Program

Metabolic Engineering IX:
Metabolic Engineering and Synthetic Biology

June 3 –7, 2012

Biarritz, France

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Philippe Soucaille
Université de Toulouse, INSA, UPS, INP, France

Elmar Heinzle
Saarland University, Germany

Gregg Whited
Danisco, USA

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Welcome from the Conference Co-Chairs

It is our great pleasure to welcome you all to Biarritz, France for the Metabolic Engineering IX Conference. ECI’s Metabolic Engineering is the longest running conference series of its kind, held every two years. This conference again emphasizes the interaction between cutting edge scientific developments and its rapid and successful transfer to sustainable industrial processes that help solving problems in the fields of supply of energy, particularly biofuels, of biomaterials, food and feed ingredients as well as compounds of pharmaceutical interest. The conference covers systems biology, synthetic biology, biochemical engineering, tools and methods, and emerging techniques, drugs, biofuels, biorefinery, and microbial and mammalian systems in the context of metabolic engineering. We hope that you will enjoy the state-of-the-art science and technology in metabolic engineering that will be shared at the conference. This conference will be a successful showcase of what we have done and what we can do with metabolic engineering and synthetic biology for the green growth of our world.

We are very pleased to inform you that we have more than 330 participants from more than 25 countries around the world. Attendees are well balanced among academia, industry and research institutes. Also, it is truly great to have more than 85 graduate students.

We have put a strong emphasis on the poster sessions to create a central scientific market place for the extended exchange of scientific results and ideas. The poster session room is the large and beautiful, with a splendid view of the Atlantic waves. We want to thank all the board members and session chairs for putting together a great program. We also would like to thank the poster chairs, Hal Alper (University of Texas, USA), Chetan T. Goudar (Bayer Healthcare, USA), Isabelle Meynial-Salles (University of Toulouse, France) and Caroline Peres (Danisco, USA), who put much effort into evaluating and selecting posters for presentation. We have more than 200 posters being presented at the conference and there will be a number of poster awards given out for the best presentations. Three Student/Young Investigator Poster Awards will be sponsored or co-sponsored by ECI and additional awards will be sponsored by the journals Metabolic Engineering (Elsevier), ACS Synthetic Biology (ACS), Journal of Industrial Microbiology & Biotechnology (Springer), Bioprocess & Biosystems Engineering (Springer) and Biotechnology Journal (Wiley). In addition, Metabolic Engineering Journal (Elsevier) will sponsor an award for the best overall poster of the conference.

The tradition of the most important and prestigious award in the field of metabolic engineering, the "International Metabolic Engineering Award," is continued in 2012. Professor Jay Keasling from the University of California, Berkeley, will receive this prize for his great accomplishments and leadership in metabolic engineering of biofuels and secondary metabolites and his dedication to the metabolic engineering community. Congratulations, Jay!

The Jay Bailey Young Investigator Best Paper Award will be presented as well. This year’s winner is Dr. Christopher Henry, a scientist in the Mathematics and Computer Science division at Argonne National Lab. In the winning paper in Nature Biotechnology, Dr. Henry and colleagues describe a new web resource, called the Model SEED, for automated reconstruction of draft genome-scale metabolic models.

This conference is run at a rather high cost. It would not have been possible to hold our conference in Biarritz without generous support from the many companies listed in this booklet. On behalf of all of us, we would like to sincerely thank them for the kind support, especially at this financially difficult time.

There are many people we want to thank for making this conference possible. In particular, we want to thank Barbara Hickernell, Kathy Chan, and Kevin Korpics of ECI for providing streamlined administration. Also, we owe many thanks to Barry Buckland and Jens Nielsen from the Steering Committee for their valuable support.

We hope you will enjoy the conference and your stay in Biarritz. Again, welcome to Metabolic Engineering IX and welcome to Biarritz!

Co-Chairs of the conference

Elmar Heinzle
Saarland University
Germany

Philippe Soucaille
University of Toulouse
France

Gregg Whited
Danisco
USA
The 2012 International Metabolic Engineering Award has been given to Professor Jay Keasling for his contributions to the field of metabolic engineering, through development of novel technologies and bioprocesses. Dr. Keasling is well known for his impressive work on metabolic engineering of yeast and \textit{E. coli} for production of the antimalarial drug artemisinin, which became the foundation needed for commercial production. He also has a number of other seminal contributions to the field, including metabolic engineering of microorganisms for production of advanced biofuels. Dr. Keasling has also pioneered the development of a number of advanced technologies that have enabled metabolic engineering, including a range of methods for controlled protein expression.

