

*Program*

# ***CO<sub>2</sub> SUMMIT: TECHNOLOGY AND OPPORTUNITY***

**June 6 - 10, 2010**

**Vail Marriott Mountain Resort  
715 West Lionhead Circle  
Vail, Colorado, USA  
T: 1-970-476-4444    F:1-970-476-1647**

**Program Chair:**

**Dr. Frank Zhu, UOP LLC, USA**



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## Featured Keynote Speakers:



**Dr. Geo. A. Richards**  
Focus Area Leader  
National Energy  
Technology Laboratory,  
US DOE  
*"Clean Energy in USA"*



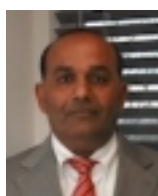
**Dr. John Carras**  
Director of Coal  
Technology, CSIRO  
Australia  
*"Low Emissions Coal  
Technology in Australia"*



**Dr. Ke Liu**  
VP/CTO  
National Institute of  
Clean Energy, China  
*"Future of Clean Energy"*



**Mr. Prabhakar Nair**  
Director, Renewable  
Energy/Chemicals, UOP  
*"Challenges & Opportunities  
in Developing a Sustainable  
Biomass Infrastructure"*



**Dr. Nazeer Bhole**  
Sr. Technology Advisor  
ExxonMobil Corporation  
*"Role of Technology in  
Clean Energy"*



**Dr. Joseph Powell**  
Chief Scientist, Shell  
*"Biofuels and Bio-based  
Chemicals"*



**Mr. Wes Bolsen**  
VP/CMO, Coskata Inc.  
*"Syngas to Ethanol  
Technology"*



**Prof. Jae Lee**  
The City College of New  
York, USA  
*"Theory and applications of  
Process Intensifications"*

## Co-sponsored by



**Sunday, June 6, 2010**

16:00 – 18:00	Conference check-in (Colorado Ballroom Foyer)
18:00 – 19:00	Welcome Reception (Colorado Ballroom Salon 3)
19:00 – 21:00	Dinner (Colorado Ballroom Salon 2)

**NOTES**

- Technical Sessions will be held Colorado Ballroom Salon 2.
- Poster Sessions will be held in Colorado Ballroom Salon 1 on Monday and Tuesday, Salon 3 on Wednesday.
- Breakfasts on Monday, Tuesday and Wednesday will be in Colorado Ballroom Salon 3, and in the Ocotillo Restaurant on Thursday.
- Lunches on Monday, Tuesday and Wednesday will be in Colorado Ballroom Salon 3, and at the Lower Pool Deck on Thursday.
- Dinners on Monday, Tuesday and Wednesday will be in Colorado Ballroom Salon 3.
- Audiotaping, videotaping and photography of presentations are 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.

## **Monday, June 7, 2010**

- 07:00 – 08:00 Breakfast
- 08:00 – 08:15 **Welcoming Remarks and Opening of the Conference**
- 08:15 – 09:00 **Conference Plenary: Energy Production in a Carbon-Constrained World**  
Geo Richards, DOE, USA
- Session 1: Clean Coal & CCS – 1**
- 09:00 – 09:45 **Keynote: Low Emissions Coal Technology in Australia**  
John Carras, CSIRO, Australia
- 09:45 – 10:15 Coffee Break
- 10:15 – 10:50 Study of the gas-liquid CO<sub>2</sub> absorption in aqueous monoethanolamine solutions: development of a new experimental tool  
C. Wylock, S. Dehaeck, E. Boulay, P. Colinet and B. Haut, University Libre de Bruxelles, Belgium
- 10:50 – 11:25 Solid fuels conversion using the iron-based chemical looping process  
R. H. Kim, F. Li, F. Wang, D. Sridhar, L. Zeng and L.-S. Fan, The Ohio State University, USA
- 11:25 – 12:00 Greenhouse gas capture and mitigation techniques for different industries  
T. Chaubey, J. P. Tranier, R. Prabhakar, B. Grover, A. Delebecque, Air Liquide, USA
- 12:00 – 12:35 Towards sustainable energy: synthesis of clean fuels from coal, biomass and municipal solid wastes with integrated carbon capture and storage  
A.-H. A. Park, H. Zhao and K. Fricker, Columbia University, USA
- 12:35 – 16:30 Lunch and free time
- Session 2: Clean Coal & CCS – 2**
- 16:30 – 17:10 A multi-objective evaluation of PC plants with aqueous amine carbon capture systems  
J. Eslick (ORISE/NETL), D. C. Miller (US DOE/NETL), A. Cozad (Carnegie Mellon University), N.V. Sahinidis (Carnegie Mellon University)
- 17:10 – 17:45 Enhanced photosynthetic growth, bio-oil and electricity production using chlorelia vulgaris and pseudomonas pudita  
P. Mitra, A. Vigueras, and G. A. Hill, University of Saskatchewan, Canada
- 17:45 – 18:15 Coffee Break

