

1st Collaboration Workshop December 2, 2004

Proposals by Presenter for Workshop Topic Areas (Examples)

Topic Area: Alternative fossil-based feedstock & chemistries

Joe Zoeller, Senior Research Associate

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Syngas (C-1) based technologies for highly oxygenated chemicals (e.g. alcohols/diols, acids, esters) which displace C2-C4 Hydrocarbons. Commercially viable Methanol to Olefins.

Darryl Fahey: Industrial Liaison Director

Center for Environmentally Beneficial Catalysis
Kansas University, CEBC
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Lawrence, KS 66047-1803
Phone: 785-330-4380
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Catalytic Systems for biomass conversions to chemicals that are industrially relevant, environmentally responsible, & economically viable. Also: similar conversion of syngas, and of olefin hydroformylations, and catalytic systems for selective chemical oxidations.

Santosh Gangwal, Senior Program Director

RTI International
3040 Cornwallis Road
Research Triangle Park, NC 27709
Phone: 919-541-8033
Email: skg@rti.org

Biomass Gasification, "syngas cleanup," biomass to ethanol, iron FT development.

Jeff McDaniel, Business Development Manager

Velocys, Inc.
7950 Corporate Blvd.
Plain City, OH 43045
Phone: 614-733-3319
Email: mcdaniel@velocys.com

Developing compact gas-phase synthesis reactors.

James Miller, Sandia National Laboratories

1001 University Blvd SE

Suite 100

Albuquerque, NM 87106

Phone: 505-272-7626

Email: jemille@sandia.gov

Apply advanced monolith structures to improve catalyst performance; develop nanoscale catalysts w/enhanced activity, uniformity & stability; develop catalysts for single-stage epoxidation of olefins using molecular oxygen.

Seth Snyder, Section Leader

Argonne National Laboratory

ESD-362

Chemical and Biological Technology

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Phytotechnologies: tree growth in marginal lands for feedstocks; Crude syngas fermentation to produce ethanol & other chemicals; Electrical-driven conversion & separation processes (acid/base chemistry); Membrane-based separations systems.

Kurt Kolasinski, Director, CAMOS Ultrafast Laser Lab

University of Virginia

Department of Chemistry

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Charlottesville, VA 22904-4319

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Email: kolasinski@virginia.edu

C1 chemistry: the catalytic reactions of syngas & methane; Chemicals & fuels from renewable carbon feedstocks via heterogeneous catalysis; Catalytic production & purification of carbon nanomaterials.

Robert Santoro: Professor

Penn State University

240 Research Building East

Bigler Rd.

University Park, PA 16802

Phone: 814-863-1285

Email: rjs2@psu.edu

Develop robust burner designs that are tolerant of fuel composition variations; the operation of gas turbines using syngas fuels requires robust burner designs that are tolerant of fuel composition variations.

John M. Maher, President

Rampant Technology Partners, LLC

1113 Highland Rd

Charleston, WV 25302

Phone: 304-552-5912

Email: maherjm@rampantech.com

Convergent synthesis of isocyanates from olefins; direct conversion of biomass to ethylene glycol, glycolic acid

Alain Roy, Vice President

Kingston Process Metallurgy Inc.
1102 Lancaster Drive
Kingston, Ontario, Canada K7P 2L7
Phone: 613-547-0116 x120
Email: alainroy@kpm.ca

Production of H₂ from H₂S as first stage of claus reactor; Production of H₂ from alternative sources (biomass) via H₂S production.

Mark Jones, Technical Leader

Dow Chemical Co.
1776 Building
Midland, MI 48674
Phone: 989-636-4307
Email: markjones@dow.com

Target=propylene. Goal=more than 20% reduction in capital and/or more than 30% reduction in raw mat'l cost (relative to EP or Naphtha). Target=benzene. Goal=same as propylene. Target=ethylene. Goal=same as benzene & propylene. Target=ethylene glycol. Goal=avoid ethylene, methane, syngas or ethane feed. HCl to CL₂ or HCl to phosgene.

Joe Jacomet, Vice President

Battelle
505 King Avenue
Columbus, OH 43201
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Development, scale-up, & commercialization of biobased chemistries, specifically modified soy oil. Potentable chemistries have been developed for various applications: plasticizers, wood adhesives, toners for improved copy paper durability, lubricants, & powder coatings.

Mark Weise, Director, R&D

Praxair, Inc.
175 East Park Drive
Tonawanda, NY 14150
Phone: 716-879-7165
Email: mark_weise@praxair.com

Enhanced gasification of biomass or other streams to produce syngas.

Arel Weisberg, Program Manager

Energy Research Company
2571-A Arthur Kill Road
Staten Island, NY 10309
Phone: 718-608-0935
Email: aweisberg@er-co.com

Develop a real-time feedstock analyzer & feed forward controls for compensating for alternative feedstocks' variable quality.

