

2004 Annual Meeting

Industrial Microbiology and Biotechnology Meeting

session topics

Sunday evening, July 25

Keynote address & Opening reception
Time: 6:00 - 9:30 PM

A reductionist approach to *E. coli* genomics
F. Blattner, University of Wisconsin, Madison, WI

Monday morning, July 26

Session 1:
Microbial membrane transport proteins: Fundamentals and applications
Convener: T.K. Van Dyk, DuPont Company, Wilmington, DE

Genomic analysis of membrane transport systems
I.T. Paulsen, The Institute for Genomic Research, Rockville, MD

Ion-coupled active transport: From membrane to molecule and mechanism
H.R. Kaback, Howard Hughes Medical Institute/University of California-Los Angeles, Los Angeles, CA

Amino acid excretion systems in bacteria: Biochemical and biotechnological aspects
R. Kraemer,* A. Burkovski, Universitaet zu Koeln, Koeln, Germany

An efflux pump for aromatic carboxylic acids: From gene expression to gene function
T.K. Van Dyk, DuPont Company, Wilmington, DE

Drug efflux and drug discovery
K. Lewis, Northeastern University, Boston, MA

Session 2:
Advances in disinfectants and antimicrobials I: New and refined applications since 9/11
Conveners: R. Borazjani, Bausch & Lomb, Rochester, NY and G. Pierce, Georgia State University, Atlanta, GA

Advances in antimicrobials and efficacy assessment methods for porous interior materials: Carpet, drywall, air filters
D. Price, Interface, Inc., LaGrange, GA; R.B. Simmons, D.G. Ahearn, S.A. Crow, Georgia State University, Atlanta, GA

Surface strategies for battling bacterial biofilms
B.P. Ratner,* and J. Bryers, University of Washington, Seattle, WA

Facially amphiphilic architectures as host defense peptide mimics
G.N. Tew, University of Massachusetts, Amherst, MA

Electrochemical detection of biological agents
K. Levon, Polytechnic University, Brooklyn, NY

Session 3:
Active ingredients via fermentation for use in the cosmetic industry

How to create and substantiate biologically active ingredients
J. Hart, Coletica, Inc., Northport, NY

Discovery and development of botanical actives for cosmetic use
C.K. Angerhofer, Aveda Corp., Blaine MN

Convener: S.
Schnittger, Estee
Lauder, Inc., Melville,
NY

Contribution of glyco-cosmetology to skin care and beauty: Obtention and industrialization of bacterial polysaccharides for the cosmetic industry

D. Miller, Solabia, Pantin, France

Fermentation and biotransformation: Promising route to novel actives for the cosmetic industry

J. Anderson, Actives International, Ramsey, NJ

Testing cosmetics that really work

T. Mammone, Estee Lauder, Inc., Melville, NY

**Session 4:
A funny thing
happened on the way
to the fermentor**

Convener: N.C.

Connors, Merck & Co.,
Inc., Rahway, NJ

Microbial response to non-ideal environments: No laughing matter

M.R. Marten,* S. Bhargava, Z.J. Li, M.P. Nandakumar, B. Raman, University of Maryland Baltimore County, Baltimore, MD; K.S. Wenger, K. Rane, V. Rising, Novozymes North America, Inc., Franklinton, NC

Strategies to enhance production of *Botulinum* neurotoxin serotype A-G, C-terminal heavy chain fragments (BoNT(Hc)) in high-cell density *Pichia pastoris* fermentation

J. Sinha,* M. Inana, M. Gouthro, M. Meagher, University of Nebraska, Lincoln, NE; W. Zhang, XOMA Ltd., Berkeley, CA; L. Smith, USAMRIID, Ft. Detrick, MD; I. Henderson, DynPort Vaccine Co., LLC, Frederick, MD

Productive microbial process platform and efficient development strategies to support strong biopharmaceutical pipeline

X. Yang,* T. Seewoester, Amgen, Inc., Thousand Oaks, CA

Production of indole diterpenes by *Aspergillus alliaceus*

A. Walker, D. Vesey, J. Greene, P. Masurekar, N.C. Connors,* Merck Research Laboratories, Inc., Rahway, NJ

**Session 5:
Harnessing microbial
biochemical diversity:
From conversion of
renewable resources to
industrial chemicals
and enzyme
application for
specialty chemicals
production and
remediation**

Convener: S.

