

The 3rd A3 foresight symposium on  
**Chemical & Synthetic Biology  
of Natural Products**

Dates: July 9-12, 2018  
Hotel North City, Sapporo, Japan



NSFC  
National Natural Science  
Foundation of China



National Research  
Foundation of Korea



上海交通大学  
SHANGHAI JIAO TONG UNIVERSITY



인하대학교  
INHA UNIVERSITY

# SCHEDULE

## July 8<sup>th</sup> Sun      **Registration**

Location:    Hotel Mystays Premier Sapporo Park, Lobby

## July 9<sup>th</sup> Mon

Location:    Hotel North City, 2<sup>nd</sup> Floor, Room ‘Kin-ju (金柔)’

### 8:00 – 8:15      **Opening Remarks**

Yasuo Ohnishi (The University of Tokyo, Japan)

Eung-Soo Kim (Inha University, Korea)

Zixin Deng (Shanghai Jiao Tong University, China)

### 8:15 – 8:50      **Session 1:** Presentation from Professor (1)

Break

### 9:05 – 10:35    **Session 2:** Presentation from Chinese Student/Post-Doc

10:35 – 10:50      Break

### 10:50 – 12:01   **Session 3:** Presentation from Japanese Student/Post-Doc (1)

12:01 – 13:00    Lunch    (A lunch box will be provided to each participant.)

### 13:00 – 14:12    **Session 4:** Presentation from Japanese Student/Post-Doc (2)

14:12 – 14:30      Break

### 14:30 – 15:45    **Session 5:** Presentation from Korean Student/Post-Doc (1)

15:45 – 16:00      Break

### 16:00 – 17:05    **Session 6:** Presentation from Korean Student/Post-Doc (2)

18:00 – 19:30    Visit to the Sapporo Beer Museum

(At 18:00, two buses will depart from the venue. We will have more than 30 min in the museum.)

Group Photo

19:30 – 21:30    Informal Gathering for Discussion (1) at Sapporo Beer Garden

(<https://www.sapporo-bier-garten.jp/global/english.html>)

## July 10<sup>th</sup> Tue

Location: Hotel North City, 2<sup>nd</sup> Floor, Room 'Kin-ju (金柔)'

- 8:30 – 9:30 **Session 7:** Presentation from Professor (2)
- 9:30 – 9:40 Break
- 9:40 – 10:40 **Session 8:** Presentation from Professor (3)
- 10:40 – 10:50 Break
- 10:50 – 12:05 **Session 9:** Presentation from Professor (4)
- 12:05 – 13:00 Lunch (A lunch box will be provided to each participant.)
- 13:00 – 14:15 **Session 10:** Presentation from Professor (5)
- 14:15 – 14:30 Break
- 14:30 – 15:45 **Session 11:** Presentation from Professor (6)
- 15:45 – 16:00 Break
- 16:00 – 16:50 **Session 12:** Presentation from Professor (7)
- 18:00 – 20:00 Informal Gathering for Discussion (2) at Crab Restaurant Sapporo Kani-Ya.  
(<http://www.kani-ya.co.jp/kani/sapporo/>)  
(We will go to the restaurant on foot; 15-20 min walk from the venue.)  
Best Student/Post-Doc Presentation Award Ceremony

## July 11<sup>th</sup> Wed

Location: Hotel North City, 2<sup>nd</sup> Floor, room 'Kin-ju (金柔)'

