

# PROGRAM

Wednesday, December 17

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9:45-10:00      **Opening Address**

10:00-11:00      **Keynote Lecture**

K-01

Chair: Yasuhisa Asano, *Toyama Prefectural University*

**New Biocatalysts by Design and Evolution**

Nicholas J. Turner

*School of Chemistry, University of Manchester, Manchester Institute of Biotechnology*

\*ERATO Asano Active Enzyme Molecule Project Invited Speaker

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11:00-11:20      Coffee Break

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11:20-12:40      **Invited Lecture 1 & 2**

Chair: Nobuya Itoh, *Toyama Prefectural University*

Mélanie Hall, *University of Graz*

11:20-12:00      **Engineering of a Novel Enzyme for the Production of Chiral Secondary and Tertiary Amines**

I-01

Greg Hughes

*Codexis, Inc.*

\*ERATO Asano Active Enzyme Molecule Project Invited Speaker

12:00-12:40      **Dynamic Kinetic Resolution of Alcohols by Lipase–Vanadium Combo Catalysis: A New Efficient Method for Producing Optically Active Compounds**

I-02

Shuji Akai

*Graduate School of Pharmaceutical Sciences, Osaka University*

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12:40-14:00      Lunch Break

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14:00-15:20      **Invited Lecture 3 & 4**

Chair: Nobuya Itoh, *Toyama Prefectural University*

Mélanie Hall, *University of Graz*

14:00-14:40      **Enzymes in medical biosensing using a portable Surface Plasmon Resonance platform**

I-03

Joelle N. Pelletier

*Department of Chemistry and Department of Biochemistry, Université de Montréal*

\*ERATO Asano Active Enzyme Molecule Project Invited Speaker

14:40-15:20      **ER Glucosyltransferase: Synthetic Chemistry's Initiative in Glycobiology**

I-04

Yukishige Ito

*Synthetic Cellular Chemistry Laboratory, RIKEN*

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15:20-15:40      Coffee Break

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15:40-17:20      **Oral Presentation 1-A (Main Hall)**

Chair: Haruyuki Atomi, *Kyoto University*

Greg Hughes, *Codexis, Inc.*

15:40-16:00      **'Rational metabolic-flow switching' for the production of exogenous secondary metabolites in plant suspension cultured cells – A proof-of-concept study using bamboo cells**

O1-01

Taiji Nomura, Shinjiro Ogita, and Yasuo Kato

*Biotechnology Research Center, Toyama Prefectural University*

16:00-16:20      **Biotransformation of  $\alpha$ -Mangostin, a Xanthone Derivative from *Garcinia mangostana*, by Endophytic Fungi**

O1-02

Panarat Arunrattiyakorn<sup>1</sup>, Sunit Suksamrarn<sup>1</sup>, Nuttika Suwannasai<sup>2</sup>, Thammarat Aree<sup>3</sup>, Hideyuki Ito<sup>4</sup> and Hiroshi Kanzaki<sup>5</sup>

<sup>1</sup>*Department of Chemistry, Faculty of Science, Srinakharinwirot University*

<sup>2</sup>*Department of Biology, Faculty of Science, Srinakharinwirot University,*

<sup>3</sup>*Department of Chemistry, Faculty of Science, Chulalongkorn University,*

<sup>4</sup>*Department of Nutritional Science, Faculty of Health and Welfare Science, Okayama Prefectural University,* <sup>5</sup>*Graduate School of Environmental and Life Science, Okayama University*

16:20-16:40  
O1-03

**A novel enzyme capping N-terminus of various peptides with amidino-PheGly derivatives**

Motoyoshi Noike,<sup>1</sup> Takashi Matsui,<sup>2</sup> Koichi Ooya,<sup>1</sup> Ikuo Sasaki,<sup>1</sup> Shouta Ohtaki,<sup>2</sup> Yoshimitsu Hamano,<sup>3</sup> Chitose Maruyama,<sup>3</sup> Jun Ishikawa,<sup>4</sup> Yasuharu Satoh,<sup>1</sup> Hajime Ito,<sup>1</sup> Hiroyuki Morita,<sup>2</sup> and Tohru Dairi<sup>1</sup>

<sup>1</sup>*Graduate School of Engineering, Hokkaido University,* <sup>2</sup>*Institute of Natural Medicine, University of Toyama,* <sup>3</sup>*Department of Bioscience, Fukui Prefectural University,* <sup>4</sup>*National Institute of Infectious Diseases*