Sariaslani, DuPont
Company, Wilmington,
DE

Using the aromatic amino acid synthesis in *E. coli* to produce pathway products and derivatives thereof: Strains and processes

R. Takors,* R. Bujnicki, L. Raeven, J. Bongaerts, R. Bovenberg, G. Sprenger, M. Müller, C. Wandrey, Forshungszentrum Julich, GmbH, Julich, Germany

Biological production of industrial chemicals

A. Gatenby,* DuPont Central Research & Development, Wilmington, DE

White biotechnology

M. Wubbolts, DSM Pharma Chemicals, Geleen, The Netherlands/DSM Biotech GmbH, Julich, Germany

Biorefinery feedstock supply - Opportunities to add value by microbial preprocessing

J. Hettenhaus, cea, Inc., Charlotte, NC

Developing microbial catalysts for remediation and fine chemicals

M. Subramanian,* P. Swanson, S.M. Resnick, I. Taylor, K. Holt-Tiffin, Dow Chemical Company, San Diego, CA

**Session 6:
Isoprenoid wizardry:
Novel production
systems, new insights
and industrial
applications**

Conveners: T. McMullin, Bio-Technical Resources, Manitowoc, WI and J. Chappell, University of Kentucky, Lexington, KY

Isoprenoid pathway engineering in *Saccharomyces cerevisiae* for sesquiterpene and diterpene production

T. McMullin, J. Maurina-Brunker, S. Wassink, L. Song, C. Leana, K. Langley, P. Olson, Bio-Technical Resources, Manitowoc, WI

Structural and mechanistic versatility of plant terpene cyclases

J.P. Noel,* P.O Maille, The Salk Institute for Biological Studies, San Diego, CA; J. Chappell, B. Greenhagen, University of Kentucky, Lexington, KY

Total synthesis of hydrocortisone from a simple carbon source in yeast

F. Menard Szczebara, C. Chandelier, C. Villeret, A. Masurel, S. Bourot, C. Duport, D. Pompon, LIPM du CNRS, Gif Sur Yvette, France; S. Blanchard, A. Groisillier, E. Testet, P. Costaglioli, T. Achstetter, ESTBB, Bordeaux, France; G. Cauet, E. Degryse, Transgene, Strasbourg, France; D. Balbuena, J. Winter, R. Spagnoli, B. Dumas,* Aventis Corp., Paris, France

Tinkering with terpene biosynthesis

S.P.T Matsuda, Rice University, Houston, TX

Metabolic engineering and process development of *Paracoccus* strains for the production of carotenoids by fermentation

R. Lopez-Ulibarri,* M. Humbelin, A.F. Mayer, P. Simic, M. Pogorevc, A. Berry, DSM Nutritional Products, Basel Switzerland

New approaches to coenzyme Q10 production

H. Jessen, R. Gokarn, R. Hobson, M.J. Zidwick,* Cargill Biotechnology Development Center, Minneapolis, MN

**Session 7:
Advances in
disinfectants and
antimicrobials II: New
and refined
applications since 9/11**

Conveners: R. Borazjani, Bausch & Lomb, Rochester, NY and G. Pierce, Georgia State University, Atlanta, GA

***Pseudomonas aeruginosa* and *Candida albicans* and device related nosocomial infections: Implications and trends**

G.E. Pierce, Georgia State University, Atlanta, GA

Antimicrobial activity of quaternized chitosan derivatives

W.H. Daly,* M. Thatte, Louisiana State University, Baton Rouge, LA

Comparison of chlorine and a new ClO₂ decontamination technology for effectiveness in killing vegetative cells and spores of *Bacillus* species

C.A. Pettigrew, Jr., M.E. Tremblay, Procter and Gamble, Cincinnati, OH; L.R. Berchat, University of Georgia, Griffin, GA

Solutions with low toxicity and high efficacy against spores of *Bacillus* species

D. Ammon* and R. Borazjani, Bausch & Lomb, Rochester, NY

**Session 8:
Cosmetic Microbiology**

Convener: S. Schnittger, Estee Lauder, Inc., Melville, NY

Opportunities for innovation in cosmetic microbiology

P. Geiss, Procter and Gamble Corp., Cincinnati, OH

An overview of antibacterial claims support testing and the role of the contract laboratory

M. Schaffer, Clinical Research Laboratories, Inc., Piscataway, NJ

Update on USP microbiology initiatives

S.V.W. Sutton, Alcon Laboratories, Arlington, TX

TBA

G. Fischler, Dial Corporation, Scottsdale, AZ

The search and the need for new antimicrobial agents

S. Schnittger, Estee Lauder, Inc., Melville, NY

Session 9: *Hansenula* & *Pichia*: Methylotrophic yeasts for therapeutic proteins and industrial enzymes

Convener: M. Piontek,
ARTES Biotechnology,
Essen Germany

Secreted expression of a bacterial alginate epimerase in *Hansenula polymorpha*: pitfalls and solutions

A. Degelmann,* H. Sletta, H. Ertesvag, S. Valla, E. Onsoyen, M. Piontek, Artes Biotechnology, Essen Germany

Heterologous expression of hexose oxidase in *Hansenula polymorpha* and industrial applications

C.H. Poulsen,* S.M. Madrid, H. Pedersen, M. Zargahi, C.L. Johansen, Danisco A/S, Brabrand, Denmark; P. Stougaard, Biotechnological Institute, Horsholm, Denmark

N*-glycan engineering for human compatible high-mannose type sugar chains in the methylotrophic yeast *Hansenula polymorpha

H.A. Kang,* S.K Rhee, Korea Research Institute of Bioscience and Biotechnology; J-Y. Kim, Chungnam National University, Daejeon, Korea; M.W. Kim, E.J. Kim, Korea Research Institute of Bioscience and Biotechnology/Chungnam University, Daejeon, Korea