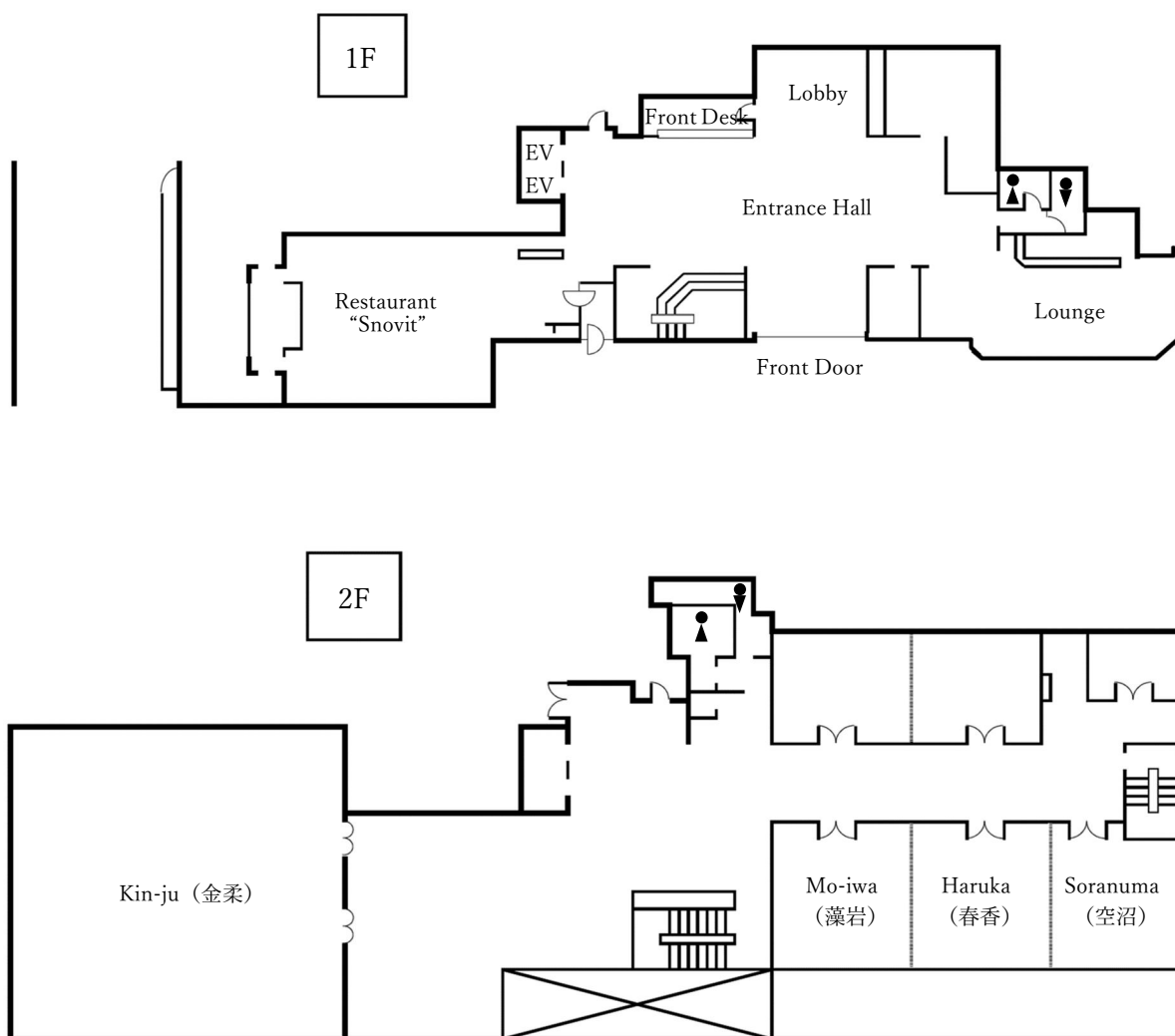
- 8:45 – 9:35 **Session 13:** Presentation from Professor (8)
- 9:35 – 9:45 Wrap up of the meeting
- 10:30 – 11:30 Move to Otaru by bus  
(At 10:30, two buses will depart from the venue. We will arrive at Otaru around 11:30.)
- 11:30 – 14:15 Lunch and Sight-seeing in Otaru (at one's own expense)
- 14:15 – 15:00 Move to Nikka Whisky Yoichi Distillery by bus
- 15:00 – 16:30 Nikka Whisky Yoichi Distillery  
(<http://www.nikka.com/distilleries/yoichi/>)  
At 18:00, we will go back to Sapporo.  
(Please enjoy favorite dishes at one's own expense.)

**July 12<sup>th</sup> Thu**

Location: Hotel North City, 2<sup>nd</sup> Floor, Room ‘Mo-iwa (藻岩)’,  
‘Haruka (春香)’, and ‘Sorayuma (空沼)’

9:00 – 10:00 Free Discussion for Future Collaboration

**Floor map**



**Free Wi-Fi**

Free Wi-Fi connection is available within the meeting rooms at the congress venue. Please select ID “Hotel Northcity” and password “northcity”.

# PROGRAM

\*Only speaker's name is presented in "Presentation from Professor" sessions.

## July 9<sup>th</sup> Mon

### Opening Remarks

8:00 – 8:15

Yasuo Ohnishi (The University of Tokyo, Japan)

Eung-Soo Kim (Inha University, Korea)

Zixin Deng (Shanghai Jiao Tong University, China)

### Session 1: Presentation from Professor (1)

8:15 – 8:40

#### Discovery of unusual polyketides by cryptic gene activation

Tomohisa Kuzuyama (The University of Tokyo, Japan)

8:40 – 8:50

#### MarQ catalyzes flexible adenylation and specific *S*-methylation to produce various maremycins

Dr. Tingting Huang (Shanghai Jiao Tong University, China)

Break

### Session 2: Presentation from Chinese Student/Post-Doc

9:05 – 9:15

#### A methylation-mediated the molecular logic of tailoring enzymatic reaction in xantholipin biosynthesis

Dr. Lingxin Kong, Qing Wang, Yan Li, Jufang Shen, Jinjin Wang, Weinan Yang, Zixin Deng and Delin You

Shanghai Jiao Tong University, China

9:15 – 9:25

**CRISPR-Cpf1 assisted multiplex genome editing and transcriptional repression in *Streptomyces***

Dr. Lei Li, Keke Wei, Guosong Zheng, Xiaocao Liu, Shaoxin Chen, Weihong Jiang and Yinhua Lu