Dr. Keasling is the Hubbard Howe Jr. Distinguished Professor of Biochemical Engineering at the University of California, Berkeley, in the Departments of Bioengineering and Chemical and Biomolecular Engineering, senior faculty scientist and Associate Laboratory Director for Biosciences at Lawrence Berkeley National Laboratory, Chief Executive Officer of the Joint BioEnergy Institute (JBEI), and director of the Synthetic Biology Engineering Research Center (SynBERC). Dr. Keasling’s current research focuses on the metabolic engineering of microorganisms for degradation of environmental contaminants or for environmentally friendly synthesis of drugs, chemicals, and fuels.

Dr. Keasling received a B.S. in Chemistry and Biology from the University of Nebraska and M.S. and Ph.D. in Chemical Engineering from the University of Michigan, and did post-doctoral research in biochemistry at Stanford University. He is a member of the National Academy of Engineering. Dr. Keasling received the inaugural \textit{Biotech Humanitarian Award} from the Biotechnology Industry Organization in 2009, the 2007 \textit{Professional Progress Award} from the American Institute for Chemical Engineers, the first ever \textit{Scientist of the Year} award from Discover Magazine in 2006, and the \textit{Technology Pioneer} award from the World Economic Forum in 2005. Dr. Keasling is also the founder of Amyris, LS9, and Lygos.
2012 Jay Bailey Young Investigator Best Paper Award

Chris Henry

Winning Paper:  "High-throughput generation, optimization and analysis of genome-scale metabolic models"
Christopher S Henry (corresponding author), Matthew DeJongh, Aaron A Best, Paul M Frybarger, Ben Linsay & Rick L Stevens

Dr. Christopher Henry is a scientist in the Mathematics and Computer Science division at Argonne National Laboratory. He also has joint appointments at the University of Chicago and Northwestern University. Dr. Henry is an expert in metabolic modeling, flux balance analysis, and biochemical thermodynamics. He is the co-lead for the Microbial Science team of the DOE Knowledgebase, and he is the PI for the Model SEED resource. Currently, Dr. Henry is conducting research in automated metabolic model reconstruction and refinement, integration of omics data into biological models, and large-scale analysis of microbial community behavior. Dr. Henry received his B.S. in Chemical Engineering from the University of Dayton (2002), and his Ph.D. in Chemical Engineering from Northwestern University (2007).

In their article in Nature Biotechnology, Henry and colleagues describe a new web resource, called the Model SEED, for automated reconstruction of draft genome-scale metabolic models. The approach annotates the genes in a genome sequence, maps these genes to metabolic reactions, computes a 'biomass reaction' for simulating growth and then optimizes the model using several established techniques. Henry and colleagues apply this resource to create new genome-scale models for 130 diverse microbial genomes, ranging from metabolically self-sufficient bacteria to parasites that rely on their hosts to provide many essential metabolic functions. The authors show how the models can be used to improve genome annotation and to assess global trends in microbial metabolism. They also demonstrate how Biolog phenotype arrays and gene essentiality data may be used to validate these models and further boost accuracy using flux-balance-analysis-based data fitting techniques. Since its release with the publication of this manuscript in Nature Biotechnology, Model SEED has been applied by 1300 scientists worldwide to construct over 13,000 metabolic models.

This award was instituted in honor of Jay Bailey, a visionary of future directions in biotechnological research and a brilliant contributor to the founding and advancement of the field of metabolic engineering (see Metabolic Engineering 3, 393, 2001; Biotechnology and Bioengineering 79 (5), 2002). The purpose of the award is to recognize outstanding research accomplishments in the field of metabolic engineering by a young investigator.
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Sunday, June 3, 2012

15:00 – 18:00  Conference check-in (Le Bellevue Congress Center, Entrance Hall)

18:00 – 18:40  Plenary Lecture 1  
Vincent Schachter, Total Gas & Power, France  
Developing industrial biotechnology through strategic partnerships

18:40 – 19:20  Plenary Lecture 2  
Rolf Müller, Saarland University, Germany  
Genomics based engineering for the identification and optimization of bioactive microbial natural products