Production of triple-helical recombinant human collagen in *P. pastoris*

M. Bodo,* R. Chang, E. Hamalainen, S. Leigh, H. McMullin, D. Olsen, T. Revak, C. Yang, J. Polarek, FibroGen, Inc., South San Francisco, CA

Expression of hepatitis C E1 in the methylotrophic yeast *Hansenula polymorpha*,

M. Suckow,* M. Prabucki, Z. Janowicz, Rhein Biotech GmbH, Dusseldorf, Germany; F. Bosman, G. Deschamps, E. Sablon, I. Samson, G. Verheyden, E. Depla, Innogenetics N.V., Gent, Belgium

Session 10:

Poster Session #1

Monday evening, July 26

Session 11:

Alma Dietz Actinomycete Roundtable and Dinner

Tuesday morning, July 27

Session 12: Natural products from microbes: Direct and/or indirect production

Convener: D.J
Newman, National

Fungi: A metabolite for every disease target?

C.J. Pearce, Mycosynthetix, Inc., Durham, NC

Marine microbes: Creating the next bull market for the pharmaceutical industry!

D.A. Mosca, Nereus Pharmaceuticals, Inc., San Diego, CA

Marine cyanobacterial metabolites with antimalarial and antitrypanosomal

activity: The Panama International Cooperative Biodiversity Group
K.L. McPhail,* P.M. Flatt, R.A. Medina, W.H. Gerwick, Oregon State
University, Corvallis, OR

**Novel and diverse assemblage of actinomycetes in marine sponges: A
resource for drug discovery**

O. Peraud, N. Mohamed, N. Montalvo, J.J. Enticknap, R.T. Hill,* Ctr. Marine
Biotechnology, UMBI, Baltimore, MD; M.T. Hamann, University of Mississippi,
University, MS

**The manzamines: Progress toward kilogram-scale production and
application as a control for malaria**

N. Kasanah, K.V. Rao, J.N. Peng, M. Donia, M.T. Hamann,* University of
Mississippi, University, MS; O. Peraud, M. Anderson, R.T. Hill, Ctr. Marine
Biotechnology, UMBI, Baltimore, MD

**Development of a process for the production of the anticancer lead
compound pleurotin by fermentation of *Hohenbuehelia atrocaerulea***

S. Shipley,* S. Graf, R. Collins, T.G. McCloud, SAIC-Frederick, Inc, Frederick,
MD; D.J. Newman, National Cancer Institute at Frederick, Frederick, MD

Unravelling natural product biosynthetic processes

K.A. Reynolds, Virginia Commonwealth University, Richmond, VA

Combinatorial biosynthesis of novel mTOR inhibitors

B. Wilkinson,* Biotica Technology Ltd., Essex, UK

**Session 13:
Industrial processes**

Conveners: J.G.
Kuenen, Kluuyver
Laboratory, TU Delft,
Delft, The Netherlands
and R.A. Rosson, Bio-
Technical Resources
Manitowoc, WI

**Anaerobic ammonium oxidation (Anammox™) and its application in
dedicated wastewater treatment**

J.G. Kuenen,* M. Schmid, L. van Niftrick, M. van Loosdrecht, Kluuyver
Laboratory, Delft University of Technology and Microbiology, Delft, The
Netherlands; M. Strous, M. Jetten, University of Nijmegen, The Netherlands

***Gluconobacter oxydans*: Industrial applications and genome analysis**

U. Deppernmeier, University of Wisconsin, Madison, WI

Tailor-made biocatalysts from recombinant organisms

M.M Yang,* S.J. Robles, W.J Coleman, KAIROS Scientific, Inc., San Diego,
CA

**Molecular and biochemical engineering for industrial fermentation of
therapeutic plasmid DNA**

H. Huber,* G. Weigl, C. Reinisch, W. Buchinger, Boehringer Ingelheim
Austria, GmbH, Vienna, Austria; R. Grabherr, K. Bayer, University of Natural
Resources and Applied Life Sciences, Vienna, Austria

**Aromatic compounds from sugar via bioconversions by the solvent-tolerant
bacterium *Pseudomonas putida* S12**

J. Wery, K. Nijkamp, N. Wiercky, R. Volkers, H. Ballerstedt, H. van Buijsen, J.
de Bont,* TNO Environment, Energy and Process Innovation, Apeldoorn, The
Netherlands

Metabolic pathway engineering for the production of L-methionine from glucose

P. Soucaille, Metabolic Explorer SA, France

Session 14: Metals and bacteria: from respiration to bioremediation

Convener: D. Saffarini,
University of
Wisconsin, Milwaukee,
WI

***Deinococcus radiodurans*: using genomics and microbiology in the development of radiation resistant bioremediation approaches**

M.J. Daly, Uniformed Services University of the Health Sciences, Bethesda, MD

Reduction and bioremediation of mercuric chloride by a mercury-resistant strain of *A. ferrooxidans*

T. Sugio,* A. Negishi, T. Maeda, T. Kanao, K. Kamimura, F. Takeuchi,
Okayama University and Hazama Corp., Japan

Functional analysis of bacterial metal transporters important in phytoremediation