Institute of Plant Physiology and Ecology, CAS, China

9:25 – 9:30

**An iron-sulfur cluster protein BlsK catalyzes the peptide bond formation in a tRNA-dependent way in Blasticidin S biosynthesis**

Xiankun Wang, Zixin Deng and Xinyi He

Shanghai Jiao Tong University, China

9:30 – 9:35

**RedH, a versatile biocatalyst for producing hybrubin analogues with pharmaceutical potential**

Qingshan Long, Daniel E. Jeffries, Shuangjun Lin, Xuefei Chen, Yemin Wang, Zixin Deng, Craig W. Lindsley and Meifeng Tao

Shanghai Jiao Tong University, China

9:35– 9:40

**Sequential methylation involved in streptonigrin biosynthesis**

Xiaozheng Wang, Dekun Kong, Fei Xu, Jing Wo, Deng Zixin and Shuangjun Lin

Shanghai Jiao Tong University, China

9:40– 9:50

**Morphology engineering for improved antibiotic production in actinobacteria**

Yuanting Wu, Xinran Wang, Qianjin Kang and Linqun Bai

Shanghai Jiao Tong University, China

9:50–10:00

**Structural basis and directed engineering of thioesterase-catalyzed polyene chain release**

Yucong Zhou, Ting Shi, Qianjin Kang, Jianting Zheng, Yilei Zhao and Linqun Bai

Shanghai Jiao Tong University, China

10:00–10:10

**Elucidation of shunt pathways guides metabolic engineering of *Actinoplanes* sp. for acarbose production**

Qinqin Zhao, Dan Zhang, Qianjin Kang and Linqun Bai

Shanghai Jiao Tong University, China

10:10–10:15

**Reconstitution of kinamycin biosynthesis within the heterologous host *Streptomyces albus* J1074**

Xiangyang Liu, Dongxu Liu, Min Xu, Meifeng Tao, Linqun Bai, Zixin Deng, Blaine A. Pfeifer and Ming Jiang

Shanghai Jiao Tong University, China

10:15–10:20

**Mining of deacylation enzymes converting ansamitocins to maytansinol from *Streptomyces galbus* ATCC14077**

Yang Zhao, Xinran Wang, Qinqin Zhao, Qianjin Kang and Linqun Bai

Shanghai Jiao Tong University, China

10:20–10:25

**Functional analysis and reconstitution of acarbose biosynthetic pathway**

Dan Zhang, Qinqin Zhao, Qianjin Kang and Linqun Bai

Shanghai Jiao Tong University, China

10:25–10:30

**Construction of genome-minimized *Streptomyces* host by Cre/loxP system based on multiple computational approaches**

Qingting Bu, Pin Yu, Zi-Yue Li, Jue Wang, Xu-Ming Mao and Yong-Quan Li

Zhejiang University, China

10:30–10:35

**Design of the PKS synthetic chassis based on an oil-preferred industrial *S. albus* strain**

Han Li, Jiaxiu Wei, Yiming Shan and Wenjun Guan

Zhejiang University, China

Break

### **Session 3: Presentations from Japanese Student/Post-Doc (1)**

10:50–11:00

#### **Directed evolution of an aromatic amine *N*-oxygenase for modifying its regioselectivity**

Dr. Hiroya Tomita<sup>1</sup>, Yohei Katsuyama<sup>1,2</sup> and Yasuo Ohnishi<sup>1,2</sup>

<sup>1</sup>The University of Tokyo, Japan

<sup>2</sup>Collaborative Research Institute for Innovative Microbiology, The University of Tokyo, Japan

11:00–11:10

#### **Crystal structure of FmoA3, a nonribosomal peptide synthetase responsible for JBIR-34 and -35 biosynthesis**

Dr. Kaoru Sone<sup>1</sup>, Ayaka Harada<sup>2</sup>, Yohei Katsuyama<sup>1,3</sup>, Miki Senda<sup>2</sup>, Kazuo Shin-ya<sup>4</sup>, Toshiya Senda<sup>2</sup> and Yasuo Ohnishi<sup>1</sup>

<sup>1</sup>The University of Tokyo, Japan

<sup>2</sup>High Energy Accelerator Research Organization (KEK), Japan

<sup>3</sup>Collaborative Research Institute for Innovative Microbiology, The University of Tokyo, Japan

<sup>4</sup>National Institute of Advanced Industrial Science and Technology (AIST), Japan

11:10-11:20

#### **Functional analysis of a type II polyketide synthase responsible for polyene biosynthesis**

Danyao Du<sup>1</sup>, Yohei Katsuyama<sup>1,2</sup> and Yasuo Ohnishi<sup>1,2</sup>

<sup>1</sup>The University of Tokyo, Japan

<sup>2</sup>Collaborative Research Institute for Innovative Microbiology, The University of Tokyo, Japan

