

Program

Biochemical Engineering XVI: Past, Present, and Future of Biochemical Engineering

**July 5-9, 2009
Burlington, Vermont, USA**

Conference Chairs

Anne Skaja Robinson
University of Delaware

Eugene Schaefer
Johnson & Johnson BIO/Centocor



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Sheraton Burlington Hotel and Conference Center

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Notes and Room Locations

- Technical Sessions will be in the Emerald Ballroom
- Poster Sessions will be in the Lake Champlain Exhibition Hall
- Audiotaping, videotaping and photography of presentations are strictly 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.
- Be sure to make any corrections to your name/contact information on the Master Participant List or confirm that the listing is correct. A corrected copy will be sent to all participants after the conference.

Sunday, July 5, 2009

- 10:00 – 18:00 Registration (Diamond Foyer)
- 13:00 – 13:15 Opening Remarks from the conference co-chairs
Anne Skaja Robinson (University of Delaware)
Gene Schaefer (J&J Centocor R & D)
- 13:15 – 14:00 **Keynote Address**
Matt Croughan (Keck Graduate Institute)
Evolution in bioprocessing, from cells to processes to corporate structures
- 14:00 – 15:30 **FRONTIERS IN STEM CELL BIOENGINEERING**
Session Chair: **Bala Rao** (North Carolina State University)
- Henry Yang** (Singapore Immunology Network)
Integrated computation approach to unravel novel growth factors relevant for pluripotency and differentiation of human embryonic stem cells
- Sharon Gerecht** (Johns Hopkins University)
Vascular regeneration: Engineering the stem cell microenvironment
- William M. Miller** (Northwestern University)
Progress towards culture-derived platelet production from blood stem cells
- 15:30 – 16:00 Coffee break
- 16:00 – 17:00 **Biochemical Engineering Journal Young Investigator Award Lecture**
Kelvin Lee (University of Delaware)
Enhanced secretion via translation rate engineering
- 17:30 – 17:45 Board buses to travel to Burlington Harbor for dinner cruise on *Spirit of Ethan Allen*
- 18:30 – 21:00 Dinner Cruise on *Spirit of Ethan Allen*
Note: Boat leaves promptly at 18:30
- 21:00 – 21:30 Buses return to Sheraton Hotel

Monday, July 6, 2009

06:30 – 08:00

Breakfast buffet

08:00 – 09:30

MOLECULAR DESIGN, ENGINEERING, AND DISPLAY TECHNOLOGIES

Session Chairs: **Patrick Daugherty** (University of California, Santa Barbara)
Jeonghoon Sun (Amgen, Protein Science)

Gunasekaran (Guna) Kannan (Amgen)

Enhancing Antibody Fc Heterodimer Formation through Protein-Protein Interface Engineering: Design of Bispecific Molecules and Monovalent IgG

François Baneyx (University of Washington)

Protein-aided fabrication of functional nanostructures for biology & medicine

Scott Banta (Columbia University)

The beta roll peptide as a novel allosterically-regulated scaffold for biomolecular recognition

09:30 – 10:00

Coffee break

10:00 – 10:45

Keynote Address

Dane Wittrup (Massachusetts Institute of Technology)

Design and construction of a highly functional, non-random, synthetic pre-immune antibody repertoire

10:45 – 12:15

QUANTITATIVE ANALYSIS, DESIGN, AND ENGINEERING OF BIOCHEMICAL NETWORKS

Session Chairs: **Jason Haugh** (North Carolina State University)
Birgit Schoeberl (Merrimack Pharmaceuticals)

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A systems biology approach to developing targeted therapies

Anand Asthagiri (California Institute of Technology)

Predicting and tuning multicellular morphodynamics

Christina Chan (Michigan State University)

Phenotype-specific gene network by synergy analysis

David Klinke II (West Virginia University)

Inferring relevant control mechanisms for interleukin-12 signaling within naïve CD4+ T-cells

12:15 – 15:00

Lunch on your own / Informal Poster Viewing / Free time

15:00 – 16:30

CELLULAR ENGINEERING: FROM PROKARYOTES TO EUKARYOTES

Session Chairs: **Matthew DeLisa** (Cornell University)
Michael Laird (Genentech)

Mike Shuler (Cornell University)

Towards a platform cell model for synthetic biology

Monday, July 6, 2009 (continued)

Bill Bentley (University of Maryland, College Park)
Hierarchical manipulation of phenotype by regulon engineering: Spatially arranged nanofactories that direct population behavior