G. Grass, Martin-Luther Universitat Halle, Germany; C. Rensing, S. Franke,
University of Arizona, Tucson, AZ

Metal reduction and anaerobic respiration in *Shewanella oneidensis* MR-1

D. Saffarini, University of Wisconsin, Milwaukee, WI

Global and physiological responses to substrate shifts in continuous and controlled batch cultures of *Shewanella oneidensis* MR-1

J. Fredrickson, Battelle Pacific Northwest Laboratory, Richland, WA

Session 15: Bacterial dehalogenation

Convener: J.
Magnuson, Pacific
Northwest National
Laboratory, Richland,
WA

Identification of biosynthetic and regulatory genes involved in production of PDTC, a dechlorinating siderophore of *Pseudomonas* sp.

T.A. Lewis,* H.J Hartwell, C. Yu, University of Vermont, Burlington, VT

Reductive dechlorination by the *Dehalococcoides* spp.

S.H. Zinder,* X. Maymo-Gattell, A. Carroll, I. Nijenhuis, L. Adrian, J. Fung,
Cornell University, Ithaca, NY

Enhanced tools for monitoring reductive dechlorination processes

R. Krajmalnik Brown, K.M. Ritalahti, I. Thomson, R.E. Loeffler,* Georgia
Institute of Technology, Atlanta, GA

Finding the needle in the microbial haystack - Detection of PCB dechlorinating bacteria in sediments and microcosms

K.R. Sowers,* S.K. Fagervold, J.E.M. Watts, Center of Marine Biotechnology,
UMBI, Baltimore, MD; H.D. May, Medical University of South Carolina,
Charleston, SC

Anaerobic dehalogenation of polychlorinated dibenzo-*p*-dioxins and brominated flame retardants in the marine environment

M.M. Haggblom, Rutgers University, New Brunswick, NJ

Session 16: Student Contributed Paper Session

Conveners: B. Olson,

Tuesday afternoon, July 27

**Amgen Award
Lecture**

Session 17: Poster Session #2

Session 18: **What role should scientists play in government and the political process?**
Marcel Faber **Panelists:** S. Shoemaker, California Institute of Food and Agricultural Research,
Roundtable University of California, Davis, CA and M. Schechtman, Office of the Deputy
Conveners: L.L. Secretary, USDA, Washington, DC
Lasure, Pacific
Northwest National
Laboratory, Richland,
WA

Session 19: **State-of-the-art manufacturing of protein hydrolysates**
Manufacturing and S. Braun, A.J. More,* DMV International Nutritionals, Delhi, NY
applications of protein
hydrolysates in **The changing requirements for protein hydrolysates in the**
biotechnology **biopharmaceutical market**
Convener: V.K. J.C. Wannlund, BD Diagnostic Systems, Sparks, MD
Pasupuleti, SAI
International, Geneva,
IL

Applications of protein hydrolysates in industrial fermentations
C.P. Wilcox,* M.M van Iersel-Snijder, L. Hagen, J. O'Reily, J.H. van der
Woude-Rekers, A.D. Siemensma, R. Cole, A. Kunst, H. Huttinga, M.
Cacciottolo, Kerry Bio-Science, Hoffman Estates, IL/ Naarden, The
Netherlands/ Norwich, NY

Applications of protein hydrolysates in starter cultures
S. Ummadi, CHR. HANSEN, Inc., Milwaukee, WI

Variable performance of protein hydrolysates in fermentation processes
C.A. Holmes,* Eli Lilly and Co., Indianapolis, IN

**Recombinant human gelatin fragments of defined molecular weight and
charge for use as biomaterials**
D. Olsen, R. Chang, K. Williams, S. Almeda, S. Leigh, R. Lundgard, J.
Polarek,* Fibrogen, Inc., South San Francisco, CA

Session 20: **Use of a spin filter basket to increase SF9 cell density and protein
Protein expression in** **expression levels**
baculovirus P. Cino,* C. Chen, Neose Technologies, Horsham, PA
Convener: P. Cino,
Neose Technologies,
Horsham, PA

**Process development and commercial production of an avian reverse
transcriptase**

C.W. Kemp, Kemp Biotechnologies, Inc., Frederick, MD

Using BEVS to develop and produce recombinant protein based vaccines: SARS and influenza

D.K. Anderson, Protein Sciences Corp., Meriden, CT

Insect cell technology: A versatile recombinant gene expression system

C. Elias, Biotechnology Research Institute (NRC), Montreal, Quebec, Canada

Protein expression using stable transformed insect cell lines: Production of a CBD-factor X fusion protein in high cell density perfusion culture using an acoustic filter

T.A. Pfeifer,* V.M. Gorenflo, D.G. Kilburn, J.M Piret, T.A. Grigliatti, University of British Columbia, Vancouver, BC, Canada

Tuesday evening, July, 27

SIM Reception and Banquet

Speaker: K. Neelson, University of Southern California, Los Angeles, CA

Wednesday morning, July 28

**Session 21:
Microbial processes using non-carbohydrate substrates**

Conveners: M.C. Flickinger, University of Minnesota, St. Paul, MN and E.S. Miller, Jr., DuPont, Wilmington, DE