11:20-11:30

#### **Unusual nitrene transfer-like cyclization catalyzed by a cytochrome P450 in benzastatin biosynthesis**

Hayama Tsutsumi<sup>1</sup>, Yohei Katsuyama<sup>1,2</sup>, Miho Izumikawa<sup>3</sup>, Motoki Takagi<sup>3</sup>, Manabu Fujie<sup>4</sup>, Noriyuki Satoh<sup>4</sup>, Kazuo Shin-ya<sup>5</sup> and Yasuo Ohnishi<sup>1,2</sup>

<sup>1</sup>The University of Tokyo, Japan

<sup>2</sup>Collaborative Research Institute for Innovative Microbiology, The University of Tokyo, Japan

<sup>3</sup>Japan Biological Informatics Consortium (JBIC), Japan

<sup>4</sup>Okinawa Institute of Science and Technology Graduate University (OIST), Japan

<sup>5</sup>National Institute of Advanced Industrial Science and Technology (AIST), Japan



11:30–11:33

**Biosynthesis of the aromatic polyketide yoropyrazone in *Streptomyces* sp. IFM11307**

Kasumi Fujita<sup>1</sup>, Yohei Katsuyama<sup>1,2</sup>, Kazufumi Toume<sup>3</sup>, Masami Ishibashi<sup>4</sup> and Yasuo Ohnishi<sup>1,2</sup>

<sup>1</sup>The University of Tokyo, Japan

<sup>2</sup>Collaborative Research Institute for Innovative Microbiology, The University of Tokyo, Japan

<sup>3</sup>University of Toyama, Japan

<sup>4</sup>Chiba University, Japan

11:33–11:36

**Identification of *Kutzneria albida* secondary metabolites synthesized using the secondary metabolism-specific nitrous acid biosynthetic pathway**

Akito Yamada<sup>1</sup>, Yohei Katsuyama<sup>1,2</sup> and Yasuo Ohnishi<sup>1,2</sup>

<sup>1</sup>The University of Tokyo, Japan

<sup>2</sup>Collaborative Research Institute for Innovative Microbiology, The University of Tokyo, Japan

11:36–11:41

**Interaction between actinomycetes and mycolic acid-containing bacteria co-isolated from Hegura island soil**

Manami Kato<sup>1</sup>, Shumpei Asamizu<sup>1,2</sup>, Kazuya Teramoto<sup>1,2</sup> and Hiroyasu Onaka<sup>1,2</sup>

<sup>1</sup>The University of Tokyo, Japan

<sup>2</sup>Collaborative Research Institute for Innovative Microbiology, The University of Tokyo, Japan

11:41–11:51

**Development of the purification process of 3-amino-4-hydroxybenzoic acid, a start-up material for polybenzimidazole, from fermentation broth of kraft pulp hydrolysate**

Dr. Shun Saito<sup>1</sup>, Yohei Katsuyama<sup>1,2</sup>, Shoko Miyazaki<sup>3</sup>, Hideo Kawaguchi<sup>3</sup>, Chiaki Ogino<sup>3</sup>, Mohammad Asif Ali<sup>4</sup>, Tatsuo Kaneko<sup>4</sup> and Yasuo Ohnishi<sup>1,2</sup>

<sup>1</sup>The University of Tokyo, Japan

<sup>2</sup>Collaborative Research Institute for Innovative Microbiology, The University of Tokyo, Japan

<sup>3</sup>Kobe University, Japan

<sup>4</sup>Japan Advanced Institute of Science and Technology (JAIST), Japan

11:51–12:01

**Lingzhi meroterpenoids from *Ganoderma* species**

Dr. Qi Luo<sup>1,3</sup> and Yong-Xian Cheng<sup>2</sup>

<sup>1</sup>Kunming Institute of Botany, Chinese Academy of Sciences, China

<sup>2</sup>Shenzhen University Health Science Center, China

<sup>3</sup>Present address: Biotechnology Research Center, The University of Tokyo, Japan

12:01 – 13:00 Lunch

**Session 4: Presentation from Japanese Student/Post-Doc (2)**

13:00 – 13:10

**Identification and characterization of novel dihydroxynaphthalene synthesis enzymes from bacterial origin**

Dr. Yusuke Sone<sup>1,2</sup>, Shuto Nakamura<sup>1</sup>, Makoto Sasaki<sup>1</sup>, Fumihito Hasebe<sup>1</sup>, Seung-Young Kim<sup>1</sup> and Nobutaka Funa<sup>1</sup>

<sup>1</sup>Graduate Division of Nutritional and Environmental Sciences, University of Shizuoka, Japan

<sup>2</sup>Present address: Biotechnology Research Center, The University of Tokyo, Japan

13:10 – 13:20

**Phosphate donor selectivity determinants of a pyrophosphate-dependent kinase**

Dr. Ryuhei Nagata<sup>1,3</sup>, Masahiro Fujihashi<sup>1</sup>, Takaaki Sato<sup>2</sup>, Haruyuki Atomi<sup>2</sup> and Kunio Miki<sup>1</sup>