19:30 – 22:00  Welcome cocktail dinner and Poster Session

NOTES

• Technical sessions will be held in the Auditorium.
• Poster sessions will be held in Atlantique Room.
• Lunches will be held in the Rotonde Room.
• The conference banquet on Wednesday will be held in a Basque farmhouse in the countryside. Buses will depart promptly at 19:00 from Casino Municipal in front of the town hall and Hotel Plaza.
• Audiotaping, videotaping and photography of presentations are prohibited.
• Speakers – Please leave at least 5 minutes for questions and discussion.
• Please do not smoke at any conference functions.
• Turn your cellular telephones to vibrate or off during technical sessions.
• After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.
**Monday, June 4, 2012**

Breakfast at your hotel

09:00 – 09:40 **Plenary Lecture 3**  
**James Liao**, University of California Los Angeles, USA  
A tale of two butanols

09:40 – 12:10 **Session 1: Metabolic Engineering for Fuels and Chemicals**  
Sponsored by Total  
Jay Keasling, USA and Akihiko Kondo, Japan

09:40 – 10:10 **Ramon Gonzalez**, Rice University, USA  
Modular biosynthesis for the production of advanced fuels and chemicals

10:10 – 10:40 Coffee break / Posters available for viewing

10:40 – 11:10 **Akihiko Kondo**, Kobe University, Japan  
Development of microbial cell factories for the production of bio-fuels and bio-based chemicals through consolidated bioprocessing

11:10 – 11:40 **Donald E Trimbur**, LS9, USA  
Advances in the production of fuels and chemicals derived from fatty acid metabolism

11:40 – 12:10 **Bryan Rush**, Cargill, USA  
Turning a novel yeast into a platform host for industrial production of fuels and chemicals

12:10 Lunch on your own / Free afternoon

16:30 – 19:00 **Session 2: Metabolic Engineering for Chemicals and Materials**  
Sponsored by GS Caltex  
Friedrich Srienc, USA and George Chen, China

16:30 – 17:00 **Isabelle Meynia-Salles**, University of Toulouse, France  
Combination of rational metabolic engineering and evolutionary engineering to develop efficient cell factories for the production of chemicals

17:00 – 17:30 **Sheng Yang**, Shanghai Institutes for Biological Sciences, China  
Optimizing pentose utilization in Clostridia for improved solvents production from lignocellulosic hydrolystates

17:30 – 18:00 **Brian Pfleger**, University of Wisconsin-Madison, USA  
Metabolic engineering of bacteria for the production of alpha-olefins

18:00 – 18:30 **George Guo-Qiang Chen**, Tsinghua University, China  
Limitless opportunities for microbial production of hydroxyalkanoates based chemicals and materials

18:30 – 19:00 Discussion

19:00 – 22:00 Cocktail dinner and Poster Session  
(Authors of odd-numbered posters are asked to stay by their posters.)
**Tuesday, June 5, 2012**

Breakfast at your hotel

09:00 – 09:40  **Plenary Lecture 4**  
**Sven Panke**, ETH, Switzerland  
Assembling and optimizing *in vitro* pathways

09:40 – 12:15  **Session 3: Emerging Tools and Methods in Metabolic Engineering**  
Vassily Hatzimanikatis, Switzerland and Joseph J. Heijnen, The Netherlands

09:40 – 10:10  **Lothar Eggeling**, Forschungszentrum Jülich GmbH, Germany  
Metabolite sensors for single-cell isolation of producing bacteria

10:10 – 10:40  Coffee break / Posters available for viewing

10:40 – 11:10  **Ryan Gill**, University of Colorado, USA  
Towards writing genomes: Drafting, editing, revising and publishing

11:10 – 11:40  **Vassily Hatzimanikatis**, EPLF Lausanne, Switzerland  
Frameworks for the development and analysis of genome-scale kinetic models

11:40 – 12:10  **Friedrich Srienc**, University of Minnesota, USA  
Predicting evolution

12:15 – 14:00  Lunch

14:00 – 14:40  **Plenary Lecture 5**  
**Sang Yup Lee**, KAIST, Korea  
Systems metabolic engineering for chemicals and materials

14:40 – 17:10  **Session 4: Systems Biology and Metabolic Engineering**  
*Sponsored by Genomatica*  
Jens Nielsen, Sweden and Wolfgang Wiechert, Germany

