka** (Osaka Prefecture University, Japan)
Screening and protein engineering of old yellow enzymes

16:45 – 17:10 **Vlada B. Urlacher** (University of Düsseldorf, Germany)
The challenge of designing p450-based biocatalysts: From electron transfer to enzyme selectivity
**ERATO Asano Active Enzyme Molecule Project Invited Speaker*

17:10 – 17:35 **Huimin Zhao** (University of Illinois, USA)
Enzyme engineering as an enabling tool for synthetic biology / chemistry

Parallel Session (Room B / 201-204)

13:15 – 15:25 **Session 4: New Aspects of Enzyme Engineering I**
Chair: Vytautas Svedas (Lomonosov Moscow State University, Russia)
Co-Chair: Stephanie Burton (University of Pretoria, South Africa)

13:15 – 13:45 **Jon Stewart** (University of Florida, USA)
Structure-function studies of alkene reductases
**ERATO Asano Active Enzyme Molecule Project Invited Speaker*

13:45 – 14:10 **Nobuhiko Tokuriki** (University of British Columbia, Canada)
Exploring catalytic promiscuity and evolutionary linkage in the metallo-beta-lactamase superfamily

14:10 – 14:35 **Jun Hiratake** (Kyoto University, Japan)
γ-Glutamyl transpeptidase and its inhibition for cellular redox modulation

14:35 – 15:00 **Pierre Monsan** (INSA de Toulouse, France)
Molecular engineering of GH-70 family glucansucrases
**ERATO Asano Active Enzyme Molecule Project Invited Speaker*

15:00 – 15:25 **Mitsuo Umetsu** (Tohoku University, Japan)
Smart bio-design for hybrid nanocellulosomes on nanoscaffolds

15:25 – 15:50 Coffee/Tea Break

15:50 – 17:35 **Session 4: New Aspects of Enzyme Engineering I (continued)**
Chair: Jon Stewart (University of Florida, USA)
Co-Chair: Mitsuo Umetsu (Tohoku University, Japan)

15:50 – 16:20 **Magali Remaud-Simeon** (University of Toulouse, France)
Glyco-innovation with GH family 13 amylosucrases
Combining natural diversity and engineering technology for novel products
**ERATO Asano Active Enzyme Molecule Project Invited Speaker*

Tuesday, September 24, 2013 (continued)

16:20 – 16:45	**Lishan Zhao** (Amyris, Inc., USA) Enzyme engineering for high level production of isoprenoids
16:45 – 17:10	**Hideo Nakano** (Nagoya University, Japan) Display of macromolecules on microbeads: a new platform for various screening methods
17:10 – 17:35	**Tomoaki Matsuura** (Osaka University, Japan) *In vitro* evolution of α-hemolysin using a liposome display
17:35 – 17:50	**Summary of today's session from Chairs (Room A)**
17:50 – 19:30	**Poster Session B** / Social Hour *Authors of even-numbered posters are asked to stand by their presentations* **Chairs: Jun Ogawa** (Kyoto University, Japan) **Hidenobu Komeda** (Toyama Prefectural University, Japan)
19:30 – 21:00	Dinner (2nd Floor)

Wednesday, September 25, 2013

Parallel Session (Room A / Main Hall)

08:45 – 10:40 **Session 5: Chemistry, Protein Engineering and Application of Oxidoreductaces II**
Chair: Stefan Lutz (Emory University, USA)
Co-Chair: Sergio Riva (Italian National Council of Research, Italy)

08:45 – 09:25 **Sergio Riva** (Italian National Council of Research, Italy)
Fishing good substrates with hydroxysteroid dehydrogenases
**ERATO Asano Active Enzyme Molecule Project Invited Speaker*

09:25 – 09:50 **Teruyuki Nagamune** (The University of Tokyo, Japan)
Nano-architecture of bacterial P450 system with PCNA as a scaffold

09:50 – 10:15 **Pimchai Chaiyen** (Mahidol University, Thailand)
Versatility of flavin-dependent monooxygenases

10:15 – 10:40 **Nobuya Itoh** (Toyama Prefectural University, Japan)
Efficient synthesis of optically pure (*S*)-epoxides using *Rhodococcus* styrene monooxygenase (SMO) and *Leifsonia* alcohol dehydrogenase (LSADH) system

10:40 – 11:10 Coffee/Tea Break

11:10 – 12:40 **Session 6: Process Engineering Aspects of Biocatalysis**
Chair: John Woodley (Technical University of Denmark, Denmark)
Co-Chair: Makoto Ueda (Oyama National College of Technology, Japan)

11:10 – 11:50 **John Woodley** (Technical University of Denmark, Denmark)
Toward the integration of enzyme engineering and process engineering
**ERATO Asano Active Enzyme Molecule Project Invited Speaker*