<sup>1</sup>Graduate School of Science, Kyoto University, Japan

<sup>2</sup>Graduate School of Engineering, Kyoto University, Japan

<sup>3</sup>Present address: Biotechnology Research Center, The University of Tokyo, Japan

13:20 – 13:25

**Large-scale exploration of bacterial terpene synthases**

Keiichi Murai<sup>1</sup>, Makoto Nishiyama<sup>2,3</sup> and Tomohisa Kuzuyama<sup>2,3</sup>

<sup>1</sup>Graduate School of Agricultural and Life Sciences, The University of Tokyo, Japan

<sup>2</sup>Biotechnology Research Center, The University of Tokyo, Japan

<sup>3</sup>Collaborative Research Institute for Innovative Microbiology, The University of Tokyo, Japan

13:25 – 13:35

**Enzymatic properties of *N*-formimidoyl transferase in the BD-12 biosynthesis**

Haruka Niikura<sup>1</sup>, Chitose Maruyama<sup>1</sup>, Yasushi Ogasawara<sup>2</sup>, Yasuo Kato<sup>3</sup>, Tohru Dairi<sup>2</sup> and Yoshimitsu Hamano<sup>1</sup>

<sup>1</sup>Graduate School of Bioscience and Biotechnology, Fukui Prefectural University, Japan

<sup>2</sup>Graduate School of Engineering, Hokkaido University, Japan

<sup>3</sup>Graduate School of Engineering, Toyama Prefectural University, Japan

13:35 – 13:38

**Bacterial 1-aminocyclopropane-1-carboxylic acid synthase**

Yukiko Chinone<sup>1</sup>, Chitose Maruyama<sup>1</sup>, Junko Hashimoto<sup>2</sup>, Ikuko Kozone<sup>2</sup>, Kazuo Shin-ya<sup>3</sup> and Yoshimitsu Hamano<sup>1</sup>

<sup>1</sup>Graduate School of Bioscience and Biotechnology, Fukui Prefectural University, Japan

<sup>2</sup>Japan Biological Informatics Consortium (JBIC), Japan

<sup>3</sup>National Institute of Advanced Industrial Science and Technology (AIST), Japan

13:38 – 13:41

**Polycationic modification of bioactive molecules by  $\epsilon$ -poly-L-lysine**

Yamato Takeuchi, Chitose Maruyama and Yoshimitsu Hamano

Graduate School of Bioscience and Biotechnology, Fukui Prefectural University, Japan

13:41 – 13:44

**Biosynthesis of two macrolides produced by *Streptomyces graminofaciens***

Kohsuke Kishikawa, Akimasa Miyana, Fumitaka Kudo and Tadashi Eguchi  
Tokyo Institute of Technology, Japan

13:44 – 13:47

**Cross-linking reaction to investigate protein-protein interaction in polyketide synthases**

Ena Goto, Risako Ouchi, Akimasa Miyana, Fumitaka Kudo and Tadashi Eguchi  
Tokyo Institute of Technology, Japan

13:47 – 13:50

**Biosynthesis of 3-aminofatty acid starter units of macrolactam antibiotics**

Daisuke Kawasaki, Taichi Chisuga, Akimasa Miyana, Fumitaka Kudo and Tadashi Eguchi  
Tokyo Institute of Technology, Japan

13:50 – 13:55

**A reductase gene *srrG* is involved in the biosynthesis of signaling molecules SRBs that induce antibiotic production in *Streptomyces rochei***

Aiko Teshima and Kenji Arakawa

Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, Japan

13:55 – 14:00

**Structural and biosynthetic investigation of secondary metabolites accumulated in the plasmidless mutants of *Streptomyces rochei***

Amirudin Akhmad Fauzi, Yosi Nindita and Kenji Arakawa

Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, Japan

14:00 – 14:03

**Control of metabolic titer by manipulation of regulatory genes**

Yuya Misaki, Miyuki Iwakuni, Yuzuru Takahashi, Toshihiro Suzuki, Haruyasu Kinashi and Kenji Arakawa

Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, Japan

14:03 – 14:06

**Structural analysis of orange pigment in *Streptomyces rochei***

Rukman Muslimin, Natsumi Shogase and Kenji Arakawa

Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, Japan

14:06 – 14:09

**Functional analysis of an amine oxidase involved in lankacidin biosynthesis**

Hazuki Ogata, Yuji Yuki-yoshi and Kenji Arakawa

Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, Japan

14:09 – 14:12

**Exploring of the cryptic bioactive secondary metabolites by extensive genome mining**

Rikito Nishiura<sup>1</sup>, Junko Hashimoto<sup>2</sup>, Kazuo Shin-ya<sup>3</sup>, Haruo Ikeda<sup>4</sup> and Kenji Arakawa<sup>1</sup>

<sup>1</sup>Department of Molecular Biotechnology, Graduate School of Advanced Sciences of Matter, Hiroshima University, Japan