14:40 – 15:10  **Bernhard Palsson**, University of California Berkeley, USA  
Expanded genome-scale models for metabolic engineering

15:10 – 15:40  **Jens Nielsen**, Chalmers Institute of Technology, Sweden  
Systems biology of metabolism: Enabling technologies for metabolic engineering of yeast

15:40 – 16:10  Coffee break / Posters available for viewing

16:10 – 16:40  **Steffen Klamt**, Max Planck Institute, Magdeburg, Germany  
Minimal cut sets as computational tool in metabolic engineering: novel theoretical results and their applications

16:40 – 17:10  **Amit Deshmukh**, TU Delft, The Netherlands  
Understanding *in vivo* kinetics and transport through stimulus response experiments: *Penicillium chrysogenum* as host strain

17:10 – 19:00  Break

19:00 – 20:30  Dinner (Rotonde)

20:30 - 22:30  Poster Session / Social Hour  
(Authors of even-numbered posters are asked to stay by their posters.)
Wednesday, June 6, 2012

Breakfast at your hotel

09:00 – 09:40  **Plenary Lecture 6**
Jeff Hasty, University of California San Diego, USA
Engineered gene circuits: From oscillators to synchronized clocks and biopixels

09:40 – 12:10  **Session 5: Synthetic Biology and Metabolic Engineering**
An-Ping Zeng, Germany and Christopher Voigt, USA

09:40 – 10:10  **An-Ping Zeng**, Institute of Bioprocess and Biosystems Engineering, Germany
Structure-based metabolic engineering and synthetic biology for efficient strain development

10:10 – 10:40  Coffee break / Posters available for viewing

10:40 – 11:10  **Christopher Voigt**, Massachusetts Institute of Technology, USA
Programming bacteria

11:10 – 11:40  **Huimin Zhao**, University of Illinois at Urbana-Champaign, USA
Pathway engineering via synthetic biology

11:40 – 12:10  **Hal Alper**, The University of Texas at Austin, USA
Synthetic control of transcription: From hybrid promoters to promoter engineering to synthetic operon design

12:15 – 14:30  Lunch

14:30 – 17:00  **Session 6: Metabolic Engineering of Industrial Microorganism**
Lars Nielsen, Australia and Christoph Wittmann, Germany

14:30 – 15:00  **Octavio Ramirez**, UNAM, Mexico
Metabolic engineering strategies for overcoming environmental heterogeneities during process scale-up

15:00 – 15:30  **Christoph Wittmann**, Technical University Braunschweig, Germany
Making use of models – In-silico driven metabolic engineering of industrial microorganisms

15:30 – 16:00  Coffee break / Posters available for viewing

16:00 – 16:30  **Mark Burk**, Genomatica, USA
Sustainable production of industrial chemicals using microbial biocatalysts: 1,4-butanediol

16:30 – 17:00  **Hiroshi Shimizu**, University of Osaka, Japan
Genome-wide multi-omics analysis of ethanol stress tolerant strain of *Escherichia coli* created by evolution engineering

17:00 – 17:45  Metabolic Engineering Award 2012 Lecture

17:45 – 17:55  **Jay Bailey Young Investigator Best Paper Award Presentation**

19:00 – 22:00  Conference Gala Dinner (at a Basque Farmhouse in the countryside)
Buses will depart promptly from Casino municipal (in front of the town hall and Hotel Plaza) at 19:00
Thursday, June 7, 2012

Breakfast at your hotel

09:30 – 12:00  **Session 7: Industrial Applications of Metabolic Engineering**
Ramon Gonzalez, USA and Oskar Zelder, Germany

09:30 – 10:00  **Stefan Turk**, DMS Biotechnology Center, The Netherlands
Fermentative production of 6-amino-caproic acid: Towards sustainable Nylon-6

10:00 – 10:30  **Ethel Jackson**, DuPont, USA
Engineering of metabolic pathways and global regulators of *Yarrowia lipolytica* to produce high value commercial products

10:30 – 11:00  Coffee break

11:00 – 11:30  **Stefan de Kok**, Amyris, USA
High throughput pathway engineering and screening for the high volume production of renewable chemicals in *Saccharomyces cerevisiae*: the industrialization of synthetic biology

11:30 – 12:00  **Esben H. Hansen**, Evolva Biotech A/S, Denmark
In-cell enzymatic glycosylation: A way to improve productivity of heterologous biosynthesis pathways in micro-organisms.