Laura Simmons (Genentech)
CHO host cell engineering using viral genes

E. Terry Papoutsakis (University of Delaware)
The case for differentiation engineering

16:30 – 17:00

Coffee break

17:00 – 19:00

**BIOTECHNOLOGY & BIOENGINEERING 50TH ANNIVERSARY –
BIOCHEMICAL ENGINEERING PAST TO PRESENT**

Session Chairs: **Doug Clark** (University of California, Berkeley)
Susan Vice (Wiley)

Doug Clark (University of California, Berkeley)
The life and times of B&B: Editorial reflections on the first half century

Daniel I.C. Wang, (Massachusetts Institute of Technology)
It happened before you were born

E. Terry Papoutsakis (University of Delaware)
*50 Years of bioreactor design, biochemical kinetics and challenges,
Elmer Gaden and B&B*

Beth Junker (Merck & Co., Inc.)
*Industrial bioprocesses: Beyond routine applications of established
methodologies*

Matthew DeLisa (Cornell University)
Engineering protein fitness using cellular quality control mechanisms

19:30 – 20:30

Reception

20:30 – 22:00

Buffet dinner/ Reception

22:00

Informal Poster Viewing

Tuesday, July 7, 2009

06:30 – 08:00 Breakfast buffet

08:00 – 09:30

NOVEL APPROACHES IN METABOLIC ENGINEERING

Session Chairs: **Kristala Prather** (Massachusetts Institute of Technology)
Brian Rush (Cargill)

Christina Smolke (Stanford University)

Advancing synthetic metabolic network design through embedded sensing-actuation devices

Mattheos Koffas (University of Buffalo)

Engineering plant secondary metabolite biosynthesis in microorganisms

Ramon Gonzalez (Rice University)

Functional genomics approaches for the understanding of glycerol fermentation in E. coli

Susan Roberts (University of Massachusetts at Amherst)

Plant cellular engineering of natural product pathways in cell culture

09:30 – 10:00

Coffee break

10:00 – 10:45

Keynote Address

Vanessa King (Bioscale, Inc.)

Innovation: Can old dogs learn new tricks, and can young dogs do any tricks well?

10:45 – 12:15

BIOFUELS AND BIOENERGY

Session Chairs: **William M. Miller** (Northwestern University)
Aaron Kelley (Genencor)

Jim McMillan (National Renewable Energy Laboratory)

Biochemical conversion of cellulosic feedstocks to biofuels: Progress and challenges

Wilfred Chen (University of California, Riverside)

Engineering yeast consortia displaying mini-cellulosomes for ethanol production from cellulose

Brian Pfleger (University of Wisconsin, Madison)

Metabolic engineering of fatty acid production in E. coli

Shelley Minteer (St. Louis University)

Stable and high current density enzymatic bio-electrocatalysis for biofuel

12:15 – 13:15

Lunch buffet

13:15 – 15:00

Informal Poster Viewing / Free time

Tuesday, July 7, 2009 (continued)

15:00 – 16:30

ENGINEERING CHALLENGES IN VACCINE PRODUCTION

Session Chairs: **Derek Adams** (Alexion Pharma)

Amine Kamen (Biotechnology Research Institute (NRC))

Udo Reichl (Max Planck Institute)

Dynamics of influenza virus replication and apoptosis in mammalian cell culture-flow cytometry and mathematical modeling

Colleen Sico (Novavax, Inc.)

Challenges for virus-like particle production

Anton PJ Middelberg (The University of Queensland)

Analyzing and optimizing the self-assembly processing of virus-like particles

16:30 – 17:00

Coffee break

17:00 – 18:30

PERSPECTIVES ON BIOCHEMICAL ENGINEERING EDUCATION

Session Chair: **Claire Komives** (San Jose State University)

Gene Schaefer (J&J Centocor R & D)

What happened to the “engineering” in biochemical engineering?

William M. Miller (Northwestern University)

Bioprocess-focused Professional Masters program in biotechnology

Mike Shuler (Cornell University)

Biology in chemical engineering education

18:30 – 20:00

Reception

Poster Session #1 (Odd Numbers)

Session Chairs: **Karl Griswold** (Dartmouth College)

Joel Sirois (University of Sherbrooke)

Szu-Wen Wang (University of California, Irvine)

20:00 --

Dinner on your own / free evening

Wednesday, July 8, 2009

06:30 – 07:45 Breakfast buffet

07:45 – 09:50

ADVANCES IN CELL CULTURE ENGINEERING

Session Chairs: **Jeffrey J. Chalmers** (Ohio State University)
Robert D. Kiss (Genentech)

Frank Baganz (University College London)

Scaling-up cell culture processes from microwells to bench-scale reactors

Susan Sharfstein (Rensselaer Polytechnic Institute)