16:40-17:00  
O1-04

**Cyclic amino acid hydroxylases found in filamentous fungi**

Makoto Hibi<sup>1</sup>, Ryosuke Mori<sup>2</sup>, Ryoma Miyake<sup>3,4</sup>, Hiroshi Kawabata<sup>3,4</sup>, Satomi Takahashi<sup>1</sup>, and Jun Ogawa<sup>2</sup>

<sup>1</sup>*Industrial Microbiology, and* <sup>2</sup>*Division of Applied Life Sciences, Graduate School of Agriculture, Kyoto University,* <sup>3</sup>*Mitsubishi Chemical Group Science and Technology Research Center, Inc.,*

17:00-17:20  
O1-05

**Novel enzymes involved in polyunsaturated fatty acid saturation metabolism in lactic acid bacteria**

Shigenobu Kishino<sup>1</sup>, Michiki Takeuchi<sup>1</sup>, Si-Bum Park<sup>2</sup>, and Jun Ogawa<sup>1</sup>

<sup>1</sup>*Division of Applied Life Sciences, and* <sup>2</sup>*Industrial Microbiology, Graduate School of Agriculture, Kyoto University*

**15:40-17:20**

**Oral Presentation 1-B (Room 201-203)**

Chair: Teruyuki Nagamune, *The University of Tokyo*

Shuji Akai, *Osaka University*

15:40-16:00  
O1-06

**Design of an artificial cellulolytic multi-enzyme complex aligned by PTDH-linked PCNA heterotrimer units**

Katharina Schmitt, Hidehiko Hirakawa, and Teruyuki Nagamune

*Department of Bioengineering, School of Engineering, The University of Tokyo*

16:00-16:20  
O1-07

**Development of whole-cell lipase (WCL) for the production of fatty acid (FA) and FA-derivatives from crude vegetable oil**

Rahman Talukder, Wang Peiying

*Department of Industrial Biotechnology, Institute of Chemical and Engineering Science*

16:20-16:40  
O1-08

**Enzyme discovery to scale-up for delivery of chiral intermediates**

Tom Moody

*Department of Biocatalysis and Isotope Chemistry, Almac Sciences*

16:40-17:00  
O1-09

**Functional Complementation of Luciferase Half-Reactions: Application to a Robust Protein-Protein Interaction Assay FlimPIA**

Hiroshi Ueda, Takahiro Yamashita, and Yuki Ohmuro-Matsuyama

*Chemical Resources Laboratory, Tokyo Institute of Technology*

17:00-17:20  
O1-10

**Importance of acetyl protective group in the integration of enzymatic and chemical transformations toward fine chemical synthesis**

Ryohei Kobayashi, Shun Hanamura, Takasi Itou, Kento Asami, Takuya Machida, Susanta Mandal, Kengo Hanaya, Mitsuru Shoji, and Takeshi Sugai