The story of fungal riboflavin production

O. Zelder, BASF Aktiengesellschaft, Ludwigshafen, Germany

Biological production of fuels and chemicals from synthesis gas

K.T. Klasson and B.H. Davison,* Oak Ridge National Laboratory, Oak Ridge, TN

"Bio-protein," a new high quality single cell protein based on natural gas

G. Kleppe, Norferm AS, Stavanger, Norway

Plasmid-borne methylotrophy: Methanol dehydrogenase and five RuMP pathway genes are encoded by a 19 kb natural plasmid in thermotolerant *Bacillus methanolicus*

T. Brautaset, S. Valla, Norwegian Univ. of Science and Technology, Trondheim, Norway; O.M. Jakobsen,* Norwegian Univ. of Science and Technology, and SINTEF Materials and Chemistry, Trondheim, Norway; T.E. Ellingsen, SINTEF Materials and Chemistry, Trondheim, Norway; M.C. Flickinger, University of Minnesota, St. Paul, MN

Commercial production of long chain dibasic acids from straight chain alkanes

Q.X. Zhang, Y.J. Qiu, N.Q. Li, P.J. Caswell,* Cathay Biotechnology, Shanghai, China

Physiology and biochemistry of glutamate and L-lysine biosynthesis from methanol by *Bacillus methanolicus* at 50°C

M.C. Flickinger,* S.B. Pluschkell, R. Dillingham, University of Minnesota, St. Paul, MN; T. Brautaset, S. Valla, Norwegian University of Science and Technology, Trondheim, Norway; O.M. Jakobsen, Norwegian University of Science and Technology/SINTEF, Trondheim, Norway

Session 22:

Docosaheptaenoic acid (DHA) synthesis in the marine microalga

Marine natural products

Convener: G. Wang, University of Hawaii at Manoa, Honolulu, HI

***Schizochytrium* sp.**

R. Zirkle,* J. Metz, J. Kuner, B. Rosenzweig, C. Weaver, A. Hauvermale, C. Lippmeier, J. Wynn, K. Apt, Martek Biosciences, Boulder, CO and Columbia, MD

Jamaicamide biosynthesis in the cyanobacterium *Lyngbya majuscula*: Novel tailoring steps in a hybrid PKS/NRPS pathway

D.J. Edwards,* W.H. Gerwick, Oregon State University, Corvallis, OR

Phylogeny, biogeography and natural product production by marine actinomycetes

P.R. Jensen,* W. Fenical, Scripps Institution of Oceanography, La Jolla, CA

Microbial metabolomics and the quest for new natural products

D.H. Sherman,* N.A. Magarvey, C. Salomon, J. Keller, University of Michigan, Ann Arbor, MI and University of Minnesota, Twin Cities, MN

BioDiversity, BioProcessing and BioDiscovery

E.J. Mathur, Diversa Corporation, San Diego, CA

**Session 23:
Fungal morphology:
Basic science and
commerical practice
Conveners: L.L.**

Lasure, Pacific Northwest National Laboratory, Richland, WA and G.S.P. Groot, DSM Food Specialties, Delft, The Netherlands

Shape Matters! The success of a fungus is largely governed by the morphology of its cell wall

S. Bartnicki-Garcia, Centro de Investigacion Cientifica y de Education Superior de Ensenada, Ensenada, Baja, Mexico

Genetic approaches for understanding hyphal morphogenesis

S.D. Harris, University of Nebraska, Lincoln, NE

A simple, inexpensive process strategy can alter fungal morphology and improve protein expression

M.R. Marten,* S. Bhargava, Z.J. Li, M.P. Nandakumar, University of Maryland Baltimore County, Baltimore, MD; and K.S. Wenger, K. Rane, V. Rising, Novozymes North America, Inc., Franklinton, NC

Fungal morphology in a novel fungal expression system

C.M. Pynnonen, P.T. Olson, Bio-Technical Resources, Manitowoc, WI; J. Bartels, C. van Zeijl, M. Heerikhuisen, P.J. Punt, TNO Voeding, Zeist, The Netherlands; R.P Burlingame,* Dyadic International, Inc., Jupiter, FL

The importance of microbial morphology for the performance of fermentation processes

J.A. de Hollander,* P. Sarantinopoulos, R. Meulenberg, H. Stam, DSM Food Specialties, Delft, The Netherlands

The ideal fungal morphology in commerical processes

L.L. Lasure,* Z. Dai, J. Magnuson, Battelle Pacific Northwest National Laboratory, Richland, WA

**Session 24:
Metabolic engineering
for the production of
nutraceuticals and**

From concept to process: Metabolic engineering for production of glucosamine and N-acetylglucosamine

M.-D. Deng,* D. Severson, A. Grund, S. Wassink, J. Running, C. Leanne, L. Song, K. Nielsen, B. Walsh, B. Huckins, T. Lutze, R. Rosson, Bio-Technical

pharmaceuticals
Convener: M.-D.
Deng, Bio-Technical
Resources, Manitowoc,
WI

Resources, Manitowoc, WI

An engineered *Aspergillus niger* industrial host strain for the safe production of food and feed enzymes