Brendan Murray, Program Manager

Energy Research Company
2571-A Arthur Kill Road
Staten Island, NY 10309

Phone: 718-608-0935

Email: aweisberg@er-co.com

Derive chemicals from advantaged alternative fossil fuel based feedstocks, stranded gas, tar sands, coal, byproduct streams, GTL product streams.

James Pollack, Business Manager, Environmental Services

Omni Tech International, Ltd.

2715 Ashman Street

Midland, MI 48640

Phone: 989-631-3377 x233

Email: jpollack@omnitechintl.com

Provide EHS & economic life cycle assessments of chemical & biochemical manufacturing & products.

Steve Kelley, Principal Scientist, National Bioenergy Center

National Renewable Energy Laboratory

1617 Cole Boulevard

MS 3212

Golden, CO 80401-3393

Phone: 303-384-6123

Email: steve_kelley@nrel.gov

Can biomass derived syngas or oils be used in conjunction w/fossil feedstocks?

Topic Area: Energy efficient process alternatives

Emory Ford, Associate Director

MTI

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Florence, MA 01062

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Create a roadmap or technical plan for process intensification in the chemical process industry

Bill Johnson, Engineering Scientist

West Virginia University

Nat'l Resource Center for Coal & Energy

PO Box 6064

Morgantown, WV 26506

Phone: (304)293-2867

Email: william.johnson@mail.wvu.edu

Simplified hydrogen peroxide production integrated w/black-liquor gasification in a pulp-based biorefinery.

Artie Chin, Rohm and Haas Co.

3100 State Road

Croydon, PA 19021

Phone: 215-785-7249

Email: achin@rohmmaas.com

Innovations in energy efficient processes

Jim Gleeson, Senior Account Manager, Business Development

Argonne National Laboratory

9700 S. Cass Avenue

OTT/201

Argonne, IL 60439

Phone: 630-252-6055

Email: jgleeson@anl.gov

Develop novel dehydration processes for clean chemicals. Combine hydrogen transport membrane technology with catalyst technology.

Francis Via, Program Development

Argonne National Laboratory

2389 Ridge Street

Yorktown, NY 10598

Phone: 914-962-5583

Email: thevias@oco.net

Environmental **catalysis** reduction CH₄ vs NH₃, SCR ??? HC's. Combustion-environmental optimization, polymeric membranes, engine testing, nitrogen rich air to reduce NO_x Nanotechnology modified clay, talc, zeolite, dispersed in waxes & coatings. Advanced coatings technology wear frictionless carbon cvd coatings: tribology—highly efficient.

CB Panchal, Chemical Engineer, Energy Systems Division

Argonne National Laboratory

9700 South Cass Avenue, Building 362

Argonne, IL 60439-4815

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Email: cpanchal@anl.gov

Project 1: Improved energy efficiency of distillation by monitoring & fouling mitigation of heat exchangers (condensers, reboilers, FH, F/E, HXS). Project 2: Energy-water nexus. Dry cooling, bottoming cycle, water pinch technology. Project 3: waste-heat powered absorption refrigerator on for improved separation processes & debottlenecking processes.

Raul Alaya, Chemical Engineer

GE Global Research

General Electric Company

One Research Circle

Building CE, Room 475

Niskayuna, NY 12309

Phone: 518-387-5850

Email: raul.ayala@research.ge.com

Desalinization & energy minimization; process & membranes; involved in polymeric membrane materials development for liquid-liquid separations; interested in site evaluation.

Sandy Kushner, Air Products and Chemicals, Inc

7201 Hamilton Blvd

Allentown, PA 18103

Phone: 610-481-5540

Email: kushnesa@airproducts.com

Rapid, safe, cost-effective scale-up of new technology/process R & D

Bala Subramaniam, Professor

University of Kansas

1501 Wakarusa Drive

Suite A-110

Lawrence, KS 66047

Phone: 785-330-4490

Email: bsubramaniam@ku.edu

Novel Rh catalysts and process for higher olefin hydroformylation w/catalyst

recycle. Novel solid acid catalysts & processes for alkylations & acylations.

Novel catalysts & processes for selective oxidation including olefin epoxidations.

Novel catalysts & processes for biomass conversion to value-added products

(biorefining). Novel catalysts & processes for syngas conversions to chemicals & fuels.

Dennis Vigil, Associate Professor

Iowa State University

2114 Sweeney Hall

Iowa State University

Ames, IA 50011-2230

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Email: vigil@iastate.edu

w/Rodney Fox: Simulation tools for poly disperse multiphase flows. Multi-scale

simulation of nanoparticle aggregation for scale up of high rate synthesis

methods. **w/Brent Shanks:** Combined catalyst/sorbent for more efficient

hydrogen production. Vibration-induced mobilization of trapped oil in porous media.