12:00 – 13:20  Lunch

13:20 – 14:00  **Plenary Lecture 7**
**Gregory Stephanopoulos**, MIT, USA
New frontiers of metabolic engineering: Linking cancer and metabolism via isotope labeling and network analysis

14:00 – 16:30  **Session 8: Metabolic Engineering for Cell Culture and for Health**
Martin Fussenegger, Switzerland and Michael Betenbaugh, USA

14:00 – 14:30  **Martin Fussenegger**, ETH, Switzerland
Reprogramming mammalian cells for therapeutic applications

14:30 – 15:00  **Michael Betenbaugh**, Johns Hopkins University, USA
‘Omics approaches to enhance mammalian cell metabolic engineering

15:00 – 15:30  Coffee Break

15:30 – 16:00  **Christian M. Metallo**, University of California San Diego, USA
Metabolic regulation of human cells by oncogenes and the microenvironment

16:00 – 16:30  **Maciek Antoniewicz**, University of Delaware, USA
Dynamic $^{13}$C-metabolic flux analysis and parallel labeling experiments elucidate the rewiring of metabolic fluxes in CHO cell cultures

16:30  Closing Remarks
Posters

1. **A systems biology approach to characterize *Pseudomonas putida*’s potential as whole cell biocatalyst**
   Birgitta E. Ebert, RWTH Aachen University, Germany

2. **Enabling pyrolytic substrate utilization for the production of biorenewable fuels and chemicals**
   Laura R. Jarboe, Iowa State University, USA

3. **Isotopically nonstationary 13C flux analysis of Myc-induced metabolic reprogramming in B-cells**
   Taylor A Murphy, Vanderbilt University, USA

4. **Modular-based reconstruction of allosteric protein for dynamic control of cellular metabolism**
   Zhen Chen, Hamburg University of Technology, Germany

5. **Dissection and engineering of xylose-metabolic pathway in Clostridium acetobutylicum**
   Yang Gu, Chinese Academy of Sciences, China

6. **DNA supercoiling-mediated mechanism of L-glutamine overproduction in *Escherichia coli***
   Mikiro Hayashi, Kyowa Hakko Bio Co., Ltd., Japan

7. **Development of gamma-aminobutyric acid (GABA) overproducing recombinant *Escherichia coli* by engineering of glutamate decarboxylase and GABA transporter**
   SoonHo Hong, University of Ulsan, Korea

8. **5-aminolevulinic acid accumulation from glucose in Engineering *Escherichia coli***
   Qingsheng Qi, Shandong University, China

9. **Yeasts as biocatalysts for the desulfurization of xenobiotics**
   Tomas Linder, Swedish University of Agricultural Sciences, Sweden

10. **Bacterial copper biosensor construction through bacterial two-component system engineering**
    SoonHo Hong, University of Ulsan, Korea

11. **Synthesis of pure meso-2,3-butanediol from crude glycerol using an engineered metabolic pathway in *Escherichia coli***
    Soojin Lee, Sogang University, Korea

12. **Control of phosphate metabolism in a xylose-fermenting yeast strain improves ethanol production from xylose.**
    Tomohisa Hasunuma, Kobe University, Japan

13. **Recombinant protein products causing metabolic interferences in the host CHO cells**
    Erno Pungor Jr., BioMarin Pharmaceutical Inc, USA

14. **Reconstruction of sugar utilization pathways and regulons in solventogenic clostridia**
    Chen Yang, Chinese Academy of Sciences, China

15. **Regulation of metabolic fluxes in bacteria by acetylation of metabolic enzymes**
    Chen Yang, Chinese Academy of Sciences, China
16. Quorum sensing-based IPTG-free system for production of bisabolene as a precursor of advanced biofuels in engineered E. coli
   Han Min Woo, Lawrence Berkeley National Laboratory / Korea Institute of Science and Technology, USA/Korea

17. Rational design of $^{13}$C-Labeling experiments for metabolic flux analysis using elementary metabolite unit-basis vectors (EMU-BV)
   Scott B. Crown, University of Delaware, USA

18. Advances in metabolic flux analysis: Parallel labeling experiments and dynamic metabolic flux analysis
   Robert W. Leighty, University of Delaware, USA