P.W.M. van Dijck, DSM Food Specialties, Delft, The Netherlands

Microbial production of arachidonic acid and docosa hexaenoic acid-rich oil: From academic possibility to commercial reality

J. Wynn,* K. Apt, Martek Biosciences Corp., Columbia, MD; H. Streekstra, B. Schultz, DSM Food Specialties, Delft, The Netherlands

Production of polyketides in *E. coli*

J.T. Kealey, Kosan Biosciences, Inc., Hayward, CA

Cloning and expression of fungal phytases in genetically modified strains of *Aspergillus awamori*

J.A. Martin,* R.A. Murphy, R.F.G Power, Alltech Ireland, Dunboyne, Ireland

Lactic acid bacteria as cell factories for the production of nutraceuticals

J. Hugenholtz, Wageningen Centre for Food Sciences and NIZO Food Research, BA Ede, The Netherlands

**Session 25:
Commerical
opportunities in
Russian biotechnology**

Convener: G. Pierce,
Georgia State
University, Atlanta, GA
and A. Smithson, Center
for Strategic and
International Studies,
Washington, DC

Transgenic plant research

S. Dolgov, Branch of Shemyakin & Ovchinnikov Institute of Bioorganic Chemistry, Pushchino, Russia

Oxygen gas analyzers using phosphorescent film sensors

N. Osin, State Scientific R&D Institute of Biological Engineering, Moscow, Russia

Aerosolization techniques as applied to animal studies

R. Borovick, Research Center for Toxicology and Hygenic Regulation of Biopreparations, Serpukhov, Russia

Overview of Biochimash Agricultural and Medical Biotechnologies

A. Moshkin, Biochimash, Moscow, Russia

Wednesday afternoon, July 28

SIM afternoon outing

This year's annual outing will take us to Disneyland, across the street from the Anaheim Marriott. Ticket price includes pass to the park and buffet dinner at the park.

Thursday morning, July 29

**Session 26:
Evolutionary
engineering for the
developments of
biological catalysts**

Conveners: S.B. del
Cardayre, Codexis,
Redwood City, CA

Gene Shuffling for the development of diverse biological catalysts

L.M. Newman, Codexis, Redwood City, CA

Directed evolution and the shikimate pathway

N. Ran, J.W. Frost,* Michigan State University, East Lansing, MI

Genome shuffling improves degradation of the anthropogenic pesticide pentachlorophenol by *Sphingobium chlorophenicum* ATTC 39723

S.D. Copley,* M.-H. Dai, University of Colorado, Boulder, CO

Why yeasts do not grow on xylose and how they can be taught by evolution
M. Sonderegger,* M. Jeppsson, B. Hahn-Hagerdal, U. Sauer, Institute of
Biotechnology, ETH Zurich, Zurich, Switzerland

**Watchmaker™ - A new technology for the evolution of small molecule
drugs. Applications in the discovery of anti-oxidants and nuclear receptor
agonists**

A.S. Sorensen,* Evolva A/S, Copenhagen, Denmark

**Session 27:
Production of
industrial chemicals
from biomass through
fermentation**

Conveners: N.P.
Nghiem, Martek
Biosciences
Corporation,
Winchester, KY and
F.A. Agblevor, VPI &
SU, Blacksburg, VA

**Integrating emerging technologies with biomass refining: Establishing the
foundation for replacing petrochemicals**

E. Ponnampalam, MBI International, Lansing, MI

Conversion of lignocellulose to fuel ethanol

B.C. Saha, USDA-ARS-NCAUR, Peoria, IL

**Metabolic engineering of catabolic product metabolism in thermophilic
bacteria**

S.G. Desai,* M.V. Tyurin, J.R. Mielenz, L.R. Lynd, Dartmouth College,
Hanover, NH

Succinic acid production from biomass

M.V. Guettler, J. Yi, D.S. Rumler, A.L. Hoffman, M.D. Stowers, S. Kleff,*
MBI International, Lansing, MI

Investigation of corn stover hydrolysate as xylitol production substrate

F.A. Agblevor,* M. Lucas, E. Birdsall, VPI & SU, Blacksburg, VA

**Integrated bioprocessing technique for production of nutraceutical oils
from agricultural residues**

T.H. Walker,* Clemson University, Clemson, SC; P. Patel, Louisiana State
University, Baton Rouge, LA

**Session 28:
Fungal genomics for
harnessing beneficial
biochemical processes
and controlling
harmful toxins**

Conveners: T.E.
Cleveland, USDA-ARS-
SRRC, New Orleans,
LA and G.A. Payne,
North Carolina State
University, Raleigh, NC

Genomics of *Aspergillus flavus* for controlling harmful toxins

D. Bhatnagar,* J. Yu, T.E. Cleveland, USDA-ARS-SRRC, New Orleans, LA;
W. Nerman, The Institute for Genomic Research, Rockville, MD