Sharon Robinson, R&D Program Manager

Oak Ridge National Laboratory

P. O. Box 2008

Oak Ridge, TN 37831-6181

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Email: robinsonsm@ornl.gov

Low temp separations. Advanced solvents, i.e. ionic liquids, etc Nanomaterials

synthesis. Thermal fluid modeling/simulation. Thermophysical properties

measurement & prediction.

John Dindorf, Senior Research Associate

BP Americas
150 West Warrenville Road
Mail Code D-4
Naperville, IL 60563-8460
Phone: 630-420-5078
Email: dindorja@bp.com

Recover energy from low-temperature steam w/a good return on investment.
Recover energy from low-temperature (40-50 degrees C) w/a good return on investment. Develop software to model 3-phase systems via computational fluid dynamics (CFD).

Rick Marinangeli, Manager, New Directions

UOP LLC
Box 5016
Des Plaines, IL 60017-5016
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Email: richard.marinangeli@uop.com

Process intensification – reaction w/separation.

John Carberry, Director, Environmental Technology

DuPont
E-Sta E302/208
Wilmington, DE 19880-0302
Phone: 302-695-3304
Email: john.b.carberry@usa.dupont.com

Inexpensive non-intrusive device to measure energy flow (gas, liquid, electricity) in a pipe or cable, especially steam or natural gas. Real-time data collection & analysis for distributed energy flow meters on a site basis.

Jim Martin, Market Development Manager

United Soybean Board
5400 W. 84th Terrace
Prairie Village, KS 66207
Phone: 913-652-6969
Email: jmartin@omnitechintl.com

Conversion of low-value cellulose & carbohydrates in soy to fuels & chemicals while increasing the efficiency of oil & protein extraction.

Len Fabiano, Market Development Manager

United Soybean Board
5400 W. 84th Terrace
Prairie Village, KS 66207
Phone: 913-652-6969
Email: jmartin@omnitechintl.com

Semi-continuous reactive distillation novel method for systems difficult to separate & fit between batch & continuous scale. Dynamic risk assessment techniques based on accident precursor data for undesirable situations i.e. safety & security.

Bruce Averill, Jefferson Science Fellow

U.S. Department of State

2201 C Street, NW

WHA/EPSC, Room 3248

Washington, DC 20520

Phone: 202-647-2066

Email: averillba@state.gov

Very large-scale separation of olefin/alkane mixtures using copper complexes as reversible olefin carriers. Separation of cis/trans & internal/terminal olefins using copper complexes as reversible olefin carriers. Selective “plucking” of ethylene and/or propylene from complex gas mixtures using copper complexes.

Topic Area: Alternative energy production, storage & transmission

Sigurd Sorensen, Manager, Ind & Mat Tech

INEEL

P.O. Box 1625

Idaho Falls, ID 83415-2210

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Supercritical fluid catalysis; Membrane separations processes

Joan Brenneke, Keating-Crawford Professor

University of Notre Dame

Dept. of Chemical and Biomolecular Engr.

University of Notre Dame

Notre Dame, IN 46556

Phone: 574-631-5847

Email: jfb@nd.edu

Use of ionic liquids for: energy efficient gas separations, separation of chemical feedstocks from fermentation broths, and for energy capture, storage & transfer.

Max Gorenssek, Fellow Engineer

Savannah River National Laboratory

Savannah River Site

773-42A

Aiken, SC 29808

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Email: maximilian.gorenssek@srs.gov

Thermochemical hydrogen production process development. Hybrid sulfur hydrogen production process development.

Harold Sturm, Senior Management Consultant

Savannah River National Laboratory
Building 773-A, Savannah River Site
Aiken, SC 29808
Phone: 803-725-3497
Email: harold.sturm@srs.gov

Hydrogen separation & storage using novel materials. Sequestration of CO₂/flue gas in aquifers located near producing facilities. Novel bioprocesses for hydrogen production.

Bruce Bishop, Vice President

CeraMem Corporation
12 Clematis Avenue
Waltham, MA 02453
Phone: 781-899-4495 x30
Email: bishop@ceramem.com

Develop zeolitic pervaporation membranes for liquid-liquid separations in biomass processing. Develop inorganic membranes for separation of hydrogen from high-temperature gas mixtures. Develop inorganic membranes for separation of carbon-dioxide from high-temperature gas mixtures. Develop inorganic membranes for clarification & fractionation of biomass-based feed streams.

Amy Teja, Regents Professor

Georgia Tech
School of ChBE
311 Ferst Drive NW
Atlanta, GA 30332-0100
Phone: 404-894-3098
Email: amyn.teja@chbe.gatech.edu

Integrating biomass-derived syngas w/energy and/or chemicals production.