*Department of Pharmaceutical Science, Keio University*

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**17:30-19:00**

**Poster Presentation 1**

## Thursday, December 18

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- 9:00-10:10**      **Invited Lecture 5 & 6**  
Chair: Michihiko Kataoka, *Osaka Prefecture University*  
Kenji Miyamoto, *Keio University*
- 9:00-9:40  
I-05      **Protein Engineering and Enzyme Cascade Reactions**  
Uwe Bornscheuer  
*Institute of Biochemistry, Dept. of Biotechnology & Enzyme Catalysis, Greifswald University*  
\*ERATO Asano Active Enzyme Molecule Project Invited Speaker
- 9:40-10:10  
I-06      **Engineered biocatalysts: exploring and exploiting flavoenzymes**  
Stefan Lutz  
*Department of Chemistry, Emory University*  
\*ERATO Asano Active Enzyme Molecule Project Invited Speaker
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- 10:10-10:30      Coffee Break
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- 10:30-12:00**      **Invited Lecture 7-9**  
Chair: Michihiko Kataoka, *Osaka Prefecture University*  
Kenji Miyamoto, *Keio University*
- 10:30-11:00  
I-07      **Thermostable Enzyme Development at Novozymes**  
Tomoko Matsui  
*Molecule Development Technology Department, R&D, Novozymes Japan Ltd.*
- 11:00-11:30  
I-08      **Stability intensification of multimeric enzymes by terminal salt-bridge strategy**  
Huimin Yu  
*Institute of Biochemical Engineering, Department of Chemical Engineering, Tsinghua University*  
\*ERATO Asano Active Enzyme Molecule Project Invited Speaker
- 11:30-12:00  
I-09      **Improvement of industrial microorganisms using Disparity mutagenesis technology**  
Kiriko Murakami  
*Neo-Morgan Laboratory Incorporated*
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- 12:00-13:20      Lunch Break
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- 13:20-15:20**      **ERATO Asano Active Enzyme Molecule Project Progress Report**  
Facilitator: Kimiyasu Isobe  
Project Coordinator of Asano Active Enzyme Molecule Project
- 13:20-13:40  
E-01      **Introduction to the ERATO session**  
Yasuhisa Asano  
Research Director of Asano Active Enzyme Molecule Project
- 13:40-13:55  
E-02      **Newly evolved R-stereoselective amine oxidase applicable to a chiral (S)-amine synthesis**  
Kazuyuki Yasukawa<sup>1,2,3</sup>, Shogo Nakano<sup>1,2</sup>, Yasuhisa Asano<sup>1,2</sup>  
<sup>1</sup>*Biotechnology Research Center and Department of Biotechnology, Toyama Prefectural University*, <sup>2</sup>*Asano Active Enzyme Molecule Project, ERATO, JST*, <sup>3</sup>*Toyama Institute of Health*
- 13:55-14:10  
E-03      **Plants and animals are valuable bioresources for exploring novel enzymes**  
Yuko Ishida<sup>1,2</sup>, Mohammad Dadashipour<sup>1,2</sup>, Takuya Yamaguchi<sup>1,2</sup>, Yuta Miki<sup>1,2</sup>, Kazunori Yamamoto<sup>1,2</sup>, Atsutoshi Ina<sup>1,2</sup>, Yayoi Ichiki<sup>1,2</sup>, Yasumasa Kuwahara<sup>1,2</sup>, and Yasuhisa Asano<sup>1,2</sup>  
<sup>1</sup>*Biotechnology Research Center and Department of Biotechnology, Toyama Prefectural University*, <sup>2</sup>*Asano Active Enzyme Molecule Project, ERATO, JST*
- 14:10-14:25  
E-04      **Hydroxynitrile lyase from a millipede as a valuable tool for white biotechnology: purification, characterization and recombinant expression**  
Mohammad Dadashipour<sup>1,2</sup>, Yuko Ishida<sup>1,2</sup>, Kazunori Yamamoto<sup>1,2</sup>, Yasuhisa Asano<sup>1,2</sup>  
<sup>1</sup>*Biotechnology Research Center and Department of Biotechnology, Toyama*

	<i>Prefectural University, <sup>2</sup>Active Enzyme Molecule Project, ERATO, JST, Toyama Prefectural University</i>
14:25-14:45 E-05	<b>New enzymatic and microbial methods for selective assay of amino acid</b> <u>Masafumi Kameya</u> <sup>1,2</sup> , Daisuke Matsui <sup>1,2</sup> , and Yasuhisa Asano <sup>1,2</sup> <sup>1</sup> <i>Biotechnology Research Center and Department of Biotechnology, Toyama Prefectural University</i> <sup>2</sup> <i>Asano Active Enzyme Molecule Project, ERATO, JST</i>
14:45-15:00 E-06	<b>Soluble expression in <i>Escherichia coli</i> of heterologous enzymes by mutagenesis</b> <u>Daisuke Matsui</u> <sup>1,2</sup> and Yasuhisa Asano <sup>1,2</sup> <sup>1</sup> <i>Biotechnology Research Center and Department of Biotechnology, Toyama Prefectural University</i> , <sup>2</sup> <i>Asano Active Enzyme Molecule Project, ERATO, JST</i>
15:00-15:20 E-07	<b>Endeavors to bridge a gap between wet and dry science in enzyme engineering</b> <u>Shogo Nakano</u> <sup>1,4</sup> , Seiji Okazaki <sup>1,4</sup> , Kazuyuki Yasukawa <sup>1,3,4</sup> , Mohanmad Dadashipour <sup>1,4</sup> , Hiroaki Tokiwa <sup>2,4</sup> and Yasuhisa Asano <sup>1,4</sup> <sup>1</sup> <i>Biotechnology Research Center and Department of Biotechnology, Toyama Prefectural University</i> , <sup>2</sup> <i>Department of Chemistry, Rikkyo University</i> , <sup>3</sup> <i>Toyama Institute of Health</i> , <sup>4</sup> <i>Asano Active Enzyme Molecule Project, ERATO, JST</i>
15:20-15:40	Coffee Break
<b>15:40-17:10</b>	<b>Invited Lecture 10-12</b> Chair: Yasuo Kato, <i>Toyama Prefectural University</i> Shun'ichi Suzuki, <i>Ajinomoto Co., Inc.</i>
15:40-16:10 I-10	<b>Hydroxylation of non-native substrates by wild-type cytochrome P450s assisted by decoy molecules</b> Osami Shoji <i>Department of Chemistry, Graduate School of Science, Nagoya University</i>
16:10-16:40 I-11	<b>The Quest for <math>\gamma</math>-Lactamases: From Vince Lactam to Monocyclic Lactams</b> Mélanie Hall <i>Department of Chemistry, University of Graz</i> *ERATO Asano Active Enzyme Molecule Project Invited Speaker
16:40-17:10 I-12	<b>Enzyme catalyzed electrochemical conversion of CO<sub>2</sub> to formate</b> Yong-Hwan Kim <i>Department of Chemical Engineering, Kwangwoon University</i> *ERATO Asano Active Enzyme Molecule Project Invited Speaker
<b>17:30-19:00</b>	<b>Poster Presentation 2</b>
<b>19:15-21:15</b>	<b>Banquet at the ANA Crowne Plaza Hotel Toyama</b>