Hyperosmotic stress responses in mammalian cells: A comparative microarray study of hybridoma and CHO cell responses

Mike Betenbaugh (Johns Hopkins University)

Glycosylation as a complex biochemical network: Interpreting mass spectrometry profiles using intracellular processing models

Weiwei Hu (Biogen IDEC)

High yield antibody production using a chemically defined process format

Mike Laird (Genentech)

Antibody disulfide bond reduction in a CHO production process

09:50 – 10:10

Coffee break

10:10 – 10:55

Keynote Address

Mike Snyder (Yale University)

High throughput analysis of proteins

10:55 – 12:15

ADVANCES IN STUDIES OF PROTEIN AGGREGATION AND STABILITY

Session Chairs: **Theresa Good** (University of Maryland, Baltimore County)
Roxana Ionescu (Merck and Co., Inc.)

Melissa Moss (University of South Carolina)

Study of inhibition at multiple stages of amyloid-beta self-assembly provides mechanistic insight

Robert Simler (Genzyme)

Facing the challenges of therapeutic protein aggregation

Troy Cellmer (National Institutes of Health)

The ultra-fast folding of the villin headpiece subdomain: New insight from laser temperature jump measurements and a simple analytical model

12:15 – 12:30

Pick up box lunch

12:30 – 16:30

Optional excursions / Free time

Wednesday, July 8, 2009 (continued)

16:30 – 17:45

SYSTEMS APPROACHES TO CONTINUOUS BIOPROCESSING

Session Chairs: **Charles Cooney** (Massachusetts Institute of Technology)
Joanne Beck (Abbott Bioresearch Center)

Bernhardt L. Trout (Massachusetts Institute of Technology)
Continuous manufacturing of small molecule pharmaceuticals: The ultra-lean way of manufacturing

Konstantin Konstantinov (Genzyme)
Parallels in continuous manufacturing of proteins and synthetic molecules

Panel Discussion:
Barriers to implementation of continuous bioprocessing

17:45 – 18:45

Amgen Award Lecture

Greg Stephanopoulos (Massachusetts Institute of Technology)
Biofuels and biochemical engineering

19:00 – 20:30

Reception

Poster Session #2 (Even Numbers)

Session Chairs: **Karl Griswold** (Dartmouth College)
Joel Sirois (University of Sherbrooke)
Szu-Wen Wang (University of California, Irvine)

20:30 – 22:00

Banquet

Thursday, July 9, 2009

06:30 – 08:00 Breakfast buffet

08:00 – 09:30

FRONTIERS IN ENZYME ENGINEERING

Session Chairs: **Ping Wang** (University of Minnesota)
Sang Yup Lee (Korea Advanced Institute of Science and Technology)

Jon Dordick (Rensselaer Polytechnic Institute)
Molecular bioprocessing: Exploiting nature's diversity to tackle therapeutic bottlenecks

Lianhong Sun (University of Massachusetts at Amherst)
Engineering and applications of quorum sensing

Hongfei Jia (Toyota)
Enzyme engineering in functional materials

Sang Yup Lee (Korea Advanced Institute of Science and Technology)
Metabolic engineering for the production of unnatural polyesters

09:30 – 10:00 Coffee break

10:00 – 11:30

PRESENTATION OF BIOCHEMICAL PRODUCTS IN MEDICINE: THE CELL-MATERIAL INTERFACE

Session Chairs: **Millicent O. Sullivan** (University of Delaware)
Sujata Bhatia (DuPont)
Karl Griswold (Dartmouth College)

Lonnie Shea (Northwestern University)
Gene delivery using biomaterials

Neil Forbes (University of Massachusetts at Amherst)
Engineered strategies to overcome therapeutic resistance in solid tumors

Szu-Wen Wang (University of California, Irvine)
Rational design of collagen-mimetic biopolymers

11:30 – 12:00

Closing Remarks

Anne Skaja Robinson (University of Delaware)
Gene Schaefer (J&J Centocor R & D)

Preview of Biochemical Engineering XVII
François Baneyx (University of Washington)
Costas Maranas (Penn State University)

12:15 – 12:30

Pick up box lunch

Departures

Poster Presentations

Poster Session Chairs: Karl Griswold (Dartmouth College), Joel Sirois (University of Sherbrooke),
Szu-Wen Wang (University of California, Irvine)