<sup>2</sup>Japan Biological Informatics Consortium (JBIC), Japan

<sup>3</sup>National Institute of Advanced Industrial Science and Technology (AIST), Japan

<sup>4</sup>Kitasato Institute for Life Sciences, Kitasato University, Japan

Break

**Session 5: Presentation from Korean Student/Post-Doc (1)**

14:30 – 14:40

**Redesign of biosynthetic pathway for the production of *cis*, *cis*-muconic acid in *Corynebacterium glutamicum***

Dr. Hanna Lee<sup>1,2</sup>, Jihoon Park<sup>1</sup>, Sisun Choi<sup>1</sup>, Sang Joung Lee<sup>2</sup>, Gie-Taek Chun<sup>3</sup>, Sang Yong Kim<sup>4</sup> and Eung-Soo Kim<sup>1</sup>

<sup>1</sup>Department of Biological Engineering, Inha University, Korea

<sup>2</sup>STR Biotech Co., Ltd., Korea

<sup>3</sup>Department of Molecular Bio-science, Kangwon National University, Korea

<sup>4</sup>Korea Institute of Industrial Technology, Korea

14:40 – 14:50

**Production of cyclized tautomycetin via thioesterase domain swapping**

Dr. Hee-Ju Nah, Seunghee Choi, Sisun Choi and Eung-Soo Kim

Department of Biological Engineering, Inha University, Korea

14:50 – 14:55

**Targeted isolation of natural product biosynthetic gene clusters and heterologous expression using pSBAC system**

Seunghee Choi, Hee-Ju Nah, Sisun Choi and Eung-Soo Kim

Department of Biological Engineering, Inha University, Korea

14:55 – 15:00

**Isolation and heterologous expression of NPP biosynthetic gene cluster from *Pseudonocardia autotrophica***

Chi-Young Han, Hye-Jin Kim, Sisun Choi and Eung-Soo Kim

Department of Biological Engineering, Inha University, Korea

15:00 – 15:05

**Genetic engineering of biosynthetic pathway for improving of *cis, cis*-muconic acid production in *Escherichia coli*.**

Jihoon Park<sup>1</sup>, Hanna Lee<sup>1,2</sup>, Sisun Choi<sup>1</sup>, Sang Joung Lee<sup>2</sup>, Gie-Taek Chun<sup>3</sup>, Sang Yong Kim<sup>4</sup> and Eung-Soo Kim<sup>1</sup>

<sup>1</sup>Department of Biological Engineering, Inha University, Korea

<sup>2</sup>STR Biotech Co., Ltd., Korea

<sup>3</sup>Department of Molecular Bio-science, Kangwon National University, Korea

<sup>4</sup>Korea Institute of Industrial Technology, Korea

15:05 – 15:10

**The cg3230 gene of *Corynebacterium glutamicum* plays regulatory roles in oxidative stress responses**

Hae Ri Jeong and Heung Shick Lee

Department of Biotechnology and Bioinformatics, Korea University, Korea

15:10 – 15:15

**The role of *whiA*-homologue in *Corynebacterium glutamicum***

Jae Hyun Lee and Heung Shick Lee

Department of Biotechnology and Bioinformatics, Korea University, Korea

15:15 – 15:25

**Genome variations of evolved *Escherichia coli* ET8 with a rhodopsin-based phototrophic metabolism**

Minju Lee and Pil Kim

Department of Biotechnology, The Catholic University of Korea, Korea

15:25 – 15:30

**Effect of hrrSA-deletion by CRISPR-Cpf1 in *Corynebacterium glutamicum*.**

Su Rin Lee and Pil Kim

Department of Biotechnology, The Catholic University of Korea, Korea

15:30 – 15:35

**Gene dosage expression of *Rhodobacter sphaeroides* hemA in *Corynebacterium glutamicum***

Hyungmo Yang and Pil Kim

Department of Biotechnology, The Catholic University of Korea, Korea

15:35 – 15:45

**Combination cancer treatment via chemo-photodynamic therapy based on the BSA nanoparticle**

Hoomin Lee and Yun Suk HUH

Department of Biological Engineering, Inha University, Korea

Break

**Session 6: Presentation from Korean Student/Post-Doc (2)**

16:00 – 16:10

**Transcriptome analysis revealed actinorhodin overproduction of *Streptomyces coelicolor* during co-culture with *Myxococcus xanthus* triggered by iron depletion**

Namil Lee<sup>1</sup>, Jinkyoo Chung<sup>1</sup>, Woori Kim<sup>1</sup>, Suhjung Cho<sup>1,2</sup>, Kyoung-Soon Jang<sup>3,4</sup>, Bernhard Palsson<sup>5,6,7</sup> and Byung-Kwan Cho<sup>1,2</sup>

<sup>1</sup>Department of Biological Sciences and KI for the BioCentury, Korea Advanced Institute of Science and Technology (KASIT), Korea