## Friday, December 19

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9:00-10:10

### Invited Lecture 13 & 14

Chair: Uwe Bornscheuer, *Greifswald University*  
Takeshi Sugai, *Keio University*

9:00-9:40  
I-13

### Combination of the two "worlds" chemo- and biocatalysis towards multi-step one-pot processes

Harald Gröger  
*Faculty of Chemistry, University of Bielefeld*  
\*ERATO Asano Active Enzyme Molecule Project Invited Speaker

9:40-10:10  
I-14

### Biocatalytic systems involving (chiral) amines

Wolfgang Kroutil  
*Department of Chemistry, Organic and Bioorganic Chemistry, NAWI Graz University of Graz*  
\*ERATO Asano Active Enzyme Molecule Project Invited Speaker

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10:10-10:30

Coffee Break

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10:30-12:00

### Invited Lecture 15-17

Chair: Uwe Bornscheuer, *Greifswald University*  
Takeshi Sugai, *Keio University*

10:30-11:00  
I-15

### Synthesis of useful chiral alcohols using a mutant carbonyl reductase enzyme

Yoshihiko Yasohara  
*Kaneka Corporation*

11:00-11:30  
I-16

### Development of a Concise, Asymmetric Synthesis of a Smoothed Receptor Inhibitor via Enzymatic Transamination of a 4-Piperidinone with Dynamic Kinetic Resolution

John W. Wong  
*Biocatalysis Center of Emphasis, Chemical R&D, Pfizer Worldwide R&D*  
\*ERATO Asano Active Enzyme Molecule Project Invited Speaker

11:30-12:00  
I-17

### Altered lipase acting as a more useful biocatalyst

Tadashi Ema  
*Graduate School of Natural Science and Technology, Okayama University*

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12:00-13:20

Lunch Break

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13:20-15:20

### Invited Lecture 18-21

Chair: Harald Gröger, *University of Bielefeld*  
Yoshihiko Yasohara, *Kaneka Corporation*

13:20-13:50  
I-18

### Engineering catalytic efficiencies and pH optima of archaeal carboxylesterases

Toru Nakayama  
*Department of Biomolecular Engineering, Graduate School of Engineering, Tohoku University*

13:50-14:20  
I-19

### Enzyme engineering of a bacterial decarboxylase for the production of fine chemicals

Kenji Miyamoto  
*Department of Biosciences and Informatics, Keio University*

14:20-14:50  
I-20

### Steroid-hydroxylating cytochrome P450 monooxygenase CYP154C5 from *Nocardia farcinica*

Anett Schallmey  
*Biocatalysis - Van 't Hoff Institute for Molecular Sciences, University of Amsterdam*  
\*ERATO Asano Active Enzyme Molecule Project Invited Speaker

14:50-15:20  
I-21

### Synthesis of $\gamma$ -glutamyl peptide as a *kokumi* substance

Shun'ichi Suzuki  
*Research Institute for Bioscience Products & Fine Chemicals, Ajinomoto Co., Inc.*