Topic: Advances in Biological Separations

- A1. A SECOND GENERATION BIO-LENTIVIRAL PACKAGING CELL LINE FOR SCALABLE LENTIVIRAL PRODUCTION IN GENE THERAPY APPLICATIONS**
Rongjun Chen, Department of Chemical Engineering and Biotechnology, University of Cambridge, UK
- A2. USE OF MICROSCALE BIOPROCESSING TECHNIQUES TO STUDY THE INFLUENCE OF CELL DISRUPTION ON MICROFILTRATION PERFORMANCE OF E. COLI CELLS FOR ANTIBODY FAB' FRAGMENTS RECOVERY**
Andrea CME Rayat, Innovative Manufacturing Research Centre, The Advanced Centre for Biochemical Engineering, University College London, UK
- A3. INTENSIFICATION OF BIOPURIFICATION PROCESSES USING PLASTIC MICROCAPILLARY FILMS**
Nuno M Reis, University of Cambridge, UK

Topic: Advances in Cell Culture Engineering

- B1. DNA METHYLATION PARTIALLY CONTRIBUTES TO THE LOSS OF MONOCLONAL CLONAL ANTIBODY PRODUCTIVITY OF CHO CELL LINES DURING LONG TERM CULTURE**
Yuan Sheng Yang , Bioprocessing Technology Institute, Singapore
- B2. ADVANCES IN USING CAPACITANCE BASED BIOMASS PROBES IN CGMP**
John Carvell, Aber Instruments, UK
- B3. A PLATFORM APPROACH TO DEVELOPING MANUFACTURING CELL LINES WITH IN-PROCESS ANALYSIS**
Yun Seung Kyung, Centocor Research and Development, Inc. , USA
- B4. TOWARDS A BIOPROCESS ON A CHIP**
Michael L. Shuler, Cornell University, USA
- B5. A NOVEL STRATEGY TO REDUCE LACTIC ACID PRODUCTION AND CONTROL PH IN ANIMAL CELL CULTURE**
Nate Freund, Keck Graduate Institute, USA
- B6. REAL-TIME MONITORING OF CELL CULTURE KINETICS USING NOVEL ENDOGENOUS BIOMARKERS AND SOFTWARE PROBES**
Joel Sirois , University of Sherbrooke, UK
- B7. AGGREGATION DYNAMICS IN PLANT CELL CULTURE AS AN APPROACH TO OPTIMIZE NATURAL PRODUCT SYNTHESIS**
Martin E Kolewe, University of Massachusetts, USA
- B8. PROCESS DEVELOPMENT STRATEGIES FOR THE APPLICATION OF CHEMICALLY DEFINED PLATFORM TO A CLINICAL PROGRAM**
Vijay Janakiraman, Biogen Idec, Inc., USA

B9. SHAKE FLASKS OR TUBESPINS FOR CLONE SCREENING: LIMITATIONS AS SCALE-DOWN MODELS FOR BIOREACTORS

Inn H. Yuk, Genentech, USA

B10. SCALE-UP OF MAB CELL CULTURE PROCESSES IN DISPOSABLE BIOREACTORS

Rolf Hjorth, GE Healthcare Bio-Sciences AB, Sweden

B11. COMPARISON BETWEEN THE NEWLY DEVELOPED CHEMICALLY DEFINED MEDIUM PLATFORM AND EXISTING CELL CULTURE PLATFORM

Dilek Tansoy, Abbott Bioresearch Center, USA

B12. TIME-SERIES GLOBAL EXPRESSION PROFILING OF RECOMBINANT CHO CELLS IN PERFUSION CULTURE

Joon Chong Yee, Department of Bioengineering, Genzyme, USA

B13. EVALUATION OF BUBBLE SIZE, BUBBLE DISPERSION, AND MASS TRANSFER IN BIOREACTORS USING AN ENVIROPTICS DIGITAL CAMERA SYSTEM

Christian Wood, Latonia Harris, Sadettin Ozturk, Centocor R&D, USA

Topic: Biofuels and Bioenergy

C1. ENGINEERING BIOFUELS PRODUCTION THROUGH RATIONAL, COMBINATORIAL, AND SYNTHETIC STRATEGIES

Ryan T. Gill, University of Colorado, Colorado Center for Biorefining and Biofuels, USA

C2. MODEL-BASED CONTROL OF A MICROALGAL BIODIESEL PROCESS

Hector De la Hoz Siegler, Department of Chemical and Materials Engineering, University of Alberta, Canada

C3. A YEAST BIOCATALYST FOR FERMENTING ACID HYDROLYSATE

Brian Rush, Cargill, Inc., USA

C4. ENGINEERING A NOVEL SYNTHETIC PATHWAY FOR BUTANOL PRODUCTION IN ESCHERICHIA COLI USING 2-KETOISOVALERATE AS AN INTERMEDIATE

Jin Hwan Park, Metabolic and Biomolecular Engineering National Research Laboratory, KAIST, Korea