Jim Miller, Sandia National Laboratories

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Suite 100
Albuquerque, NM 87106
Phone: 505-272-7626
Email: jemille@sandia.gov

H₂ Storage Multi-functional hybrid nanoporous materials.

Chris Cornelius, Principal Member of Technical Staff

Sandia National Laboratories
P.O. Box 5800, MS0734
Albuquerque, NM 87185-0734
Phone: 505-844-6192
Email: cjcorme@sandia.gov

H₂ Storage Multi-functional hybrid nanoporous materials (w/Jim Miller);
Alternative PEMFC membranes—high temp H₂ membrane 120 degrees C/50%RH, Membrane Electrode Assembly, Direct methanol fuel cell. H₂ Separations: Surfactant templated silica (self-assembled). Inorganic: Zeolite membranes, hybrid organic-inorganic membranes.

George Philippidis, Senior Manager

Florida International University

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EC 2105

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Sequester CO₂ in geologic formations. Produce hydrogen from biomass & store hydrogen for fuel cell and ICE applications. Develop membranes, catalysts, & MEA for low-cost high-temperature PEM fuel cells.

Boyd Davis, Adjunct Professor

Queen's University

25 Union Street

Department of Mining Engineering

Kingston, Ontario, Canada K7L 3N6

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Email: brd@post.queensu.ca

Develop alternative non-aqueous solvents for chemical hydrogen storage. Study methods for separations of reactants and products in chemical hydrogen storage.

Rich Jarrett, Director, Business Development

Praxair

30 Old Ridgebury Rd.

Darien, CT 06810

Phone: (203) 837-2474

Email: rich_jarrett@praxair.com

Use hot-oxygen burner technology for the gasification of low value fuels or wastes.

Martin Abraham, Adjunct Professor

Queen's University

25 Union Street

Department of Mining Engineering

Kingston, Ontario, Canada K7L 3N6

Phone: 613-547-0116 x141

Email: brd@post.queensu.ca

Conversion of biomass resources to hydrogen using thermal and biological methods. Development of sulfur tolerant systems for fuel reforming.

R.W. Sylvester, Principal Consultant, Process Engineering

DuPont Engineering Technology

1007 Market Street, B-9448

Wilmington, DE 19898

Phone: 302-744-2323

Email: robert.w.sylvester@usa.dupont.com

Fungible renewable fuels. Pelletize straw, stover, etc.

Shulin Chen, Professor
Washington State University
258 LJ Smith Hall
Washington State University
Pullman, WA 99164
Phone: 509-335-3743
Email: chens@wsu.edu

Fermentative hydrogen production from waste & agricultural residues. Complete use of C5 & C6 sugars lignocellulosic material for the production of bioenergy & biofuel.

John Carberry, Director, Environmental Technology
DuPont
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Wilmington, DE 19880-0302
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Email: john.b.carberry@usa.dupont.com

High temperature fuel cell producing electricity *and* useable waste heat from waste vegetable oil.

John Hryn, Group Leader, Process Metallurgy and Materials
Argonne National Laboratory
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Argonne, IL 60439
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Email: hryn@anl.gov
Atomic layer deposition for membrane surface modification

Topic Area: Energy conversion

Sangtae Kim, Assistant Professor
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Department of Chemical Engineering and Material Science
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Email: chmkim@ucdavis.edu

Grain boundary engineering of solid electrolytes for intermediate temperature solid oxide fuel cells (IT-SOFCs)

Phil Winkler, Manager, Government Contracting
Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18062
Phone: 610-481-4284
Email: winklep@airproducts.com

Scale-up services: hydrogenation, nitration, amination, N-Alkylation, dehydrogenation, dehydration, esterification, hydrolysis, epoxies, specialty additives, emulsion, polymer.

Jack Solomon, Director of Technology Assessment

Praxair

39 Old Ridgebury Road

Danbury, CT 06910

Phone: 203-837-2164

Email: jack_solomon@praxair.com

Novel hydrogen production technology

Ashok Joshi, President

Ceramatec Inc.

2425 South, 900 West

Salt Lake City, UT 84124

Phone: 801-978-2143

Email: aj@ceramatec.com

Solid oxide fuel cells. Reformation of hydrocarbons. Advance batteries (sodium, lithium)

Alagu Thenappan, Senior Principal Scientist

Honeywell Int. Inc.

101 Columbia Road

Morristown, NJ 07960-4640

Phone: 973-455-2143

Email: alagu.thenappan@honeywell.com

Develop electrolytes for fuel cells – efficient & practical way to produce hydrogen safely & commercially.

Wayne Ranbom, Director of Research & Development, Additives

Arkema Inc.

900 First Avenue

King of Prussia, PA 19406

Phone: 610-878-6662

Email: wayne.ranbom@arkemagroup.com

Develop new transparent conducting oxides to replace Indium.tin oxide for use in solar cells.