**Monday, June 7, 2010 (continued)**

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| 18:15 – 18:45 | Sustainable and innovative processes for carbon capture and recycling<br><u>M. Alvarez-Guerra</u> , A. Irabien, University of Cantabria, Spain   |
| 18:45 – 19:15 | CO <sub>2</sub> conversion to organic compounds and polymeric precursors<br><u>J. L. de Miranda</u> , A. A. Barbosa, H. B. P. Ferreira, and C. J. A. Mota,<br>Federal University of Rio de Janeiro, Brazil |
| 19:30 – 21:00 | Dinner   |
| 21:00 – 22:00 | Poster Session and Social Hour   |

## **Tuesday, June 8, 2010**

- 07:00 – 08:00 Breakfast
- 08:00 – 08:15 Announcements
- 08:15 – 09:00 **Conference Plenary:** *The Role of Technology in Energy Outlook*  
Nazeer Bhore, ExxonMobil, USA
- Session 3: Renewable Energy 1**
- 09:00 – 09:45 **Keynote:** *Challenges & Opportunities in Developing a Sustainable Biomass Infrastructure*  
Prabhakar Nair, UOP, USA
- 09:45 – 10:15 Coffee Break
- 10:15 – 10:40 Bio-energy greenhouse gases life cycle assessment review  
H. Chum, E. S. Warner, G. A. Heath, and M. K. Mann, NREL, USA
- 10:40 – 11:05 A Mobile Pyrolyzer for Converting Agricultural and Forestry Residues into Liquid Bio-Oil and Bio-Char  
F. Berruti, The University of Western Ontario, Canada
- 11:05 – 11:30 GHG Impact of Using fast pyrolysis oil for electricity and biofuel generation  
T. Kalnes, UOP, USA
- 11:30 – 11:55 Characterization and Genetic Engineering of a Strain of *Saccharomyces Cerevisiae* Capable of Utilizing Xylose for Growth and Ethanol Production  
A. Fulton, University of Saskatchewan, Canada
- 11:55 – 12:20 Analysis of Global Warming Mitigation by White Reflecting Surfaces  
F. Rossi, A. Nicolini, University Of Perugia, Italy
- 12:20 – 12:45 Microalgae Biomass Production Potential in the US  
J. Quinn, T. Bradley, Colorado State University, USA
- 12:45 – 16:30 Lunch and free time
- Session 4: Renewable Energy 2**
- 16:30 – 17:15 **Keynote:** *Biofuels and Bio-Based Chemicals: Opportunities & Barriers*  
Joseph Powell, Shell, USA
- 17:15 – 17:40 Unlocking Biofuels with Microchannel Technology  
J. McDaniel, D. Kilanowski, Velocys, Inc.  
T. Dritz, Green Columbus, USA
- 17:40 – 18:00 Coffee Break
- 18:00 – 18:25 Net Energy and Greenhouse Gas Emissions Evaluation of Biodiesel Derived from Microalgae  
L. Batan, J. C. Quinn, B. D. Willson, T. H. Bradley, Colorado State University, USA
- 18:25 – 18:50 Use of Genetically Modified *Saccharomyces Cerevisiae* to Convert Starch Directly into Bioethanol  
B. Liao, G. A. Hill, W. J. Roesler, University of Saskatchewan, Canada