C5. METABOLIC ENGINEERING FOR THE PRODUCTION OF FUELS AND CHEMICALS FROM BIO-OILS: A NEW BIOREFINERY PARADIGM

Clementina Dellomonaco, Department of Chemical and Biomolecular Engineering - Rice University, USA

C6. HEURISTIC DEVELOPMENT FOR MODEL-GUIDED CELLULAR ENGINEERING OF ESCHERICHIA COLI FOR BIOHYDROGEN PRODUCTION

Ranjan Srivastava, University of Connecticut, USA

C7. WITHDRAWN

C8. ACTIVITY AND FUNCTION OF IONIC LIQUIDS FOR LIGNOCELLULOSE DISSOLUTION AND HYDROLYSIS

Paul Wolski, University of California Berkeley, USA

C9. HYBRID ELECTROCHEMICAL AND BIOMOLECULAR CATALYSIS ON CELLULOSE-BASED NANOCARBON ELECTRODES FOR REDUCTION AND CONVERSION OF CARBON DIOXIDE TO FUELS

Ping Wang, University of Minnesota, USA

Topic: Cellular engineering: from prokaryotes to eukaryotes

D1. EXTERNAL TUNING OF GENETIC CIRCUITS

Richard Heins, Johns Hopkins University, USA

D2. YEAST SYSTEMS BIOTECHNOLOGY FOR THE PRODUCTION OF HETEROLOGOUS PROTEINS

Diethard Mattanovich, University of Natural Resources and Applied Life Sciences Vienna, Austria

D3. SYSTEMATIC QUANTIFICATION OF CROSSTALK INTERACTIONS IN SIGNAL TRANSDUCTION NETWORKS

Jason Haugh, North Carolina State University, USA

D4. BIOMOLECULAR ENGINEERING OF SIRNA THERAPEUTICS

S. Patrick Walton, Department of Chemical Engineering and Materials Science, Michigan State University, USA

D5. UNRAVELING THE ROLE OF AUTOPHAGY IN FILAMENTOUS FUNGI

Mark R. Marten, UMBC, Chemical & Biochemical Engineering, USA

D6. EXPLORING BETA AMYLOID CELL SURFACE INTERACTIONS AT THE RESIDUE LEVEL

Theresa Good, UMBC, USA

D7. DEFINING STRUCTURAL CHARACTERISTICS OF GPCRS THAT ARE IMPORTANT FOR RECEPTOR ACTIVITY AND TRAFFICKING TO THE PLASMA MEMBRANE

Andrea Naranjo, University of Delaware, USA

D8. HETEROLOGOUS EXPRESSION OF G-PROTEIN COUPLED RECEPTORS IN S. CEREVISIAE: LINKING TRANSLOCATION WITH LOCALIZATION

Michelle A. O'Malley, University of Delaware, USA

D9. ACTIVATION OF ENDOTHELIUM IN ALZHEIMER'S DISEASE BRAIN INVOLVES SOLUBLE AGGREGATES OF THE AMYLOID-BETA PROTEIN

Melissa Moss, University of South Carolina, USA

D10. COMPARISON OF OPTIMIZATION METHODS FOR PICHIA PASTORIS FED BATCH CULTIVATIONS FOR THE PRODUCTION OF HETEROLOGOUS PROTEINS

Michael Maurer, University of Applied Sciences FH Campus Vienna, Austria

Topic: Engineering challenges in vaccine production

E1. CONVERSION OF MDCK CELL LINE TO SUSPENSION CULTURE; APPLICATION FOR INFLUENZA VIRUS PRODUCTION

Chia Chu, NIDDK/NIH, USA

E2. DEVELOPMENT OF A CELL CULTURE PRODUCTION PLATFORM FOR COLD-ADAPTED LIVE ATTENUATED INFLUENZA VACCINE (LAIV) STRAINS: ROLE OF MULTIPLICITY OF INFECTION IN IMPROVING BIOREACTOR PRODUCTIVITY

Kunal Aggarwal, MedImmune

E3. CASE STUDY: DEVELOPMENT OF A THERMO-STABLE ALUMINUM SALT ADJUVANTED FORMULATION FOR A RECOMBINANT SUBUNIT PROTEIN BASED VACCINE