11:50 – 12:15 **Udo Kragl** (University of Rostock, Germany)
Eco-efficiency analysis as a tool for process design of enzymatic biotransformations

12:15 – 12:40 **Andreas Liese** (Hamburg University of Technology, Germany)
Benefit of reaction engineering for non-conventional biotransformations

Parallel Session (Room B / 201-204)

08:45 – 10:30 **Session 7: New Tricks in Biosynthesis I**
Chair: Makoto Nishiyama (The University of Tokyo, Japan)
Co-Chair: Yasuo Ohnishi (The University of Tokyo, Japan)

08:45 – 09:15 **Makoto Nishiyama** (The University of Tokyo, Japan)
Origin of lysine and arginine biosynthesis

09:15 – 09:40 **Byung-Gee Kim** (Seoul National University, Korea)
Ortho-dihydroxylation of (iso)flavonoids using oxygenases: Bacterial P450 vs.Tyrosinase

09:40 – 10:05 **Yasuo Ohnishi** (The University of Tokyo, Japan)
Coupled binuclear copper enzymes involved in the secondary metabolite biosynthesisin *Streptomyces*

Wednesday, September 25, 2013 (continued)

10:05 – 10:30	**David F. Ackerley** (Victoria University of Wellington, New Zealand) Discovery, engineering and applications of non-ribosomal peptide synthetase and phosphopantetheinyl transferase enzymes
10:30 – 11:00	Coffee/Tea Break
11:00 – 12:40	**Session 8: Screening for Enzymes and Directed Evolution** **Chair: Juergen Eck** (B.R.A.I.N, Germany) **Co-Chair: Vesna Mitchell** (Codexis Corporation, USA)
11:00 – 11:25	**Juergen Eck** (B.R.A.I.N, Germany) Engineering biology: Learning from nature
11:25 – 11:50	**Jun Ogawa** (Kyoto University, Japan) Development of platform technologies and screening of module enzymes for multi-component enzyme systems requiring energy supply
11:50 – 12:15	**Yan Feng** (Shanghai Jiao Tong University, China) Molecular evolution of a thermostable lactonase towards high degrading activity for organophosphate pesticides
12:15 – 12:40	**Yoshihiko Hirose** (Amano Enzyme Inc., Japan) Improvement of properties of *B.cepacia* Lipase (BCL) by protein engineering
12:40 – 12:55	**Summary of Today's Session from Chairs (Room A)**
12:55 – 21:00	Boxed Lunch
	Optional Excursions / Dinner

Thursday, September 26, 2013

Parallel Session (Room A / Main Hall)

08:45 – 10:40 **Session 9: Biorefinery and Energy Production**
Chair: Akihiko Kondo (Kobe University, Japan)
Co-Chair: Jinchuan Wu (Institute of Chemical & Engineering Sciences, Singapore)

08:45 – 09:25 **Akihiko Kondo** (Kobe University, Japan)
Development of microbial cell factories for biorefineries

09:25 – 09:50 **Jian Jiang Zhong** (Shanghai Jiao Tong University, China)
Bioenergy production by using a robust whole-cell biocatalyst or an *in-vitro* cascadeenzymatic process
**ERATO Asano Active Enzyme Molecule Project Invited Speaker*

09:50 – 10:15 **Ryosuke Kadoya** (Hokkaido University, Japan)
Single-step production of polyesters from starch in *Corynebacterium* glutamicum by using α-amylase cell-surface displaying system

10:15 – 10:40 **Jinchuan Wu** (Institute of Chemical & Engineering Sciences, Singapore)
Innovative production of optically pure lactic acids from lignocellulose
**ERATO Asano Active Enzyme Molecule Project Invited Speaker*

10:40 – 11:10 Coffee/Tea Break

11:10 – 12:40 **Session 10: Discovery and Application of Thermostable Enzymes**
Chair: Haruyuki Atomi (Kyoto University, Japan)
Co-Chair: Toshihisa Ohshima (Osaka Institute of Technology, Japan)

11:10 – 11:50 **Haruyuki Atomi** (Kyoto University, Japan)
Novel enzyme discovery in the Archaea

11:50 – 12:15 **Xin-Hui Xing** (Tsinghua University, China)
Novel thermostable alcohol dehydrogenase and NAD(P)H oxidase from *Thermococcus kodakarensis* KOD1 for effective enantioselective bioconversion of secondary alcohols via NAD(P)H regeneration

12:15 – 12:40 **Toshihisa Ohshima** (Osaka Institute of Technology, Japan)
Thermostable NADP-dependent D-amino acid dehydrogenase: Creation from *meso*-diaminopimelate dehydrogenase by site-directed mutagenesis and application

Parallel Session (Room B / 201-202)

08:45 – 10:40 **Session 11: Application of Enzymes in Medical Uses**
Chair: Takeshi Tsumuraya (Osaka Prefecture University, Japan)
Co-Chair: Koji Sode (Tokyo University of Agriculture & Technology, Japan)

08:45 – 09:25 **Koji Sode** (Tokyo University of Agriculture & Technology, Japan)
How many letters should you change to convert the name of enzymes, oxidase into dehydrogenase?