Sequence analysis and functional genomics of *Aspergillus flavus*

G.A. Payne,* R.A. Dean, M.S. Price, North Carolina State University, Raleigh,
NC; J. Yu, T.E. Cleveland, D. Bhatnagar, USDA-ARS-SRRC, New Orleans,
LA; W.A. Nierman, The Institute for Genomic Research, Rockville, MD; A.M.
Fakhoury, Southern Illinois University, Carbondale, IL

Genomics of *A. oryzae* and the analysis of metabolic regulation

M. Machida,* K. Asai, AIST; T. Tanaka, NITE; Y. Kashiwage, NFRL; O.
Akita, NRIB; K. Gomi, K. Abe, Tohoku University; K. Kitamoto, H. Horiuchi,
University of Tokyo; T. Kobayashi, Nagoya University; M. Takeuchi, Tokyo
University of Agric. & Tech; H. Anazawa, Kyowa Hakko; Y. Koide, Amano
Enzyme; T. Komori, Intec Web & Genome Informatics; Y. Koyama, Kikkoman;
A. Tanaka, Higeta Shoyu; Y. Hata, Gekkeikan Sake; T. Minetoki, Ozeki; J. Yu,
SRRC, Japan

Genomics of the wheat and barley pathogen, *Fusarium graminearum*

C. Kistler, L.R. Gale, USDA-ARS/Univ. of Minnesota, St. Paul, MN; F. Trail, Michigan State University, East Lansing, MI; B. Birren, L-J. Ma, J. Galagan, K. O'Donnell, MIT, Cambridge, MA; K. Seong, J-R. Xu,* Purdue University, W. Lafayette, IN

Fungal genomics for the development of biobased products and the study of secondary metabolites

S.E. Baker,* Syngenta, San Diego, CA/PNNL, Richland, WA; T.P. Asvarak, Cornell University, Ithaca, NY; S. Kroken, B-Y. Li, L. Shi, O.C. Yoder, Syngenta, San Diego, CA; B.G. Turgeon, Syngenta/Cornell University; E.A. Panisko, J.K. Magnuson, Z. Dai, C.F. Wend, L.L. Lasure, PNNL, Richland, WA

Session 29:

**Process optimization:
Better designs for
faster development**

Convener: E.T. Davies,
University of Georgia,
Athens, GA

Statistical design of experiments (DOE) for making breakthroughs

M.J. Anderson,* P.J. Whitcomb, Stat-Ease, Inc., Minneapolis, MN

Use of scale-up models to accelerate technology transfer

K. Green,* C. Knevelman, Lonza Biologies, Portsmouth, NH

Micronutrients in animal cell culture: When is small beautiful?

D.M Mousdale,* K. Dowdells, beocarta; J. Spencer, University of Strathclyde, Glasgow, UK

Using historical manufacturing data as a key resource for fermentation optimization: A database mining and neural network approach to process improvement

D.E. Block, University of California, Davis, CA

Response surface methods (RSM) for optimization of products and processes

M.J. Anderson,* P.J. Whitcomb, Stat-Ease, Inc., Minneapolis, MN

Session 30:

**Expression of human
proteins in microbial
and non-traditional
hosts**

Convener: R.P.
Burlingame, Dyadic
International, Inc.,
Jupiter, FL

Overcoming obstacles to expression of human proteins in *E. coli*

M.R. Mayer, University of Georgia, Athens, GA

A robust and high yield *Pseudomonas fluorescens* platform for protein and biopharmaceutical manufacturing

L.C. Chew,* C.H. Squires, H.W. Talbot, D.M. Retallack, J.C. Schneider, T.M. Ramseier, Dow Chemical Co., San Diego, CA

Production of human proteins using double knockout strains of *Physcomitrella patens*

C. Stemmer, A. Koprivova, F. Kaufmann, F. Altmann, O. Lienhardt, S. Wagner, R. Reski, E. Decker, G. Gorr,* greenovation Biotech GmbH, Freilburg, Germany

Fungal protein expression systems with humanized secretory pathways: The answer to therapeutic protein production?

P. Bobrowicz, R. Davidson, T. Gerngross, S. Hamilton, J. Nett, T. Stadheim, S. Wildt,* GlycoFi, Inc., Lebanon, NH

Expressing of proteins from higher eukaryotes in microbial systems
H.J. Meerman,* H. Wang, M. Ward, R. Meneses, E. Baliu, H. Rashid, S. Wong,
V. Schellenberger, Genencor International, Inc., Palo Alto, CA

***Chrysosporium lucknowense*, a novel fungal expression system for protein production**

C. van Zeijl, M. Heerikhuisen, P.J. Punt, TNO Nutrition and Food Research,
Zeist, The Netherlands; R.P Burlingame,* Dyadic International, Inc., Jupiter, FL

Thursday afternoon, July 29

Thom Award Lecture **Metals, minerals, and microbes**
G. Gadd, University of Dundee, UK

Session 31: **Metabolic engineering of terpene production**
Metabolic engineering to enable industrial bioprocesses J.D. Keasling, University of California, Berkeley, CA

Conveners: J. Forster, Fluxome Sciences A/S, Lyngby, Denmark and
***myo*-inositol oxidation: A new opportunity in metabolic engineering**
W. Schroeder,* S. McFarlan, P. Hicks, Cargill, Minneapolis, MN