19. Tandem mass spectrometry: A new frontier in $^{13}$C-metabolic flux analysis
   Jungik Choi, University of Delaware, USA

20. Consolidated bioprocessing for bioethanol production from agricultural waste biomass using a diploid yeast strain with optimized cellulase expression
   Ryosuke Yamada, Kobe University, Japan

21. Co-expression of acca, fabd and thioesterase genes for increasing intracellular long-chain fatty acids in pseudomonas aeruginosa and Escherichia coli
   Sunhee Lee, Sogang University, Korea

22. A quantitative, graded dominant mutant approach for probing protein function and gene regulation
   Amanda M. Lanza, The University of Texas at Austin, USA

23. Metabolic engineering of Escherichia coli to overproduce 10-hydroxystearic acid from oleic acid
   Eun-Yeong Jeon, Ewha Womans University, Korea

24. Quantitative Quenching Evaluation and Direct Intracellular Metabolite Analysis of Penicillium chrysogenum Industrial Production Cultivations
   Timo Hardiman, Sandoz GmbH, Austria

25. Metabolic engineering of Corynebacterium glutamicum for biotransformation of ¥á-keto acid precursors into non-proteinogenic amino acids
   Jin-Byung Park, Ewha Womans University, Korea

26. Engineering streptomyces pristinaespiralis for improved pristinamycin production
   Yinhua Lu, Chinese Academy of Sciences, China

27. Metabolic flux analysis of cyanobacteria on various trophic conditions
   Tsubasa Nakajima, Osaka University, Japan

28. Effect of metabolic inhibitors on yeast central metabolism
   Fumio Matsuda, Kobe University, Japan

29. Genome-scale reconstruction of metabolic network for yarrowia lipolytica and its applications in understanding of oleaginous yeasts
   Qiang Hua, East China University of Science and Technology, China