09:25 – 09:50 **Mara Boenitz-Dulat** (Roche Diagnostics GmbH, Germany)
The strategic engineering of PQQ glucose dehydrogenase -the flagship enzyme for the self-monitoring of blood glucose

Thursday, September 26, 2013 (continued)

09:50 – 10:15	**Takeshi Tsumuraya** (Osaka Prefecture University, Japan) Catalytic antibodies with luciferase activity
10:15 – 10:40	**Janine Naomi Copp** (Victoria University of Wellington, New Zealand) Engineered nitroreductases as cancer therapeutics
10:40 – 11:10	Coffee/Tea Break
11:10 – 12:30	**Session 12: Engineering New Activities of Enzymes** **Chair: Nobuya Ito** (Toyama Prefectural University, Japan) **Co-Chair: Jian Jiang Zhong** (Shanghai Jiao Tong University, China)
11:10 – 11:30	**Saulius Klimasauskas** (Vilnius University, Lithuania) Innate and designed catalytic versatility of SAM-dependent methyltransferases
11:30 – 11:50	**Rachel S. Heath** (University of Manchester, United Kingdom) Engineering enzymes for chiral amine synthesis via high-throughput screening
11:50 – 12:10	**Bian Wu** (University of Groningen, The Netherlands) Computational engineering of an amidase for versatile peptide C-terminal modification
12:10 – 12:30	**Michihiko Kobayashi** (University of Tsukuba, Japan) Unique heme-containing enzyme involved in formation of carbon-nitrogen triple bond: Expression, structural and mechanistic understanding and the potential for nitrile synthesis
12:40 – 13:40	Boxed Lunch (Room B, 2nd Floor)
13:40 – 15:00	**Session 13: New Tricks in Biosynthesis II** **Chair: Byung-Gee Kim** (Seoul National University, Korea)
13:40 – 14:00	**Elmar Heinzle** (Saarland University, Germany) Multi-step biocatalysis using tailored permeabilized cells
14:00 – 14:20	**Y-H Percival Zhang** (Virginia Tech, USA) Cell-free cascade enzymatic processes: Synthetic metabolons and cofactor engineering
14:20 – 14:40	**Kento Koketsu** (Kyowa Hakko Bio Co., Ltd., Japan) Microbial production of homophenylalanine using the biosynthetic genes identified from the genome of cyanobacterium *Nostoc punctiforme* PCC73102
14:40 – 15:00	**Yoshimitsu Hamano** (Fukui Prefectural University, Japan) Harnessing the streptothricin biosynthetic machinery
15:00 – 15:30	Coffee/Tea Break
15:30 – 16:30	**Session 13: New Tricks in Biosynthesis II (continued)** **Chair: Yoshihiko Yasohara** (Kaneka Corporation, Japan)
15:30 – 15:50	**Toshiaki Fukui** (Tokyo Institute of Technology, Japan) Microbial synthesis of biodegradable copolyesters from biomass

Thursday, September 26, 2013 (continued)

15:50 – 16:10 **Makoto Hibi** (Kyoto University, Japan)
Bioconversion of amino acids with whole-cell biocatalysts

16:10 – 16:30 **Ikuo Kira** (Ajinomoto Co., Inc., Japan)
Enzymatic production of L-Alanyl-L-Glutamine

Parallel Session (Room C / 203)

13:40 – 15:00 **Session 14: New Aspects of Enzyme Engineering II**
Chair: Yasuo Kato (Toyama Prefectural University, Japan)

13:40 – 14:00 **Kathrin Castiglione** (Technical University of Munich, Germany)
Novel *N*-Acyl-D-glucosamine 2-epimerases from cyanobacteria with low dependence on ATP and low inhibition by pyruvate

14:00 – 14:20 **Yuta Miki** (Toyama Prefectural University, Biotechnology Research Center & Department of Biotechnology / JST, ERATO, Japan)
Microbial production of phenylacetonitrile utilizing enzymes from the Aldoxime-Nitrile pathway

14:20 – 14:40 **Hidehiko Hirakawa** (The University of Tokyo, Japan)
A heterotrimeric ring-shape protein can immobilize multienzyme complex

14:40 – 15:00 **Pravin Kumar** (Polyclone Bioservices, India)
A receptor dependent-4D QSAR approach to predict the activity of modified enzymes