**Tuesday, June 8, 2010 (continued)**

18:50 – 19:15	Compatible Powertrain Fuel from Municipal Solid Waste Plastic <u>M. Sarker</u> , M. M. Rashid, M. Molla, Natural State Research, Inc., USA
19:30 – 21:00	Dinner
21:00 – 22:00	Poster Session and Social Hour

**Wednesday, June 9, 2010**

- 07:00 – 08:00 Breakfast
- 08:00 – 08:15 Announcements
- 08:15 – 09:00 **Conference Plenary:** *Painting the Future Picture Energy from Different Angles*  
Ke Liu, National Institute of Clean Energy, China
- Session 5: Process Efficiency and Innovation**
- 09:00 – 09:45 **Keynote:** *Towards Sustainable CO<sub>2</sub> Capture*  
Jae Lee, The City College of New York, USA
- 09:45 – 10:15 Coffee Break
- 10:15 – 10:40 Lifecycle Energy Modeling—Input into Upstream Design Process  
P. Chandrahasan, T. Mallinson, N. Patwa, Siemens Energy Inc., USA
- 10:40– 11:05 Monitoring Consumption – the first step in developing an online energy management solution  
P. Feder, Honeywell Process Solutions, USA
- 11:05 – 11:30 Achieving Process Energy Efficiency Via Innovations  
G. Werba, F. Zhu, UOP, USA
- 11:30 – 11:55 Exergy analysis and heat integration of an oxy-combustion process for coal-fired power plants with CO<sub>2</sub> capture  
F. Chao, T. Gundersen, Norwegian University of Science and Technology, Norway
- 11:55 - 12:20 Efficient Combustion—The Chemical Engineer's Quest?  
D. Hildebrandt, D. Glasser, B Sempuga, B Patel, B Hausberger, University of the Witwatersrand, South Africa
- 12:20 - 12:45 Integrated Assessment of Strategies Proposed to Reduce CO<sub>2</sub> Emissions  
C. Tsouris, K. A. Williams, Oak Ridge National Laboratory, D. Aaron, Georgia Institute of Technology, USA
- 12:45 – 15:30 Lunch and free time
- 15:30 – 16:30 Poster Session
- Session 6: Developing Industrial Projects**
- 16:30 – 17:15 **Keynote:** *Efficient Syngas-to-Ethanol Technology*  
Wes Bolsen, Coskata Inc., USA
- 17:15 – 17:40 Life Cycle Analysis of Oil Sands  
Robert Braiser, B. Keesom, Jacobs Consultancy, USA
- 17:40 – 18:00 Coffee Break
- 18:00 – 18:25 How to Make Cements and Concretes with Lower CO<sub>2</sub> Emissions  
E. Garnter, Lafarge Central Research, France



## List of Posters

- 1. Analysis of global warming mitigation by white reflecting surfaces**  
Federico Rossi, University of Perugia, Italy
- 2. Sustainable and innovative processes for carbon capture and recycling**  
Manuel Alvarez-Guerra, University of Cantabria, Spain
- 3. Aqueous amine absorption: Experimentation and modeling**  
Clint Aichele, ConocoPhillips, USA
- 4. A multi-objective evaluation of PC plants with aqueous amine carbon capture systems**  
John Eslick, National Energy Technology Laboratory, USA
- 5. Studies on carbon capture and utilization for enhanced oil recovery**  
Yuedong Yao, China University of Petroleum, China
- 6. Clean hydrogen production from SMR**  
Trapti Chaubey, Air Liquide Delaware Research and Technology Center, USA