30. Towards high-throughput single cell growth optimization and production analysis using picoliter bioreactors
   Wolfgang Wiechert, Forschungszentrum Jülich GmbH, Germany
| 31. | Engineering inhibitor tolerance for the production of biorenewable fuels and chemicals  
Laura R. Jarboe, Iowa State University, USA |
| 32. | Efficient production of a model short peptide surfactant in high cell density *Escherichia coli* BL21(DE3) culture from sucrose feedstock  
Michele Bruschi, The University of Queensland, Australia |
| 33. | Alkane-biofuel production with engineered cyanobacterial pathways  
András Pásztor, University of Turku, Finland |
| 34. | Improvement of butanol production from xylose mother liquor by engineering xylose metabolic pathway in *Clostridium acetobutylicum* EA2018  
Yu Jiang, Chinese Academy of Sciences, China |
| 35. | Development of recombinant Klebsiella pneumoniae for the enhanced 2,3-butanediol production  
Borim Kim, Sogang University, Korea |
| 36. | Engineering corynebacterium glutamicum for L-Valine production  
Bastian Blombach, University of Stuttgart, Germany |
| 37. | Genetic engineering to enhance the Ehrlich pathway and alter carbon flux for increased isobutanol production by *Saccharomyces cerevisiae*  
Jun Ishii, Kobe University, Japan |
| 38. | Manipulation of the major lactococcal glucose-PTS properties by single base substitution  
Ana Rute Neves, Universidade Nova de Lisboa/Instituto de Biologia Experimental e Tecnológica (ITQB-UNL/IBET), Portugal |
| 39. | Functional implementation of the posttranslational secb-seca protein targeting pathway in *Bacillus subtilis*  
Liuyang Diao, Chinese Academy of Sciences, China |
| 40. | Predictive design of mrna translation initiation region to control prokaryotic translation efficiency  
Sang Woo Seo, Pohang University of Science and Technology (POSTECH), Korea |
| 41. | Reprograming translational process for functional expression of heterologous enzymes in *Escherichia coli*  
Byung Eun Min, Pohang University of Science and Technology (POSTECH), Korea |
| 42. | Synthetic RNA devices to expedite evolution of metabolite-producing *Escherichia coli*  
Jina Yang, Pohang University of Science and Technology (POSTECH), Korea |
| 43. | In silico aid metabolic engineering design for improving strain performance of *Bacillus subtilis* on its representative products  
Tong Hao, Tianjin University, China |
| 44. | In silico platform for rational heterologous pathway design of nonnative metabolites using genome-metabolic networks information  
Sunisa Chatsurachai, Osaka University, Japan |
| 45. | Exo-metabolomics: An underestimated tool in systems biology  
Stephan Noack, Forschungszentrum Jülich GmbH, Germany |
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<td>A computational method for exploring extensive biosynthetic pathways</td>
<td>Michihiro Araki, Kyoto University, Japan</td>
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<td>A multi-tissue genome-scale metabolic modeling for analysis of whole plant systems</td>
<td>Cristiana G.O. Dal’Molin, The University of Queensland, Australia</td>
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<td>Development of Enterobacter aerogenes mutants for enhancing 2,3-butanediol production</td>
<td>Moo-Young Jung, Korea university, Korea</td>
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<td>Evolving and engineering actinobacillus succinogenes for succinate production from lignocellulose hydrolysate</td>
<td>Nikolas McPherson, Michigan State University, USA</td>
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<td>Identification of acetogenic 2,3-butanediol and lactate production pathways and reconstruction in metabolically engineered <em>E. coli</em></td>
<td>Wendy Yiting Chen, LanzaTech NZ Ltd, New Zealand</td>
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92. Metabolic engineering of *Escherichia coli* for the fumaric acid production by aerobic system
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93. Modulation of endogenous pathways enhances bioethanol yield and productivity in *Escherichia coli*
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94. Engineering of Clostridium acetobutylicum ATCC 824 towards a mixed alcohol producer
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96. Biological hydrogen production beyond current limits
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98. Pathways for synthesis of advanced biofuels
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99. Yeast development for cellulosic ethanol production
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100. Toward development of an optimal modular cell for production of chemicals and biofuels
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101. A metabolic pathway module for formate conversion to biofuel precursors in *Escherichia coli*
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102. Reduction of glycerol formation during anaerobic growth of a *Saccharomyces cerevisiae* strain engineered to produce formate
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103. The metabolic load of recombinant protein expression in CHO cells
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104. Control of a long-duration high-density perfusion cell culture using continuous oxygen uptake rate
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105. Metabolic flux analysis of HEK293 cells producing viral vectors for gene therapy against alcoholism
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107. Selecting thermophilic bacilli as hosts for white biotechnology applications
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108. Synthetic metabolic engineering of corynebacterium glutamicum for bio-based production of 1,5-diaminopentane
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109. Unravelling the Leloir pathway in bifidobacterium bifidum
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110. Producing 1-octanol and tolerating n-butanol with Pseudomonas putida in industry-like applications
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111. Enhanced production of native-sized recombinant spider dragline silk protein in *Escherichia coli* through synthetic biology approach using orthogonal ribosome
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112. DNA guided assembly line
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113. Oligo-based Gibson assembly – a new way of creating expression variability
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114. Engineering the transcription machinery of *E. coli* to enable efficient functional screening of heterologous or metagenomic libraries
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115. The development of a genetically encoded, function-based taxol biosensor
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117. Systems-level analysis of baculovirus-host interactions: From genomic to metabolomic decomposition
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119. Metabolic control analysis of the central carbon pathway in optimally grown *E. coli*
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120. The metabolic response to stepwise ethanol increase in *S. Cerevisiae*
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122. Interrelation between 4-hydroxyproline production and the central carbon metabolism in recombinant Escherichia coli expressing 2-oxoglutarate-dependent proline-4-hydroxylase
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123. Smart, small metabolite regulated, promoters for optimizing Saccharomyces cerevisiae industrial bioprocesses
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124. Towards a platform organism for terpenoid production – in silico comparison of E. Coli and S. Cerevisiae as potential hosts
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125. Are genes regulated or constitutive? An experimental-based contribution
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126. Metabolic model-based prediction of engineering targets for increased production of heterologous proteins
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128. Flux regulation at a primary metabolic node: Lessons for acetyl-coa derived products
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129. Scaffolding platform for expression of P450 enzymes
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130. Metabolomic and metabolic flux profiling of recombinant Pichia pastoris growing on glucose: methanol mixtures
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131. Comparison of the productivity of a new human cell line in different steady states of continuous cultivations using MFA
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132. A quantitative metabolomics study of the oxygen availability impact on recombinant Pichia pastoris central carbon metabolism
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133. Metabolomics and 13C-metabolic flux analysis of a xylose-consuming Saccharomyces cerevisiae strain under aerobic and anaerobic conditions
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134. Systems biotechnology of Bacillus megaterium for recombinant protein production
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154. Use of transcription factors to visualize small-molecules at the single cell level, and
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158. Rational cell design for small molecule synthesis by pseudomonas putida
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160. The protein acetylation pathway and central metabolism of \textit{Escherichia coli}: The role of
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186. Calculation of constrained minimal cut sets including regulatory information by the utilization of binary linear programming
Christian Jungreuthmayer, Austrian Centre of Industrial Biotechnology (ACIB), Austria