15:00 – 15:30 Coffee/Tea Break

15:30 – 16:30 **Session 14: New Aspects of Enzyme Engineering II (continue)**
Chair: Pierre Monsan (TWB-LISBP-INSA, University of Toulouse, France)

15:30 – 15:50 **Shigeru Deguchi** (Japan Agency for Marine-Earth Science and Technology, Japan)
Ultra-sensitive functional screening of cellulolytic microorganisms using surface pitting on nanofiber matrix

15:50 – 16:10 **Jan Marienhagen** (Institute of Bio- and Geosciences, Germany)
Genetically encoded biosensors for enzyme engineering in single cells

16:10 – 16:30 **Hiroshi Ishikita** (Kyoto University/JST PRESTO, Japan)
Short hydrogen bonds in O_2-evolving photosystem II

Parallel Session (Room D / 204)

13:40 – 15:00 **Session 15: New Aspects of Enzyme Engineering III**
Chair: Jun Hiratake (Kyoto University, Japan)

13:40 – 14:00 **Toshiaki Yanamoto** (Sugino Machine Limited, National Institute Advanced Industrial Science and Technology (AIST), Japan)
Effective conversion process of biomass using water jet system and hyperthermophilic cellulase

Thursday, September 26, 2013 (continued)

14:00 – 14:20	**Habibullah Nadeem** (National Institute for Biotechnology and Genetic Engineering (NIBGE), Pakistan) Engineering of surface carboxyl groups of invertases from *Aspergillus niger*: Effect on thermostability and thermopholicity
14:20 – 14:40	**Henk Jan Joosten** (Bio-Prodict, The Netherlands) Protein superfamily data and enzyme engineering
14:40 – 15:00	**Seiji Okazaki** (Toyama Prefectural University, Biotechnology Research Center & Department of Biotechnology / JST, ERATO, Japan) Crystallographic evidence for the presence of the cysteine tryptophylquinone cofactor in L-Lysine ε-oxidase from *Marinomonas mediterranea*
15:00 – 15:30	Coffee/Tea Break
15:30 – 16:30	**Session 15: New Aspects of Enzyme Engineering III (continued)** **Chair: Hidenobu Komeda** (Toyama Prefectural University, Japan)
15:30 – 15:50	**Kohsuke Honda** (Osaka University, Japan) Butanol production through *in vitro* synthetic metabolic pathway
15:50– 16:10	**Anu Koivula** (VTT Technical Research Centre of Finland, Finland) Identification and characterization of enzymes involved in the oxidative D-galacturonic acid pathway
16:10 – 16:30	**Ryota Fujii** (Mitsui Chemicals Singapore R & D Centre, Singapore) Increasing fermentation yield by CO_2 fixation
16:30 – 16:45	Short break
16:45 – 17:15	**Summary of today's session from Chairs (Room B/C/D)**
17:15 – 18:00	**Go to banquet venue (Hotel Grand Terrace Toyama)** (10-minute walk or 5-minute tram ride)
18:00 – 18:45	**Poster Awards/Presentations**
18:45 – 19:45	**Enzyme Engineering Award Lecture**
19:45 – 20:00	**Conference Closure**
20:00 – 22:00	**Conference Banquet**

Poster List

1. **Direct L-lysine production from cellobiose by corynebacterium glutamicum displaying beta-glucosidase on its cell surface**
   Noriko Adachi, Kobe University

2. **Structural and functional analyses of binary pattern-designed de novo proteins WA20 and Dnhps1**
   Ryoichi Arai, Shinshu University

3. **Immobilization of NAD on an electrode to drive dehydrogenase-based catalysis**
   Justin Beauchamp, Michigan State University

4. **Simple and efficient route for the production of terpenes by enzymatic means**
   Sascha Beutel, Leibniz University of Hannover

5. **Studies of immobilized protease inhibitors**
   Erika Billinger, Uppsala Univeristy

6. **Stereoselective oxidation of arylsubstituted diols into chiral alpha-hydroxyl aldehydes by re-engineered propanediol oxidureductase**
   Cecilia Blikstad, Uppsala University

7. **Polymerase chain chimaerization: A new recombination method for obtaining circular mutated and/or chimaeric polynucleotides**
   Mara Boenitz-Dulat, Roche Diagnostics GmbH

8. **Identification and characterization of a mycobacterial S-Acetoin reductase**
   Xue Chen, Yokohama National University

9. **Rational design of ornithine decarboxylase for production of putrescine**
   Hyang Choi, KAIST

10. **A new method for immobilizing yarrowia lipolytica lipase lip2 on blending-modified poly (glycidylmethacrylate- triallyisocyanurate- ethyleneglycoldimethacrylate) beads to improve the activity**
    Caixia Cui, Beijing University of Chemical Technology

