



GCEP Research Symposium

New Research Directions in a Rapidly Evolving Global Energy Landscape



September 30 - October 2, 2009
Frances C. Arrillaga Alumni Center
 STANFORD UNIVERSITY

Wednesday, September 30

8:00 – 8:30	CONTINENTAL BREAKFAST	
8:30 – 9:40	Introduction and Keynotes	
8:30	GCEP Welcome	Sally Benson, <i>Stanford</i>
8:40	Keynote Address – Report from the America's Energy Future panel at the National Academy of Sciences	Mark Wrighton, <i>Washington University in St Louis</i>
9:40–11:55	Perspectives on the Need for Innovative and Transformative Energy Research in the Current Global Environment	Chair: Sally Benson
9:40	Accelerating Energy Innovations - What is Important and What is Not	John Deutch, <i>MIT</i>
10:15– 10:45	BREAK	
10:45	Technological Innovation: The Cornerstone of Value	Jeff Keller, <i>GE</i>
11:20	Basic Research Needs in Solar Energy Utilization	Nate Lewis, <i>Caltech</i>
11:55 – 1:00	LUNCH	
1:00 – 5:30	Highlights and Future Directions for Innovative Energy Research	Chair: Lynn Orr
1:00	Advanced Batteries	Yi Cui, <i>Stanford</i>
1:40	Biofuels from Bacteria	Chaitan Khosla, <i>Stanford</i>
2:20	Advanced Combustion	Chris Edwards, <i>Stanford</i>
3:05 – 3:35	BREAK	
3:35	Electricity Infrastructure	Kevin Tomsovic, <i>U Tennessee</i>
4:15	Results from America's Energy Future Panel on Liquid Transportation Fuels from Coal and Biomass	Michael P. Ramage, <i>ExxonMobil Research and Engineering Company (retired)</i> , Jim Sweeney, <i>Stanford</i>
5:30	ADJOURN	
5:30 – 6:45	Reception	



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Thursday, October 1

8:00 – 8:30 **CONTINENTAL BREAKFAST**

8:30 – 9:00 Renewable Energy Analysis Chair: Sally Benson

8:30 Insights and Opportunities: Technologies, Policies and Markets for Clean Energy Solutions
Doug Arent, *NREL*

9:00 – 12:00 Biofuels and Bioenergy Conversion Chair: Chris Field

9:00 Biomass Energy: the Climate-Protective Domain
David Lobell, *Stanford*

9:30 Assembly of a Lignin Modification Toolbox
Clint Chapple, *Purdue University*

10:30 Biofuels and Bioenergy Conversion Poster Session

12:00 – 1:30 **LUNCH**

1:30 – 5:00 Carbon Capture and Storage Chair: Sally Benson

1:30 A Strategy for Exploiting Unconventional Gas Resources Incorporating CO₂ Sequestration
Mark Zoback, *Stanford*

2:00 Controlled Freeze Zone™ Technology: An Integrated Solution for Processing Sour Natural Gas
Chuck Mart, *ExxonMobil*

2:30 Geological Sequestration of CO₂ - An Exploratory Study of the Mechanisms and Kinetics of CO₂ Reaction with Mg-Silicates
Gordon Brown, *Stanford*

3:00 Collaborative Research on Carbon Sequestration in Saline Aquifers in China
Kristian Jessen, *University of Southern California*

3:30 Carbon Capture and Storage Poster Session

5:00 **ADJOURN**



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Friday, October 2

8:00 – 8:30 **CONTINENTAL BREAKFAST**

8:30 – 9:00 Global Exergy Analysis Chair: Sally Benson

8:30 Exergy and Carbon Flow in Natural and Human Systems Richard Sassoon, *Stanford*

9:00 – 12:00 Solar Energy Chair: Nate Lewis

9:00 Plasmonic Photovoltaics Mark Brongersma, *Stanford*

9:30 Photo-electric Enhancement of Thermionic Emission Nick Melosh, *Stanford*

10:00 Ultra-High Efficiency Thermo-Photovoltaic Cells Using Metallic Photonic Crystals as Intermediate Absorber and Emitter Shanhui Fan, *Stanford*

10:30 Solar Energy Poster Session

12:00 – 1:15 **LUNCH**

1:15 – 5:00 Advanced Energy Transformations and Storage Chair: Chris Chidsey

1:15 Metal Oxide Nanotubes and Photo-Excitation Effects: New Approaches for Low Temperature Solid Oxide Fuel Cells to Enable Low GWG-Emission Transportation Paul McIntyre, *Stanford*

1:45 Nano-structured MoS₂ and WS₂ for the Solar Production of Hydrogen Tom Jaramillo, *Stanford*

2:15 High Capacity Molecular Hydrogen Storage in Novel Crystalline Solids Wendy Mao, *Stanford*

2:45 The Electron Economy: Oxidation Catalysis for Energy Management Bob Waymouth, *Stanford*

3:15 Advanced Energy Transformations and Storage Poster Session

5:00 **ADJOURN**