



**DRAFT
AGENDA**

GCEP Research Symposium
***Meeting the Challenge of Reducing Global GHG
Emissions Through Energy Research***

June 13-16, 2005

Frances C. Arillaga Alumni Center
STANFORD UNIVERSITY



Monday, June 13
Geologic Sequestration of CO₂

8:00 – 8:30 **CONTINENTAL BREAKFAST**

8:30 – 10:30 Introduction and Opening Addresses

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| 8:30 | GCEP Welcome and Introduction | Lynn Orr, <i>Global Climate and Energy Project</i> |
| 8:40 | Keynote Address: What We Don't Know About Energy and Climate | Freeman Dyson, <i>Institute for Advanced Study, Princeton University</i> |
| 9:40 | Geologic Storage—Grand View | Sally Benson, <i>Lawrence Berkeley National Laboratory</i> |

10:30 – 10:50 **BREAK**

10:50 – 12:40 Geologic Sequestration of CO₂ (I)

Chair: Jerry M. Harris

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| 10:50 | Seal Integrity for Geologic Storage of CO ₂ | Mark Zoback, <i>Stanford University</i> |
| 11:20 | Modeling Flow in Geologic Storage Systems | Lynn Orr, <i>Stanford University</i> |
| 11:50 | Experience and Challenges in Canadian Gas Storage Projects | Malcolm Wilson, <i>University of Regina, Canada</i> |

12:40 – 1:40 **LUNCH**

1:40 – 4:00 Geologic Sequestration of CO₂ (II)

Chair: Mark Zoback

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| 1:40 | Storing CO ₂ in Coal Beds | Tony Kavscek, <i>Stanford University</i> |
| 2:10 | Monitoring Geologic Storage Projects | Jerry M. Harris, <i>Stanford University</i> |
| 2:40 | Geologic Formations Suitable for CO ₂ Storage Around the World | John Bradshaw, <i>Geoscience Australia</i> |
| 3:30 | Panel Discussion | |

4:00 – 6:00 Poster Session and Reception

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| 4:00 | Geologic Sequestration of CO ₂ Posters and Reception | |
| 6:00 | ADJOURN | |



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**Tuesday, June 14
 Advanced Combustion**

8:00 – 8:30 **CONTINENTAL BREAKFAST**

8:30 – 9:30 Keynote Address

8:30 Opening Remarks Lynn Orr, *Global Climate and Energy Project*

8:40 Keynote Address: Meeting Energy Challenges: Technology and Policy Ernest Moniz, *Massachusetts Institute of Technology*

9:30 – 12:00 Perspectives on Advanced Combustion

Chair: Craig T. Bowman

9:30 Challenges in Combustion Charles Westbrook, *Lawrence Livermore National Laboratory*

10:20 – 10:40 **BREAK**

10:40 Integrated Gasification Combined Cycles with CO₂ Capture Jeffrey Phillips, *EPRI*

11:20 Biomass Larry Baxter, *Brigham Young University*

12:00 – 1:00 **LUNCH**

1:00 – 4:20 Advanced Combustion

Chair: Charles Westbrook

1:00 Low-Irreversibility Engines Chris Edwards, *Stanford University*

1:30 Low-Temperature Controlled Combustion Craig T. Bowman, *Stanford University*

2:00 Biomass and Coal Char Combustion Reginald Mitchell, *Stanford University*

2:30 – 2:50 **BREAK**

2:50 Process Informatics for Reaction Process Models David Golden, *Stanford University*

3:20 Optical Diagnostics and Sensors Ronald Hanson, *Stanford University*

3:50 Panel Discussion

4:20 – 6:00 Poster Session

4:20 Advanced Combustion Posters

6:00 **ADJOURN**



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Wednesday, June 15 **Hydrogen**