11. **Mechanism of drastic protein solubility enhancement by protein engineering strategies-biophysical and biochemical studies of wild-type and mutant s-hydroxynitrile lyase from manihot esculenta expressed in Escherichia coli**
    Mohammad Dadashipour, Toyama Prefectural University / JST, ERATO

12. **Substrate binding residues in streptomyces phospholipase D insights from crystal structures, substrate docking and experimental data**
    Jasmina Damnjanovic, Nagoya University

13. **Circular permutation of old yellow enzyme: Characterization of a complete synthetic library**
    Ashley B. Daugherty, Emory University

14. **Engineering fructosyl peptide oxidase for HBA1C measurement**
    Stefano Ferri, Tokyo University of Agriculture and Technology

15. **Engineering of pyranose dehydrogenase for improved performance in enzymatic biofuel cells**
    Clemens Peterbauer, University of Natural Resources and Life Sciences Vienna

16. **Novel enzymes and synthetic pathways for bio-based chemicals**
    Alexandre Zanghellini, University of Washington

17. **Artificial enzyme complex of cytochrome P450 and redox proteins with multiple electron transfer routes**
Tomoaki Haga, The University of Tokyo

18. **Biochemical and structural characterisation of a novel manganese-dependent hydroxynitrile lyase from bacteria**
Ivan Hajnal, ACIB GmbH

19. **Structure-based rational design of chorismate-pyruvate lyase for decreased product inhibition**
SangSoo Han, KAIST

20. **Improvement of substrate specificity of fructosyl peptide oxidase by structure-based mutagenesis**
Atsushi Ichiyanagi, Kikkoman Corporation

21. **Direct putrescine production from cellobiose using *Escherichia coli* displaying cellulase**
Naoki Ikeda, Kobe University

22. **Creation of synthetically useful mutant enzymes on the basis of mechanistic studies**
Hiroki Inoue, Okayama University

23. **Immobilized lipases with inter-particle mesoporous silica**
Satoru Ishihara, Amano Enzyme Inc.

24. **Discovery of novel omega-transaminases and their application to the synthesis of chiral amines**
Noriyuki Ito, Kaneka Corporation

25. **Pcna from metallosphaera sedula-mediated stable multienzyme complex formation**
Fumiya Iwata, University of Tokyo

26. **Increasing optical purity for product diols - contributions from changes in both enantio- and regioselectivity**
Åsa Janfalk Carlsson, Uppsala University

27. **Bioprocess engineering for the production of ω-hydroxyundec-9-enoic acid from ricinoleic acid**
Hyun-Young Jang, Ewha Womans University

28. **Characteristics of acetyl-coa acetyltransferase (acat) from megasphaera sp. Bs-4 for the carbon elongation**
Byoung Seung Jeon, Hanyang University

29. **Production of C9, C11, C13 α,ω-dicarboxylic acids from renewable fatty acids**
Eun-Yeong Jeon, Ewha Womans University

30. **Systematic optimization for efficient heterologous expression of proline-4-hydroxylase in *E.coli* for catalytic production of trans-4-hydroxy-l-proline**
Yang Ji, Tsinghua University

31. **Reversibility of an enzymatic activity switch by laboratory evolution**
Miriam Kaltenbach, University of British Columbia

32. **Enzymatic determination of amino acids by coupling aminoacyl-TRNA synthetase and pyrophosphate detection system**
Masafumi Kameya, Toyama Prefectural University, / JST, ERATO

33. **Substrate engineering for enzymatic site-specific and covalent modification of functional proteins**
Noriho Kamiya, Kyushu University

34. **Environment-conscious process for the preparation of antimicrobial tulipalin b from tulip biomass**
Yasuo Kato, Toyama Prefectural University

35. **Characterization of archaeal enzymes with thermostability for enzymatic production of nucleotide-sugar molecules**
Yutaka Kawarabayasi, Kyushu University

36. **Synthesis of phytosterol and triterpene alcohol esters through lipase-catalyzed esterification**
Takashi Kobayashi, Kyoto University

37. **Enzymes involved in pentose metabolism in zygomycetous fungus mucor circinelloides**
Hidenobu Komeda, Toyama Prefectural University

38. **Genetic engineering of the budding yeast kluyveromyces marxianus for effective production of the rose-like odor 2-phenylethanol**
Takashi Koyanagi, Ishikawa Prefectural University

39. **Enzyme activity regulation system based on the formation of enzyme/polymer complex**
Takaaki Kurinomaru, University of Tsukuba

40. **Enzymatic blood antigen removal: Directed evolution of a blood antigen-cleaving enzyme**
David H. Kwan, University of British Columbia

41. **Development of new bacterial cellulases by directed evolution and assembly of catalytic domain, binding domain, and linker moiety**
Soo-Jin Yeom, Korea Research Institute of Bioscience & Biotechnology (KRIBB)