Vidya Pai, Hawaii Biotech Inc ., USA

- E4. MICROFLUIDIC SIMULATION OF A SYNTHETIC LIVE-ATTENUATED VIRUS ASSEMBLY PLATFORM FOR VACCINE PRODUCTION**
Philippe-Alexandre Gilbert, MedImmune, USA
- E5. REAL-TIME MONITORING OF VIRAL REPLICATION AND ANTI-VIRAL DRUG DISCOVERY BY MOLECULAR FRET PROBES**
Hsiao-Yun Yeh, UC Riverside, USA
- E6. GENERIC DNA VACCINE PRODUCTION PLATFORM: UPSTREAM PROCESS INNOVATIONS FOR OVERCOMING PLASMID INSTABILITY AND TOXICITY AND ACHIEVING HIGH YIELDS**
Aaron E. Carnes, Nature Technology Corporation, USA

Topic: Frontiers in Enzyme Engineering

- F1. COMPUTATION GUIDED PROTEIN DESIGN FOR ALTERED COFACTOR SPECIFICITY AND INTRODUCTION OF BINDING SITES**
Costas D. Maranas, Pennsylvania State University, USA
- F2. ENGINEERING ENZYMES TO SELF-ASSEMBLE INTO HYDROGELS**
Scott Banta, Columbia University, USA
- F3. MOLECULAR ENGINEERING AND PRECLINICAL TESTING OF ANTIMICROBIAL BIOCATALYSTS**
Thomas C. Scanlon, Thayer School of Engineering, Dartmouth College, USA
- F4. REVIVING THE ANTIBODY “MAGIC BULLET” ANALOGY WITH PROTEOLYTIC REGULATION**
Patrick S. Daugherty, University of California, Santa Barbara, USA
- F5. HIGH PERFORMANCE COFACTOR RECYCLING MULTIENZYME BIOCATALYST SYSTEM FOR ETHANOL METABOLISM**
Robert P. Chambers, Matthew Eggert, Auburn University, USA
- F6. UNNATURAL BIOCATALYSTS**
Eric Althoff, Arzeda Corporation, USA
- F7. DEVELOPING IMPROVED THERMOSTABLE CELLULASES: HIGH-THROUGHPUT CELLULOLYTIC ASSAYS AND PROTEIN ENGINEERING STRATEGIES**
Harshal A. Chokhawala, University of California Berkeley, USA
- F8. UNIQUE FUNCTION OF THE ENZYME INVOLVED IN ISONITRILE METABOLISM - A NEW SYNTHETIC ROUTE TO *N*-BENZYLAMIDES -**
Michihiko KOBAYASHI, The University of Tsukuba, Japan

Topic: Frontiers in Stem Cell Bioengineering

- G1. ARE CIRCULATING TUMOR CELLS PRESENT IN THE PERIPHERAL BLOOD OF CANCER PATIENTS CANCER STEM CELLS?**
Priya Balasubramanian, The Ohio State University, USA
- G2. EXPANSION OF MEGAKARYOCYTIC PROGENITORS WITH HIGH POLYPLOIDIZATION POTENTIAL**
Swapna Panuganti, Northwestern University, USA

G3. EXPANSION AND DIFFERENTIATION OF EMBRYONIC STEM CELLS IN FIBROUS BED BIOREACTORS

Ning Liu, The Ohio State University, USA

G4. ENGINEERING OF EPITHELIAL TISSUES FROM PLURIPOTENT HUMAN CELLS

Christian M. Metallo, Massachusetts Institute of Technology, USA

Topic: Molecular design, engineering, and display technologies

H1. MOLECULAR BARCODING FOR PARALLEL ANALYTICAL TECHNIQUES

S. Patrick Walton, Department of Chemical Engineering and Materials Science; Michigan State University, USA

H2. ENGINEERING PROTEINS INTO THE FOLD: NEW BIOCOMPONENTS FOR NANOSCALE ENGINEERING

Douglas S. Clark, University of California USA

H3. QUANTIFYING AND RESOLVING MULTIPLE TRANSFORMANTS IN S. CEREVISIAE PLASMID LIBRARIES

Elizabeth C. Gray, Thayer School of Engineering, Dartmouth College, USA

H4. MULTIFUNCTIONAL PROPERTIES OF STRUCTURAL PROTEINS OF ROTAVIRUS AS TEMPLATES FOR SYNTHESIS OF NANOBOMATERIALS

Germán Plascencia-Villa, Instituto de Biotecnología UNAM, Mexico

H5. DEVELOPMENT OF A SOLUBLE T CELL RECEPTORS FOR THERAPEUTIC APPLICATIONS

Jennifer Maynard, University of Texas at Austin, USA

H6. HYPERTHERMOPHILIC PROTEIN SCAFFOLDS FOR ENGINEERING MOLECULAR RECOGNITION

Nimish Gera, North Carolina State University, USA

Topic: Novel Approaches for Metabolic Engineering

I1. PREDICTION OF METABOLIC FLUX DISTRIBUTION AFTER GENE KNOCKOUT, USING LINEAR PROGRAMMING

Marcelo Rivas Astroza, Department of Biochemical Engineering, Pontificia Universidad Católica de Valparaíso, Chile