187. Recombinant whole cell production of human tetrahydrocannabinol metabolites
Torsten Tobias Arndt, Technische Universität Dortmund, Germany

188. Predictive metabolic network models for industrial bioprocesses – accelerating process design and improving host cell engineering
Jens Niklas, Insilico Biotechnology AG, Germany

189. Metabolic engineering of E. coli for the production of UDP-glucose using permeabilized cells
Christian Weyler, Saarland University, Germany

190. Identification and characterization of a novel diterpene gene cluster in Aspergillus nidulans
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191. Exploring the allosteric mechanism of dihydrodipicolinate synthase by reverse engineering of the allosteric inhibitor binding sites and its application for lysine production
Zhen Chen, Hamburg University of Technology, Germany

192. Proteomic analysis and manipulation of the central metabolism for optimizing the production of optically active (R,R)-2,3-butanediol by Paenibacillus polymyxa
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194. Exploring the allosteric mechanism of dihydrodipicolinate synthase by reverse engineering of the allosteric inhibitor binding sites and its application for lysine production
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195. Enhanced butyric acid productivity by 2-deoxy-D-glucose-adapted Clostridium tyrobutyricum on glucose and xylose mixtures with non-diauxic growth
Han Min Woo, Korea Institute of Science and Technology, Republic of Korea

196. Bio-based production of polyamide 6 and polyamide 6,6 monomers
Liang Wu, DSM Biotechnology Center, The Netherlands

197. Improvement of butanol production from xylose mother liquor by engineering xylose metabolic pathway in Clostridium acetobutylicum EA2018
Yu Jiang, Chinese Academy of Sciences, China

198. The metabolic response to stepwise ethanol increase in S. cerevisiae,
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199. Metabolic changes in murine and human cardiomyocytes induced by subtoxic concentrations of doxorubicin
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200. Quantitative quenching evaluation and direct intracellular metabolite analysis of penicillium chrysogenum industrial production cultivations
Timo Hardiman, Sandoz GmbH, SU Development Anti-Infectives, Austria

201. Metabolic engineering for pathway rewiring and enhancement of spinosyn biosynthesis in Saccharopolyspora spinosa
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202. Analysis of constraint based in silico metabolic model of rhodococcus erythropolis for efficient biodesulfurization
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203. Mammalian systems biotechnology for characterizing CHO cell and HESC cultures
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204. Discovery of a yet unknown mammalian pathway linking metabolism to immunity: Immune response gene 1 (IRG1) catalyzes the synthesis of the antimicrobial compound itaconic acid
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205. Unraveling in vivo kinetics of penicillin biosynthesis pathway
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206. New insights into substrate supply and regulation of FK506 biosynthesis and their implications for bioprocess development and drug discovery
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207. Flux and metabolite flexibility in Escherichia coli at seconds time scale in response to rapid shifts of substrate excess
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208. Combination of metabolic engineering and enzyme fusion technology for Improved production of amorphadiene in Saccharomyces cerevisiae
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209. Application of metabolome data and thermodynamics for the development of efficient xylose-fermenting *Saccharomyces cerevisiae*
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210. Enhanced xylan degradation and xylitol production by *Candida tropicalis* overexpressing fungal xylanase
    Chun Li, Beijing Institute of Technology, China

211. Use both rational metabolic engineering and adaptive evolutionary to select an efficient *E. coli* cell factory for the production of 1.3-propanediol from glucose
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212. In vivo carbon fluxes in *Schizosaccharomyces pombe*: Applying $^{13}$C metabolic flux analysis in parallel small-scale continuous cultivations
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213. New molecular toolkit for yeast engineering
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