42. **Characterization of esterases active toward long chain aliphatic esters**
Young-A Lee, Ewha Womans University

43. **Towards rational engineering of iterative polyketide synthase: Insight into the programmed keto-reduction and chain length determination**
Zhao-Xun Liang, Nanyang Technological University

44. **Expanding the substrate scope of 2-deoxyribose-5-phosphate aldolase by directed evolution**
Huan Ma, Uppsala University

45. **Biochemical properties and kinetics of glycerol 3-phosphate oxidase**
Somchart Maenpuen, Burapha University

46. **Metabolic engineering for ricinoleic acid production in the oleaginous yeast yarrowia lipolytica**
Alain Marty, LISBP/INSA, CNRS, INRA

47. **Preparation and characterization of chimeric transducers of HTR8 and hemat from extremely halophilic archaeon haloarcula japonica**
Toshitaka Matsubara, Tokyo Institute of Technology

48. **Enhancement of the stability and catalytic activity of l-tryptophan dehydrogense by directed evolution for l-tryptophan determination**
Daisuke Matsui, Toyama Prefectural University, / JST, ERATO

49. **Stabilization of phytase by disulfide crosslinks**
Tomoko Matsui, Novozymes

50. **Oriented immobilization of cellulosomal enzyme using sortagging**
Takuya Matsumoto, Kobe University

51. ***Streptomyces* phospholipase D recognizes substrate micelle surface**
Yusaku Matsumoto, Fukushima University

52. **Protein function enhancement by the horseradish peroxidase mediated protein cross-linking reaction**
Kosuke Minamihata, The University of Tokyo

53. **Purification, characterization, and gene cloning of a glycerophosphoethanolamine ethanolaminephosphodiesterase from *Streptomyces sanglieri* A14**
Shingo Mineta, Fukushima University

54. **Application of enantioselective imine reductases for the synthesis of optically active amines**
Koichi Mitsukura, Gifu University

55. **Enzymatic synthesis of L-pipecolic acid and related cyclic amino acids**
Ryoma Miyake, Mitsubishi Chemical Group Science and Technology Research Center, Inc

56. **Escherichia coli host engineering for efficient enzyme discovery from the metagenome**
Kentaro Miyazaki, AIST

57. **Novel design of an artificial cellulosome using dna as a scaffold molecule**
Yutaro Mori, Kyushu University

58. **New insight into substrate promiscuity and catalytic versatility of a fungal indole prenyltransferase**
Hiroyuki Morita, University of Toyama

59. **Construction of artificial metabolic pathway to bio-1,3-butanediol from glucose**
Takanori Nakajima, Daicel Corporation

60. **Development of multiple sequence alignment method to support design of site-directed mutants: Intmsalign**
Shogo Nakano, Toyama Prefectural University, / JST, ERATO

61. **Switching open and closed conformation of L-threonine dehydrogenase from cupriavidus necator**
Seiji Okazaki, Toyama Prefectural University

62. **Nanocellulosome designed from module library on nanomaterials**
Hikaru Nakazawa, Tohoku University

63. **Advantageous of supercritical carbon dioxide for lipid modification by immobilized lipase**
Masakazu Naya, Nihon University

64. **The lignocellulose degradation in fungus-growing termite macrotermes barneyi**
Jinfeng Ni, Shandong University

65. **Enzymatic synthesis of protein-gold nanoparticle conjugates: Stable immobilization by artificial peptide-tag for gold surface**
Teppei Niide, Kyushu University

66. **Development of continuous bioconversion system using thermophilic whole-cell biocatalyst**
Pham Huynh Ninh, Osaka University

67. **Evolutionary relationships among fungal histone deacetylases CLR6, HOS2, RPD3, and their homologs**
Hiromi Nishida, Toyama Prefectural University

68. **Microbial desymmetrization of 3-substituted glutaric acid diamides**
Masutoshi Nojiri, Kaneka Corporation

69. **Activity and stability of hewl adsorbed onto plant biomass charcoal**
Hidetaka Noritomi, Tokyo Metropolitan University

70. **Two arginine residues in the substrate pocket predominantly control the substrate selectivity of thiocyanate hydrolase**
Masafumi Odaka, Tokyo University of Agriculture and Technology

71. **Purification, characterization, gene cloning, and extracellular production of a novel glycerophosphocholine cholinephosphodiesterase from *Streptmyces sanglieri* A14**
Koki Okuda, Fukushima University

72. **External signal responsiveness by enzyme engineering**
Yuhei Oshiba, Tokyo Institute of Technology

73. **Production of C9 to C13 ω-hydroxycarboxylic and α,ω-dicarboxylic acids from renewable fatty acids**
Jin-Byung Park, Ewha Womans University