I2. DE NOVO PATHWAY ENGINEERING – FROM IN VITRO TO IN VIVO SYSTEMS

Frank Baganz, Department of Biochemical Engineering, University College London, UK

I3. NON-RIBOSOMAL PEPTIDE PRODUCTION IN SACCHAROMYCES CEREVISIAE

Verena Siewers, Department of Chemical and Biological Engineering, Chalmers University of Technology, Sweden

I4. CATALYSIS THROUGH METABOLIC ENGINEERING: FLUX AMPLIFICATION IN AROMATIC AMINO ACID PATHWAY

Tuncer H. Özdamar, Ankara University, Turkey

I5. A NOVEL APPROACH TO CONSTRAINTS BASED MODELING: COMBINING MECHANISTIC AND STATISTICAL CONSTRAINTS TO REDUCE THE SOLUTION SPACE

Rui Oliveira, REQUIMTE, Chemistry Department, Faculty of Sciences and Technology, Universidade Nova de Lisboa, Portugal

- I6. ON THE INTERROGATION OF METABOLIC NETWORKS USING METABOLIC NETWORK DYNAMICS (MND)**
Adam C. Baughman, Susan Sharfstein, Rensselaer Polytechnic Institute, USA
- I7. THE PROTEOME OF MANNHEIMIA AND ITS USE IN METABOLIC ENGINEERING**
Jeong Wook Lee, KAIST, Korea
- I8. IDENTIFICATION AND ENGINEERING OF SUCROSE TRANSPORT AND UTILIZATION SYSTEM IN MANNHEIMIA SUCCINICIPRODUCENS**
Jeong Wook Lee, KAIST, Korea
- I9. IN SILICO AIDED FED-BATCH PRODUCTION OF L-VALINE IN ESCHERICHIA COLI**
Jin Hwan Park, Metabolic and Biomolecular Engineering National Research Laboratory, KAIST, Korea
- I10. ENGINEERING THE SPATIAL ARRANGEMENT OF METABOLIC PATHWAYS**
Line Albertsen, Technical University of Denmark
- I11. GREEN PRODUCTION OF SUBSTITUTED AROMATICS BY ENGINEERED SOLVENT-TOLERANT PSEUDOMONAS PUTIDA S12**
Harald Ruijsenaars, TNO Quality of Life, the Netherlands
- I12. ENGINEERING MICROBES FOR PRODUCTION OF VALUE-ADDED CHEMICALS**
Kristala Jones Prather, Massachusetts Institute of Technology, USA
- I13. YIELD ENHANCEMENT OF 1,2-PROPANDIOL PRODUCTION BY SACCHAROMYCES CEREVISIAE STRAIN OBTAINING MGS AND DHAD GENES**
Eunyoung Jeon, Department of Chemical and Biomolecular Engineering, Sogang University, Korea
- I14. REDOX AND ENERGY COFACTORS AS METABOLIC ENGINEERING TARGETS**
Goutham N. Vemuri, Chalmers University of Technology, Sweden

Topic: Perspectives on Biochemical Engineering Education

- J1. BIOENGINEERING EDUCATIONAL MATERIALS BANK**
Claire Komives San Jose State University, USA

Topic: Presentation of biochemical products in medicine: the cell-material interface

- K1. NOVEL BIODEGRADABLE ELECTROSPUN NANOFIBRES FOR TISSUE ENGINEERING SCAFFOLDS**
Pradeep Srivastava, Banaras Hindu University, India
- K2. FORMULATION OF A HIERARCHICALLY DESIGNED PEPTIDE NUCLEIC ACID BASED DNA DELIVERY CONSTRUCT**
Peter G. Millili, Department of Chemical Engineering, University of Delaware, USA
- K3. GENETICALLY ENGINEERED PEG CONJUGATES OF ALGINATE LYASE AS IMMUNOTOLERANT ENZYME THERAPIES FOR P. AERUGINOSA INFECTIONS**
John W. Lamppa, Thayer School of Engineering, Dartmouth College, USA

