

Final Program

Metabolic Engineering V: Genome to Product

September 19 – 23, 2004

Squaw Creek Resort and Conference Center
P.O. Box 3333
400 Squaw Creek Road
Olympic Valley, Ca. 96146
Guest Fax: (530) 581-6632, Guest tel: (530) 583-6300

Conference Chair:

James Liao
University of California, Los Angeles, USA

Co-Chairs:

Douglas Cameron
Cargill, USA

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Technical University of Delft, The Netherlands

ECI

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Sunday, September 19, 2004

15:00 – 18:00	Registration Setup Posters (Session A)
17:00 – 18:00	Reception
18:00 – 18:10	Opening Remarks
18:10 – 19:00	Opening Keynote Lecture The Road to Stockholm: A Nobel Mission <u>Louis J. Ignarro</u> , University of California at Los Angeles, USA
19:00 – 20:30	Dinner
20:30 – 22:30	Poster Session A* and Social Hour Chairs: Christina Chan , Michigan State University, USA Kristala Jones Prather , MIT, USA

* Sponsored by the Society for Biological Engineering (SBE)

- ? **All General Sessions will be held in the Grand Sierra Ballroom**
- ? **All Poster Sessions will be held in the Grand Sierra Ballroom**
- ? **All meals with the exception of Wednesday banquet will be held in the Cascades**
- ? **The Wednesday banquet will be held in the Alpine Ballroom**

Monday, September 20, 2004

Advances in Metabolic Engineering

07:00 – 08:00 Breakfast Buffet

08:00 – 08:50 Keynote Lecture
Theory and Empiricism in Metabolic Engineering: A View From the Trenches
John Pierce, DuPont, USA

08:50 – 09:00 Break

Session I: Advances in Production of Metabolites

Chairs: **Charles Nakamura**, DuPont, USA

Friedrich Srienc, University of Minnesota, USA

09:00 – 09:30 **Novel Metabolic Pathway for Production of 3-Hydroxypropionic Acid by Fermentation**
Ravi Gokarn, Cargill, USA

09:30 – 10:00 **Metabolic Pathway Engineering for the Production of Fine Chemicals**
Oskar Zelder, BASF, Germany

10:00 – 10:30 Coffee Break

10:30 – 11:00 **Metabolic Engineering for Industrial Production of Glucosamine and N-Acetylglucosamine in E. Coli**
Ming-De Deng, Biotechnical Resources, USA

11:00 – 11:30 **Diversity-oriented metabolic engineering of Escherichia coli: Production of Functionalized cyclohexadiene-trans-diols from Chorismate**
Johannes Bongaerts, DSM, The Netherlands

11:30 – 12:00 Discussion

12:30 – 14:00 Luncheon

13:30 – 15:00 Free Time, Poster viewing

Monday, September 20, 2004 (continued)

Session II: Host Physiology and Biochemistry: Current and Potential Industrial Microbes

Chairs: **Kwang Myung Cho**, CJ Corp, Korea
Fernando Valle, Genencor, USA

- 15:00 – 15:30 **Metabolic Engineering to Enhance Carbon Sequestration and Biohydrogen Production by nonsulfur purple bacteria**
F. Robert Tabita, Ohio State University, USA
- 15:30 – 16:00 **Saccharomyces Cerevisiae: A Versatile Biocatalyst for the Production of Chemicals and Fuels**
Jack Pronk, Delft University of Technology, The Netherlands
- 16:00 – 16:30 Coffee Break
- 16:30 – 17:00 **Advances in Physiological Understanding of Thermophilic Saccharolytic Anaerobic Bacteria Relevant to their use as Industrial Microorganisms**
Lee R. Lynd, Dartmouth College, USA
- 17:00 – 17:30 **New Approaches in the Engineering Biosynthesis of Polyketides**
Yi Tang, University of California at Los Angeles, USA
- 17:30 – 18:00 **Identification of Target Genes to Optimize Amino Acid Production by Global Gene Expression Analysis**
Volker F. Wendisch, Research Center Juelich, Germany
- 18:00 – 18:30 Discussion
- 18:30 – 20:00 Dinner
- 20:00 – 23:00 Poster Session A and Social Hour

Tuesday, September 21, 2004

Evolutionary Strategies in Metabolic Engineering

07:00 – 08:00 Breakfast

08:00 – 08:50 Keynote Lecture
A Reductionist Approach to E. coli Genomics
Frederick R. Blattner, University of Wisconsin, USA

08:50 – 09:00 Break

Session III: Evolution Strategies in Metabolic Engineering

Chairs: **Ryan Gill**, University of Colorado, USA
Huiming Zhao, University of Illinois, USA

09:00 – 09:30 **Evolutionary Pathway Optimization in Escherichia Coli**
Gregory Stephanopoulos, Massachusetts Institute of Technology, USA

09:30 – 10:00 **Combining Genome-Scale Reconstructions, OptKnock and Adaptive Evolution to Design Production Strains**
Bernhard Palsson, University of California at San Diego, USA

10:00 – 10:30 Coffee Break

10:30 – 11:00 **Metevol, A Powerful In Vivo Molecular Evolution Tool to Optimize Enzymes and Metabolic Pathways**
Phillipe Soucaille, METabolic EXplorer SA, France

