Metabolic Engineering IX: Metabolic Engineering and Synthetic Biology 2012

Biarritz, France
3 – 7 June 2012

Editors:

E. Heinzle
P. Soucaille

G. Whited

# TABLE OF CONTENTS

## PLENARY LECTURE 1

Developing Industrial Biotechnology Through Partnerships .................................................. 1  
*Vincent Schachter*

## PLENARY LECTURE 2

Genomics Based Engineering for the Identification and Optimization of Bioactive Microbial Natural Products ................................................................. 25  
*Rolf Müller*

## SESSION 1: METABOLIC ENGINEERING FOR FUELS AND CHEMICALS

Development of Microbial Cell factories for Production of Biofuels and Bio-based Chemicals through Consolidated Bioprocessing ................................................................. 56  
*Akihiko Kondo*

Advances in the Production of Fuels and Chemicals Derived from Fatty Acid Metabolism ................................................................. 73  
*Donald Trimbur*

Turning a Novel Yeast into a Platform Host for Industrial Production of Fuels and Chemicals 91  
*Bryan Rush*

## SESSION 2: METABOLIC ENGINEERING FOR CHEMICALS AND MATERIALS

Optimizing Pentose Utilization in Clostridia for Improved Solvents Production from Lignocellulosic Hydrolysates ................................................................. 106  
*Sheng Yang*

Metabolic Engineering of Bacteria for the Production of alpha-olefins ................................................................. 122  
*Brian F. Pfleger*

Limitless Opportunities for Microbial Production of Hydroxyalkanoates Based Chemicals and Materials ................................................................. 139  
*George Guo, Qiang Chen*

## SESSION 3: EMERGING TOOLS AND METHODS IN METABOLIC ENGINEERING

Monitoring Intracellular Concentrations of Small Molecules ................................................................. 157  
*Lothar Eggeling*

## SESSION 4: SYSTEMS BIOLOGY AND METABOLIC ENGINEERING

Minimal Cut Sets as Computational Tool in Metabolic Engineering ................................................................. 168  
*Steffen Klamt*

Understanding In-vivo Kinetics and Transport Through Stimulus Response Experiments Penicillium chrysogenum as Host Strain ................................................................. 191  
*Amit Deshmukh*

## SESSION 5: SYNTHETIC BIOLOGY AND METABOLIC ENGINEERING

Structure-based Metabolic Engineering and Synthetic Biology for Efficient Strain Development ................................................................. 216  
*An Ping Zeng*

Pathway Engineering via Synthetic Biology ................................................................. 233  
*Huimin Zhao*
Synthetic Control of Transcription: From Hybrid Promoters to Promoter Engineering to Synthetic Operon Design .......................................................................................................................... 257
Hal Alper

SESSION 6: METABOLIC ENGINEERING OF INDUSTRIAL MICROORGANISM

Sustainable Production of Industrial Chemicals Using Microbial Biocatalysts: 1,4-Butanediol .......................... 279
Mark Burk

SESSION 7: INDUSTRIAL APPLICATIONS OF METABOLIC ENGINEERING

Towards Sustainable Nylon-6: Fermentative Production of 6-Aminocaproic Acid ................................. 293
Stefan Turk, Axel Trefzer, Elly Raemakers, Lian Wu, Monika Müller, Margarita Temudo, Henk Noorman
Engineering of Metabolic Pathways and Global Regulators of Yarrowia lipolytica to Produce High Value Commercial Products ................................................................. 310
Ethal Jackson
In-cell Enzymatic Glycosylation: A Way to Improve Productivity of Heterologous Biosynthesis Pathways in Micro-Organism .......................................................... 326
Esben Hansen

SESSION 8: METABOLIC ENGINEERING FOR CELL CULTURE AND FOR HEALTH

Omics Approaches To Mammalian Cell Metabolic Engineering ................................................................. 347
Michael Betenbaugh
13C Metabolic Flux Analysis of CHO Cells with Parallel Labeling Experiments ..................................... 457
Maciek Antoniewicz

Author Index