74. **Development of a plasmid display system based an OCT-1 DNA-binding domain suitable for in vitro screening of engineered proteins in Escherichia coli**
Jong Hyun Park, KAIST

75. **Expression, purification, and product identification of chlorophenol-4-hydroxylase from ralstonia pickettii**
Panu Pimviriyakul, Mahidol University

76. **Investigation the enzymatic properties of human serine hydroxymethyltransferase with THF-independent reaction**
Chatchadaporn Pinthong, Mahidol University

77. **Rational design of glucose dehydrogenase from glucose oxidase**
Shoko Saito, Tokyo university of agriculture and technology

78. **Improvement of thermal stability of fungi-derived fad-dependent glucose dehydrogenase by introducing disulfide bond**
Genki Sakai, Tokyo University of Agriculture and Technology

79. **Production of C11 to C13 ω-aminocarboxylic acids from renewable fatty acids**
Jin-Won Song, Ewha Womans University

80. **Functional expression of a lysosomal enzyme glucocerebrosidase in stably transformed insect cells**
Hiroyuki Sonoda, JCR Pharmaceuticals

81. **Novel enone-reductases identified by database mining for catalytic promiscuity**
Georg Steinkellner, Austrian Centre of Industrial Biotechnology

82. **The construction of recombinant heparinase ii efficient expression system in *E.coli* and analysis of related mechanism**
Nan Su, Tsinghua University

83. **The isolation and identification of a light-induced protein in ALFALFA sprouts and the cloning of its specific promoter**
Xin Su, Shenyang Pharmaceutical University

84. **Kinetic mechanism of 3-hydroxybenzoate 6-hydroxylase from rhodococcus jostii RHA1**
Jeerus Sucharitakul, Chulalongkorn University

85. **A novel amine oxidase from *Syncephalastrum racemosum***
Daisuke Sugimori, Fukushima University

86. **Development of a novel enzymatic method for D-amino acids synthesis by using D-succinylase and N-succinylamino acids racemase**
Yosuke Sumida, Toyobo Co., Ltd.

87. **Bioconversion of D-galactose to D-tagatose using heterologous expression of L-arabinose isomerases**
Yuanxia Sun, Tianjin Institute of Industrial Biotechnology, Chinese Academy of Sciences

88. **Production of long chain hydroxy-fatty acids from glucose by genetic engineered Escherichia coli**
Changmin Sung, Seoul National University

89. **Heterotrimeric protein-mediated reconstitution of cytochrome p450 bm3**
Risa Suzuki, The University of Tokyo

90. **Rational design of penicillin acylase based on bioinformatic analysis and molecular modeling to improve enzyme catalytic performance in alkaline medium**
Vytas Svedas, Lomonosov Moscow State University

91. **Quantitative determination of threonine in human plasma using l-threonine 3-dehydrogenase from cupriavidus necator**
Yosuke Tabei, Toyama Prefectural University

92. **Crystal structure of phosphoketolase from bifidobacterium longum**
Kazutoshi Takahashi, Ajinomoto Co., Inc.

93. **Expression, purification and characterization of two enanthioselective beta phehylanaline aminoacylases derived from variovolax sp. and burkhorderia sp.**
Toshihiro Takezawa, Tokyo Denki University

94. **Catalytically active gel particles containing a bacterial cytochrome p450 and its redox protein partners**
Cheau Yuaan Tan, The University of Tokyo

95. **Omics analysis of spirulina platensis mutants generated by artp mutation system**
Yin Yee Tan, Tsinghua University

96. **Co-assimilation of cellobiose and xylooligosaccharides using *E. coli* displaying both beta-glucosidase and beta-xylosidase on its cell surface**
Tsutomu Tanaka, Kobe University

97. **Improving of the enzymatic activity of 3,4-dihydroxyphenylacetate dioxygenase from pseudomonas aeruginosa by random mutagenesis**
Kittisak Thotsaporn, Chulalongkorn University

98. **Fusion bacterial luciferase for eukaryotic reporter and thermostability improvement by random mutagenesis**
Ruchanok Tinikul, Mahidol University

99. **The first reaction intermediate complex of glutamate dehydrogenase from corynebacterium glutamicum**
Takeo Tomita, The University of Tokyo

100. **Glucose sensing employing direct electron transfer principle**
Wakako Tsugawa, Tokyo University of Agriculture and Technology

101. **Robust protein-protein interaction detection by the complementation of luciferase half-reactions**
Yuki Ohmuro-Matsuyama, Tokyo Institute of Technology

102. **Metabolic engineering of Escherichia coli for fermentative production of 1-propanol**
Nobuyuki Urano, Osaka Prefecture University

103. **Heterologous production of horseradish peroxidase C1A with codon and transport signal optimization in basidiomyces yeast cryptococcus sp. strain s-2**
Yu Utashima, Toyobo Co., LTD, Hiroshima University