Metabolic engineering of redox metabolism improves bio-based chemical production
J. Forster,* J. Nielsen, Fluxome Sciences A/S, Lyngby, Denmark

Establishment of functional genomics capability for *Pseudomonas fluorescens*, a high yield platform for protein production
T. Ramseier, Dow Chemical Co., San Diego, CA

Biological production of 1, 3-propanediol
G.K. Donaldson,* C.M. Peres, DuPont, Wilmington, DE and Genencor International, Palo Alto, CA

Session 32: **Exploiting bacterial glycogen metabolism as an approach to metabolically engineer rice for enhanced productivity and yields**
Biotechnology in agriculture T.W. Okita, Washington State University, Pullman, WA

Convener: B.C. Saha, USDA-ARS-NCAUR, Peoria, IL
***Bacillus thuringiensis*: Molecular mechanisms of Cry1Ab insecticidal action**
L.A Bulla Jr.,* X. Zhang, M. Candas, University of Texas-Dallas, Richardson, TX

Strategies for enhanced fuel ethanol production from corn
R.J. Bothast, Southern Illinois University, Edwardsville, IL

Functional genomic studies of *in situ* detoxification of bioethanol fermentation inhibitors using ethanolgenic yeasts
Z.L. Liu,* P.J. Slininger, USDA-ARS-NCAUR, Peoria, IL

Biobased industrial products: Back to the future for agriculture
J.G. Zeikus, Michigan State University, East Lansing, MI

"Why can't we just talk science here?" Ethical assuagion for the use of biotechnology in agriculture

Session 33:

Fungal proteomics

Conveners: S.E. Baker, Pacific Northwest National Laboratory, Richland, WA and H. Nevalainen, Macquarie University, Sydney, Australia

Proteomic response of the biological control fungus *Trichoderma atroviride* to growth on the cell wall material of *Rhizoctonia solani*

H. Nevalainen,* Macquarie University, Sydney, Australia; J. Grinyer, M. McKay, B. Herbert, Proteome Systems, Sydney, Australia

Proteome investigations of a filamentous fungus, *Phanerochaete chrysosporium*

E.A. Panisko,* J.K. Magnuson, S.E. Baker, R.J. Moore, M.S. Lipton, L.L. Lasure, Pacific Northwest National Laboratory, Richland, WA

Analysis of the *Neurospora* cell wall proteome by mass spectrometry

P.J. Vierula,* C.A. Valencia, Carleton University, Ottawa, ON, Canada; L. Tessier, J.F. Kelly, Inst. for Biological Sciences (NRC), Ottawa, ON, Canada

Proteome analysis of cell responses to protein secretion in *Trichoderma reesei*

M. Penttila,* T.M. Pakula, H. Koivistoinen, M. Saloheimo, VTT Biotechnology, Espoo, Finland; T. Riipi, L. Valmu, N. Kalkkinen, Instit. Biotechnology, Finland; K. Lanthaler, G. Robson, University of Manchester, UK

Proteomic analysis of cellulose-degrading filamentous fungi-The search for improved cellulases

P.V. Harris,* K.M. Brown, W. Albano, J.R. Cherry, Novozymes Biotech Inc., Davis, CA

Session 34:

Coatings, inks and microstructures containing living cells

Conveners: M.C. Flickinger, University of Minnesota, St. Paul, MN and D.B. Chrisey, Naval Research Laboratory, Washington, DC

Optical imaging fiber arrays with living cells

Y. Kuang,* D.R. Walt, Tufts University, Medford, MA

Immobilization of yeast cells on patterned lipid films and nanogold membranes

M. Sastry,* National Chemical Laboratory, Pune, India

Whole cells as components in micro- and nanoscale devices and systems

M.L. Simpson,* Oak Ridge National Laboratory, Oak Ridge, TN; G.S. Saylor, University of Tennessee, Knoxville, TN

Rapid prototyping of living biological systems

D.B. Chrisey, Naval Research Laboratory, Washington, DC

Direct-printing of biological materials by precision spray process

G.J. Marquez,* M.J. Renn, Optomec, Inc., Albuquerque, NM

Biocatalysis and gene expression in porous latex coatings and piezoelectric-printed microstructures containing living bacteria

M.C. Flickinger,* S. Charaniya, C. Solheid, C.R. Anderson, O.K. Lyngberg, H. Ge, J.L. Schottel, L.E. Scriven, University of Minnesota, Minneapolis/St. Paul, MN

Thursday evening, July 29

Optional Outing

Anaheim Angels vs. Seattle Mariners

Program Committee

Reinhardt A. Rosson, Bio-Technical Resources, Manitowoc, WI, Chair
S.N. Rajagopal, University of Wisconsin, La Crosse, WI, Co-chair
Thomas "Ed" Cleveland, USDA/ARS/SRRC, New Orleans, LA, Co-chair
Kevin Reynolds, Virginia Commonwealth University, Richmond, VA
Badal Saha, USDA-ARS-NCAUR, Peoria, IL