Topic: Quantitative analysis, design, and engineering of biochemical networks

- L1. USING COMPUTATIONS TO RECONSTRUCT, ANALYZE AND REDESIGN METABOLISM**
Costas D. Maranas, Pennsylvania State University, USA
- L2. DYNAMIC MODELING AND METABOLIC ANALYSIS OF GLYCOLYSIS IN ESCHERICHIA COLI**
Changhun Park, Department of Chemical and Biomolecular Engineering, Sogang University, Korea
- L3. OPTIMIZING THE BIOMASS CONSTITUTING EQUATION OF A GENOME-SCALE MODEL: THE CASE FOR THE BIO-BUTANOL PRODUCER CLOSTRIDIUM ACETOBUTYLICUM**
Ryan S. Senger, Virginia Polytechnic Institute and State University, USA
- L4. BIO-COMPLEXITY THROUGH DYNAMIC MATHEMATICAL MODELING: METABOLISM AND INFECTION**
Mariajose Castellanos, UMBC, USA
- L5. COORDINATE REGULATION OF SALMONELLA VIRULENCE**
Christopher Rao, University of Illinois at Urbana-Champaign, USA
- L6. GENOME-WIDE INFERENCE OF REGULATORY NETWORKS IN STREPTOMYCES COELICOLOR**
Marlene Castro-Melchor, Department of Chemical Engineering and Materials Science, University of Minnesota, USA
- L7. METABOLITE ESSENTIALITY OF PATHOGENS USING GENOME-SCALE METABOLIC NETWORKS FOR THE DRUG DISCOVERY**
Hyun Uk Kim, KAIST, Korea
- L8. IDENTIFICATION OF ESSENTIAL METABOLITES TO EXPLORE THE ROBUSTNESS OF ESCHERICHIA COLI METABOLISM**
Hyun Uk Kim, KAIST, Korea
- L9. BIOINFORMATIC IDENTIFICATION AND EMPIRICAL DEMONSTRATION OF NOVEL +1 FRAMESHIFT CASSETTES IN THE ESCHERICHIA COLI GENOME**
Pei-Yu Liao, Cornell University, School of Chemical and Biomolecular Engineering, USA
- L10. THE DESIGN OF A MATHEMATICAL MODEL FOR THE DYNAMIC SIMULATION OF METABOLISM IN A CHO FED-BATCH PROCESS**
Ryan Nolan, Tufts University & Wyeth BioPharma, USA
- L11. REGULATION OF INTRINSIC MULTIPLE ANTIBIOTIC RESISTANCE IN ESCHERICHIA COLI**
Christopher Rao, University of Illinois at Urbana-Champaign, USA
- L12. USING AN ARGININE ELUTION BUFFER IN A POROS A COLUMN FOR OVERCOMING THE HINDRANCE OF QUANTITATIVE ANALYSIS OF MONOCLONAL ANTIBODY BY DEXTRAN SULFATE**
Bong Gyun Kim, Hanyang University, Korea
- L13. A STOCHASTIC MODEL OF THE EUKARYOTIC CHEMICAL OSCILLATOR**
Michael Benton, Louisiana State University, USA
- L14. TRANSCRIPTIONAL DYNAMICS IN SACCHAROMYCES CEREVISIAE DURING TRANSIENT NUTRITION LIMITATION**
Goutham N. Vemuri, Chalmers University of Technology, Sweden

L15. SUBSTRATE UPTAKE, CATABOLITE REPRESSION AND EFFECT OF SEED CULTURE ON GLYCOPEPTIDE ANTIBIOTIC PRODUCTION: PROCESS MODEL DEVELOPMENT AND APPLICATION

Soumen Kumar Maiti, Indian Institute of Technology Bombay, India

Topic: Systems approaches to continuous bioprocessing

M1. OXYGEN TRANSFER INFLUENCES THE INTRACELLULAR REACTION NETWORK PICHIA PASTORIS

Pinar Calik, Middle Esat Technical University, Turkey

M2. PRODUCTION OF MONOCLONAL ANTIBODIES BY GLYCOENGINEERED YEAST STRAINS IN CONTINUOUS STIRRED TANK REACTORS

Sean Kersey, Merck & Co., USA

M3. A PROCESS YOU CAN BANK ON: EVALUATION OF A DISPOSABLE BIOREACTOR SYSTEM TO REPLACE STIRRED-TANK BIOREACTOR FOR MANUFACTURING MAMMALIAN CELL BANKS

Dinesh Baskar, Genentech Inc., USA

M4. SYSTEMATIC PROTEOME-BASED APPROACH FOR HIGH-LEVEL EXTRACELLULAR PRODUCTION OF RECOMBINANT PROTEINS IN ESCHERICHIA COLI

Sang Yup Lee, Metabolic and Biomolecular Engineering National Research Laboratory, KAIST, Korea

M5. DEVELOPMENT OF AN IMPROVED CYCLE 2 CELL CULTURE PROCESS AND ESTABLISHMENT OF PRODUCT COMPARABILITY: A CASE STUDY

Barbara Woppmann, Biogen Idec, USA