104. **Synthesis of luminmides using permeabilized cells**
Christian Weyler, Saarland University

105. **Computational engineering of an amidase for versatile peptide c-terminal modification**
Bian Wu, University of Groningen

106. **Reactor selection for multi-step enzymatic reactions**
Rui Xue, Technical University of Denmark

107. **One-pot l-2-aminobutyric acid production from L-threonine by L-threonine deaminase, L-leucine dehydrogenase and formate dehydrogenase based nadh regeneration system**
Sheng Yang, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences

108. **Microbial production of hydroxylated forms of vitamin D**
Kaori Yasuda, Toyama Prefectural University

109. **Production of (s)-methylbenzylamine by deracemization of its racemic mixture using newly evolved amine oxidase from porcine kidney d-amino acid oxidase**
Kazuyuki Yasukawa, Toyama Prefectural University, / JST, ERATO

110. **Characterization of catalytic protein aggregates induced by cellulose binding domain fusion: Improved catalysis and thermal stability**
Soo-Jin Yeom, KRIBB

111. **Lysine and arginine biosynthesis in thermococcus kodakarensis**
Ayako Yoshida, The University of Tokyo

112. **Aptameric enzyme subunit ~ aptamers regulating enzyme activity by binding with specific target~**
Wataru Yoshida, Tokyo University of Agriculture and Technology

113. **Stereoselectivity of ketoreductases-catalyzed reduction of acetophenones**
Xin Zhang, Shenyang Pharmaceutical University

114. **Construction of ancestral enzymes for unnatural reaction**
Zhijun Zhang, East China University of Science and Technology

115. **Construction of efficient oxidoreduction system consisting of TKADH and TKNOX by synthetic protein scaffolds**
Xiang Zheng, Tsinghua University

116. **Stereoselective epoxidation of curcumol and curdione by cunninghamella elegans as 3.2028**
Lina Zhou, Shenyang Pharmaceutical University

117. **Enhancing thermostability of candida antarctica lipase b by enhancing intraprotein interaction and lowering overall RMSD**
Hyun June Park, Seoul National University

118. **Understanding α-helix and application to enzyme activity design**
Hyun June Park, Seoul National University

119. **Molecular engineering of rubisco for improved CO_2-fixation efficiency**
Zhen Cai, Institution of Microbiology, Chinese Academy of Sciences

120. **Reaction of the oxygenase component of P-hydroxyphenylacetate hydroxylase (C2) with substrate analogues**
Pimchai Chaiyen, Mahidol University

121. **1,3-1,4-A-L-fucosidase: A tool for the synthesis of lewis a and x antigens**
Takane Katayama, Ishikawa Prefectural University

122. **Controlling redox potential in the production of bio-based chemicals: From strategies designing to global understanding**
Yanping Zhang, Institute of Microbioloby, Chinese Academy of Sciences

123. **Regio-selective enzymatic carboxylation of aromatic substrates: A green variant of the kolbe-schmitt reaction**
Christiane Wuensch, University of Graz

124. **Enzyme-catalyzed asymmetric hydration of C=C bonds**
Silvia M. Glueck, ACIB GmbH

125. **Chemo-enzymatic synthesis of efficient chiral building blocks using D-allose derivartives**
Yumiko Takagi, Kagawa University

126. **Enzymatic modification of tea seed saponin and anti-aging factor control effect in cultured human dermal fibroblasts**
Jun-seong Park, Amorepacific R&D Center

127. **Enhancement of protein heat-stability in E.coli phytase by introducing novel N-glycosylation sites on the molecule surface**
Dietrich Loebel, AB Enzymes GmbH

128. **Isolation and Characterization of a Novel Thermoalkaliphilic Esterase Isolated from Soil Metagenome Showing High Stability over a Broad pH Range**
Ji-eun Choi, Korea Research Institute of Chemical Technology

129. **Discovery of new Baeyer-Villiger Monooxygenases (BVMO) from metagenomic library using high-throughput screening (HTS) system**
Jong Hyun Choi, Korea Research Institute of Bioscience and Biotechnology

130. **Strategy for screening metagenomic resources for exocellulase activity using a robotic high-throughput screening system and characterization of a novel multifunctional cellulolytic enzyme**
Kyong-Cheol Ko, Korea Research Institute of Bioscience and Biotechnology

131. **Engineering Branched-chain Amino Acid Aminotransferase (BCAT) for the Production of Non-natural Amino Acids**
Xuejing Yu, University College Dublin

132. **Targeted Mutagenesis and Screening of Bacterial Nitroreductases to Enable Non-Invasive Imaging in Anti-Cancer Gene Therapy**
Elsie Williams, Victoria University of Wellington