<sup>2</sup>Intelligent Synthetic Biology Center, Korea

<sup>3</sup>Biomedical Omics Group, Korea Basic Science Institute, Korea

<sup>4</sup>Division of Bio-Analytical Science, University of Science and Technology, Korea

<sup>5</sup>Department of Bioengineering, University of California San Diego, USA

<sup>6</sup>Department of Pediatrics, University of California San Diego, USA

<sup>7</sup>Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark, Denmark

16:10 – 16:20

**Multi-omics analysis reveals diverse regulatory features in *Streptomyces venezuelae* ATCC 15439**

Yujin Jeong<sup>1</sup>, Bernhard Palsson<sup>2,3,4</sup> and Byung-Kwan Cho<sup>1,5</sup>

<sup>1</sup>Department of Biological Sciences and KI for the BioCentury, Korea Advanced Institute of Science and Technology (KAIST), Korea

<sup>2</sup>Department of Bioengineering, University of California San Diego, USA

<sup>3</sup>Department of Pediatrics, University of California San Diego, USA

<sup>4</sup>Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark, Denmark

<sup>5</sup>Intelligent Synthetic Biology Center, Korea

16:20 – 16:30

**Systematic analysis on transcriptional architecture of *Streptomyces avermitilis* MA-4680**

Yongjae Lee<sup>1</sup>, Yujin Jeong<sup>1</sup>, Namil Lee<sup>1</sup>, Woori Kim<sup>1</sup>, Bernhard palsson<sup>2,3,4</sup> and Byung-Kwan Cho<sup>1,5</sup>

<sup>1</sup>Department of Biological Sciences and KI for the BioCentury, Korea Advanced Institute of Science and Technology (KASIT), Korea

<sup>2</sup>Department of Bioengineering, University of California San Diego, USA

<sup>3</sup>Department of Pediatrics, University of California San Diego, USA

<sup>4</sup>Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark, Denmark

<sup>5</sup>Intelligent Synthetic Biology Center, Korea

16:30 – 16:40

**Comparative phenotype analysis and genome completion of *Streptomyces venezuelae* strains**

Woori Kim<sup>1</sup>, Namil Lee<sup>1</sup>, Yujin Jeong<sup>1</sup>, Soonkyu Hwang<sup>1</sup>, Yongjae Lee<sup>1</sup> and Byung-Kwan Cho<sup>1,2</sup>

<sup>1</sup>Department of Biological Sciences and KI for the BioCentury, Korea Advanced Institute of Science and Technology (KAIST), Korea

<sup>2</sup>Intelligent Synthetic Biology Center, Korea



16:40 – 16:50

**Isolation and characterization of novel derivatives of nargenicin A1 and study of biological activities**

Dr. Dipesh Dhakal and Jae Kyung Sohng

Department of life science and biochemical engineering, institute of biomolecule reconstruction(ibr), Sun Moon University, Korea

16:50 – 17:00

**Exploration of photosensitive compounds from *Streptomyces venezulae***

Nguyen Thi Hue, Anaya Raj Pokhrel and Jae Kyung Sohng

Department of life science and biochemical engineering, institute of biomolecule reconstruction(ibr), Sun Moon University, Korea

17:00 – 17:05

***In vivo* studies on the biosynthetic gene cluster of nargenicin A1**

Vijay Rayamajhi, Dipesh Dhakal and Jae Kyung Sohng

Department of life science and biochemical engineering, institute of biomolecule reconstruction(ibr), Sun Moon University, Korea

18:00 – 19:30 Visit to the Sapporo Beer Museum

19:30 – 21:30 Informal gathering for discussion (1) at Sapporo Beer Garden

## July 10<sup>th</sup> Tue

### Session 7: Presentation from Professor (2)

8:30 – 8:50

#### **Studies on the biosynthesis of terpenoids from fungal phytopathogens.**

Taro Ozaki (Hokkaido University, Japan)

8:50 – 9:10

#### **Systemic reconfiguration for daptomycin production in *Streptomyces roseosporus***

Xu-ming Mao (Zhejiang University, China)

9:10 – 9:30

#### **Transcription unit architectures in *Streptomyces***

Byung-Kwan Cho (Korea Advanced Institute of Science and Technology, Korea)

Break

### Session 8: Presentation from Professor (3)

9:40 – 10:00

#### **Secondary metabolism-specific nitrous acid biosynthetic pathway in actinobacteria**

Yohei Katsuyama (The University of Tokyo, Japan)

10:00 – 10:20

#### **Reaction catalyzed by small molecules involved in Stryptonigrone and spiro-maremycins biosynthesis**

Shuangjun Lin (Shanghai Jiao Tong University, China)

10:20 – 10:40

#### **The role of WhiA and WhcD in corynebacterial cell division**

Heung Shick Lee (Department of Biotechnology and Bioinformatics, Korea University, Korea)

Break

## **Session 9: Presentation from Professor (4)**

10:50 –11:10

### **RiPPs biosynthesis by in vitro reconstitution system**

Hiroyasu Onaka (The University of Tokyo, Japan)