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15:20-15:40

Coffee Break

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- 15:40-17:20 Oral Presentation 2-A (Room 201-203)**  
 Chair: Tohru Dairi, *Hokkaido University*  
 Manfred Schneider, *FHDW Bergisch Gladbach*
- 15:40-16:00  
 O2-01 **Potential use of oxidoreductases for the fabrication of biomaterials**  
Noriho Kamiya<sup>1,2</sup>, Kousuke Moriyama<sup>1</sup>, Teppei Niide<sup>3</sup>, Rie Wakabayashi<sup>1</sup> and Masahiro Goto<sup>1,2</sup>  
<sup>1</sup>*Department of Applied Chemistry, Graduate School of Engineering, Kyushu University,* <sup>2</sup>*Division of Biotechnology, Center for Future Chemistry, Kyushu University,* <sup>3</sup>*Department of Biomolecular Engineering, Graduate School of Engineering, Tohoku University*
- 16:00-16:20  
 O2-02 **Suggestion of new method for screening of effective  $\beta$ -fructofuranosidase using microbial cell surface display - For development of  $\beta$ -fructofuranosidase, producing 1-Kestose specifically**  
Takumi Tochio<sup>1</sup>, Saki Nakamura<sup>1</sup>, Naomi Ito<sup>1</sup>, Keisuke Tamura<sup>2</sup> and Tadashi Fujii<sup>2</sup>  
<sup>1</sup>*B Food Science Co., Ltd.* <sup>2</sup>*MicroBiopharm Japan Co., Ltd.*
- 16:20-16:40  
 O2-03 **A single amino acid residue change of  $\beta$ -fructofuranosidase from *Beijerinckia indica* drastically enhanced 1-kestose synthesis.**  
Keisuke Tamura<sup>1</sup>, Takumi Tochio<sup>2</sup>, and Tadashi Fujii<sup>1</sup>  
<sup>1</sup>*MicroBiopharm Japan Co., Ltd.* <sup>2</sup>*B Food Science Co., Ltd.*
- 16:40-17:00  
 O2-04 **Holoabzyme: a single antibody catalyzes multiple chemical transformations upon replacement of artificial cofactors**  
Takeshi Tsumuraya, Fumihiro Ishikawa, Ayaka Take, Asako Yamaguchi, Toshiji Tada, and Ikuo Fujii  
*Department of Biological Science, Graduate School of Science, Osaka Prefecture University*
- 17:00-17:20  
 O2-05 **Screening of gene-specific amplicons from metagenomes for improving biocatalysis**  
Nobuya Itoh, Satomi Kariya, and Junji Kurokawa  
*Biotechnology Research Center and Department of Biotechnology Toyama Prefectural University*
- 15:40-17:20 Oral Presentation 2-B (Special Room)**  
 Chair: Stefan Lutz, *Emory University*  
 Makoto Hibi, *Kyoto University*
- 15:40-16:00  
 O2-06 **Novel enzymes and metabolic networks in Archaea**  
Haruyuki Atomi, Riku Aono, Sanae Hodo, Yuuta Yoshii, Takaaki Sato and Tadayuki Imanaka  
*Department of Synthetic Chemistry and Biological Chemistry, Graduate School of Engineering, Kyoto University*  
*Department of Biotechnology, College of Life Sciences, Ritsumeikan University*  
*JST, CREST*
- 16:00-16:20  
 O2-07 **Experimental Discovery of the UDP-GlcNAc Biosynthetic Pathway Unpredicted from the Genomic Data of a Crenarchaeon, *Sulfolobus tokodaii***  
 Yutaka Kawarabayasi  
*Faculty of Agriculture, Kyushu University, Institute for Health Science, National Institute for Advanced industrial Science and Technology (AIST)*
- 16:20-16:40  
 O2-08 **Identification of the electron transfer partner proteins that can activate P450 from *Thermobifida fusca***  
Masayoshi Kondo, Hidehiko Hirakawa, and Teruyuki Nagamune  
*Department of Chemistry and Biotechnology, School of Engineering, The University of Tokyo*
- 16:40-17:00  
 O2-09 **An artificial self-sufficient cytochrome P450 wakes up earlier with extra redox components**  
 Tomoaki Haga, Hidehiko Hirakawa and Teruyuki Nagamune  
*Department of chemistry and Biotechnology, School of Engineering, The University of Tokyo*

17:00-17:20  
O2-10

**Construction of arming yeast displaying optimal ratio of cellulases for degradation of biomass pretreated with ionic liquid**

Chiaki Ogino,<sup>a</sup> Naoya Ishizue,<sup>a</sup> Misa Yasuda,<sup>a</sup> Miki Ishizaki,<sup>a</sup> Kazunori Ninomiya,<sup>b</sup> and Akihiko Kondo<sup>a</sup>

<sup>a</sup>*Department of Chemical Science and Engineering, Graduate School of Engineering, Kobe University,* <sup>b</sup>*Institute of Nature and Environmental Technology, Kanazawa University*

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**17:20-17:40**      **Poster Award Ceremony**

**17:40-17:50**      **Closing Remarks**