11:00 – 11:30 **Biosynthetic Pathway Engineering for the Production of Natural and Unnatural Compounds in Recombinant Cells**
Claudia Schmidt-Dannert, University of Minnesota, USA

11:30 – 12:00 Discussion

12:00 – 13:30 Luncheon

13:30 – 14:00 Setup Posters (Session B)

14:00 – 18:30 Optional Recreation, Free Time, Poster Viewing

18:30 – 19:30 Dinner

20:00 – 22:00 Poster Session B* and Social Hour
Chairs: **Kristala Jones Prather**, MIT, USA
Christina Chan, Michigan State University, USA

Wednesday, September 22, 2004

Design and Analysis in Metabolic Engineering

07:00 – 08:00 Breakfast Buffet

08:00 – 08:50 Keynote Lecture
Re-Engineering Bacteria for Fuels and Chemicals
Lonnie Ingram, University of Florida, USA

08:50 – 09:00 Break

Session IV: Rational Design in Metabolic Engineering

Chairs: **Ramon Gonzalez**, Iowa State University, USA
Ravi Gokarn, Cargill, USA

09:00 – 09:30 **Synthesis of Biosynthesis**
John Frost, Michigan State University, USA

09:30 – 10:00 **Co-Factor Engineering as a metabolic engineering tool to increase process productivity**
Ka-Yiu San, Rice University, USA

10:00 – 10:30 Coffee Break

10:30 – 11:00 **Rational Improvement Strategy of Metabolic Pathway based on Bioinformatic data in *Saccharomyces Cerevisiae***
Hiroshi Shimizu, Osaka University, Japan

11:00 – 11:30 **Development of Homofermentative Succinic Acid Producer by Metabolic Engineering**
Sang Yup Lee, KAIST, Korea

11:30 – 12:00 Discussion

12:30 – 14:00 Luncheon

Wednesday, September 22, 2004 (continued)

Session V: Bioinformatics, Systems Analysis, and X-omics in Metabolic Engineering

Chairs: **Vassily Hatzimanikatis**, Northwestern University, USA
Costas Maranas, Pennsylvania State University, USA

- 14:00 – 14:30 **The Metacyc Pathway Database: A Bioinformatics Tool for Metabolic Engineering**
Ron Caspi, SRI International, USA
- 14:30 – 15:00 **Hiding Behind the Population average- Cell Cycle Dynamics of Energy Metabolism During the Lifelines of Individual Yeast Cells**
Matthias Reuss, University Stuttgart, Germany
- 15:00 – 15:30 **The Next Stage of Flux Analysis: Model-Independent Fluxome Profiling**
Uwe Sauer, Swiss Federal Institute of Technology, Switzerland
- 15:30 – 16:00 Coffee Break
- 16:00 – 16:30 **Metabolomics of Recombinant Yeast: Fluxes, Gene Expression and Discreet Mathematical Model for Gene Regulation of Metabolism**
Juan A. Asenjo, University of Chile, Chile
- 16:30 – 17:00 **Unveiling Regulatory Networks of Secondary Metabolism by Integrating Gene Perturbations, Transcriptome Dynamics Analysis and Mathematical Modeling**
Wei-shou Hu, University of Minnesota, USA
- 17:00 – 17:30 **Development of Experimental Methods for the Assessment of the In-Vivo Kinetic Properties of Microbial Metabolism; Application to Saccharomyces Cerevisiae and Penicillium Chrysogenum**
Walter van Gulik, Delft University of Technology, The Netherlands
- 17:30 – 18:00 Discussion and Coffee Break
- 18:00 – 18:45 **Merck Award Lecture**
Jens Nielsen, Technical University of Denmark, Denmark
- 19:00 – 21:00 Banquet
- 21:00 – 22:30 Poster Session B and Social Hour

Thursday, September 23, 2004

Future and New Frontiers in Metabolic Engineering

07:00 – 08:00 Breakfast Buffet

Session VI: New Frontiers in Metabolic Engineering

Chairs: **Juan A. Asenjo**, University of Chile, Chile

Jacqueline Shanks, Iowa State University, USA

08:00 – 08:30 **Metabolic Engineering in Eucaryotes: Modifying Glycosylation Pathways for Improved Biotherapeutics**

Michael Betenbaugh, Johns Hopkins University, USA

08:30 – 09:00 **Genomic View of Differentiation and Lineage Plasticity of Human Hematopoietic Stem Cells**

E. Terry Papoutsakis, Northwestern University, USA

09:00 – 09:30 Coffee Break

09:30 – 10:00 **Metabolic Engineering of Microbes for Production of Terpenoid Drugs**

Jay Keasling, University of California at Berkeley, USA

10:00 – 10:30 **Metabolic Engineering for Cell-Free Production of Pharmaceutical Proteins with Multiple Disulfide Bonds**

James Swartz, Stanford University, USA

10:30 – 11:00 **Designer Seeds: Enhancing Free Tryptophan by Manipulation a Single Key Enzyme**

Lisa Weaver, Monsanto, USA

11:00 – 11:30 Closing Keynote Lecture

Discovery and Optimization of Metabolic Pathways

Steve Briggs, Diversa, USA

11:30 – 12:00 Discussion, Future Directions and Adjournment

12:30 – 14:00 Luncheon

14:00 – 16:00 Business Meeting