11:10 –11:30

### **New strategies of Enzyme Evolution for Synthetic Biology**

Yan Feng (Shanghai Jiao Tong University, China)

11:30 –11:50

### **An evolutionary investigation to develop a fast-growing *Corynebacterium glutamicum***

Pil Kim (The Catholic University of Korea, Korea)

11:50 –12:05

### **Production of curcumin in *Aspergillus oryzae*: yield improvement by strengthening malonyl-CoA supply**

Eiichiro Kan<sup>1,2</sup>, Yohei Katsuyama<sup>1,3</sup>, Jun-ichi Maruyama<sup>1</sup>, Kouichi Tamano<sup>4</sup>, Yasuji Koyama<sup>2</sup> and Yasuo Ohnishi<sup>1,3</sup>

<sup>1</sup>The University of Tokyo, Japan

<sup>2</sup>Noda Institute for Scientific Research, Japan

<sup>3</sup>Collaborative Research Institute for Innovative Microbiology, The University of Tokyo, Japan

<sup>4</sup>National Institute of Advanced Industrial Science and Technology (AIST), Japan

12:05 – 13:00    Lunch

## **Session 10: Presentation from Professor (5)**

13:00 – 13:20

### **New enzymes for bacterial peptidoglycan biosynthesis**

Toru Dairi (Hokkaido University, Japan)

13:20 – 13:40

### **CRISPR/Cas9-based techniques for genome engineering as well as functional gene screening in *Streptomyces***

Yinhua Lu (Shanghai Jiao Tong University, China)

13:40 – 14:00

**Bio-Security of Toxic Chemicals and Microbial Toxins in Food and Environment**

YunSuk Huh (Inha University, Korea)

14:00 – 14:15

**Decarboxylation switches the bifurcation point for lanthionin/labionen structure formation**

Kazuya Teramoto (The University of Tokyo, Japan)

Break

**Session 11: Presentation from Professor (6)**

14:30 – 14:50

**Biosynthesis of streptothricin group antibiotics**

Yoshimitsu Hamano (Fukui Prefectural University, Japan)

14:50 – 15:10

**Stereochemistry of polyketide biosynthesis**

Jianting Zheng (Shanghai Jiao Tong University, China)

15:10 – 15:30

**Genome analysis of *Nocardia* sp. CS682 as nargenicin A1 producer: Biosynthesis and production of nargenicin A1**

Jae Kyung Sohng (Sun Moon University, Korea)

15:30 – 15:45

**Toward the molecular mechanism of mycolic acid-containing bacteria induced actinomycetes specialized metabolism**

Shumpei Asamizu (The University of Tokyo, Japan)

Break

## **Session 12: Presentation from Professor (7)**

16:00 – 16:20

**Genome-wide metabolic engineering for activation of the silent secondary metabolites gene clusters in *Streptomyces* species**

Kenji Arakawa (Hiroshima University, Japan)

16:20 – 16:35

**Development of novel NPP antifungal polyene macrolides in a rare actinomycetes, *Pseudonocardia autotrophica***

Sisun Choi (Inha University, Korea)

16:35 – 16:50

**Promiscuous reactivity of aminoacyl-tRNA-dependent enzyme**

Chitose Maruyama (Fukui Prefectural University, Japan)

18:00 – 20:00    Informal Gathering for Discussion (2) at Crab Restaurant Sapporo Kani-Ya.

Best Student/Post-Doc Presentation Award Ceremony

## July 11<sup>th</sup> Wed

### Session 13: Presentation from Professor (8)

8:45 – 9:10

**Radical SAM enzymes in natural products biosynthesis ~ Characterization of methylcobalamin dependent radical SAM C-methyltransferase Fom3 in fosfomycin biosynthesis ~**

Fumitaka Kudo (Tokyo Institute of Technology, Japan)

9:10 – 9:35

**Potential application of actinomycetes for microbial fungicide**

Eung-Soo KIM (Department of Biological Engineering, Inha University, Korea)

9:35 – 9:45    Wrap up of the meeting

10:30 – 18:00    Excursion to Otaru

## July 12<sup>th</sup> Thu

9:00 – 10:00    Free Discussion for Future Collaboration

## Chairperson

### July 9<sup>th</sup> Mon

**Session 1:** Hiroyasu Onaka

**Session 2:** Shunpei Asamizu

**Session 3:** Kazuya Teramoto

**Session 4:** Yohei Katsuyama

**Session 5:** Chitose Maruyama

**Session 6:** Tomohisa Kuzuyama

### July 10<sup>th</sup> Tue

**Session 7:** Fumitaka Kudo

**Session 8:** Yoshimitsu Hamano

**Session 9:** Kenji Arakawa

**Session 10:** Xu-ming Mao

**Session 11:** Byung-Kwan Cho

**Session 12:** Pil Kim

### July 11<sup>th</sup> Wed

**Session 13:** Shuangjun Lin