8:00 – 8:30	CONTINENTAL BREAKFAST	
8:30 – 9:30	Keynote Address	
8:30	Keynote Address	TBD
9:30 – 11:20	Fuel Cells	Chair: Bruce Clemens
9:30	Oxygen Ion Conduction Materials	Fritz Prinz, <i>Stanford University</i>
10:00	NMR Studies of Ceramic Materials	Jonathan Stebbins, <i>Stanford University</i>
10:30 – 10:50	BREAK	
10:50	Proton Conduction Materials	Sossina Haile, <i>Caltech</i>
11:20 – 11:50	Hydrogen Storage (I)	Chair: Bruce Clemens
11:20	Using Nanoscience to Design Hydrogen Storage Materials	Michael Heben, <i>NREL</i>
11:50 – 12:50	LUNCH	
12:50 – 2:10	Hydrogen Storage (II)	Chair: Anders Nilsson
12:50	A First-Principles Approach to Catalytic Hydrogen Production and Chemistry: Reaction Mechanisms and Identification of Promising Catalysts	Manos Mavrikakis, <i>University of Wisconsin</i>
1:20	Nanomaterial Engineering for Hydrogen Storage	KJ Cho, Bruce Clemens, Hongjie Dai, Anders Nilsson, <i>Stanford University</i>
2:10 – 2:30	BREAK	
2:30 – 4:30	Biohydrogen and Environmental Impacts of Hydrogen	Chair: Fritz Prinz
2:30	Engineering for the Direct Production of Hydrogen from Sunlight: Making Fuels Using Biology (The Old Fashioned Way)	James Swartz, <i>Stanford University</i>
3:00	Metabolic Engineering of Hydrogen Production in Cyanobacteria	Alfred Spormann, <i>Stanford University</i>
3:30	The Effects on Air Pollution and Health of Converting All US Vehicles to Hydrogen Fuel Cell or Hybrid Vehicles	Mark Z. Jacobson, <i>Stanford University</i>
4:00	Preserving Mobility While Protecting the Environment: Hybrid Versus Hydrogen Vehicles	James Sweeney, <i>Stanford University</i>
4:30 – 6:00	Poster Session	
4:30	Hydrogen Posters	
6:00	ADJOURN	



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Thursday, June 16

**Assessments of Future Directions, Renewables &
 Recently Awarded GCEP Research Projects**

8:00 – 8:30	CONTINENTAL BREAKFAST	
8:30 – 9:30	Assessments of Future Directions	Chair: Lynn Orr
8:30	Integrated Assessment of Technology Options	John Weyant, <i>Stanford University</i>
9:00 – 9:30	Renewables	Chair: Lynn Orr
9:00	Nanostructured Organic-Inorganic Hybrid Photovoltaic Cells	Michael McGehee, <i>Stanford University</i>
9:30 – 11:50	Recently Awarded GCEP Projects (I)	Chair: Chris Edwards
9:30	Numerical Simulation of CO ₂ Sequestration in Subsurface Formations	Amir Riaz, Hamdi Tchelepi, Louis Durlofsky, and Khalid Aziz, <i>Stanford University</i>
10:00 – 10:20	BREAK	
10:20	Genetic Engineering of Cellulose Accumulation	Jennifer Milne and Chris Somerville, <i>Stanford University</i>
10:50	Novel Yeast Species for More Efficient Biomass Conversion	Gavin Sherlock, <i>Stanford University</i>
11:20	Using Cellular Photosynthesis for Bioelectricity	Fritz Prinz, <i>Stanford University</i> and Arthur Grossman, <i>Carnegie Institution of Washington at Stanford University</i>
11:50 – 1:30	Poster Session	
11:50 – 1:30	LUNCH AND POSTERS	
1:30 – 3:30	Recently Awarded GCEP Projects (II)	Chair: Richard Sassoon
1:30	Modeling AFM Measurements of PEMFCs	Peter Pinsky and David Barnett, <i>Stanford University</i>
2:00	Electrocatalysis with Discrete Transition Metal Complexes in Energy Conversion Systems	Chris Chidsey, Daniel Stack, and Robert Waymouth, <i>Stanford University</i>
2:30	Advanced Membrane Reactors in Energy Systems	Dan Jansen, <i>ECN</i> and Joop Schoonman, <i>TU Delft</i>
3:00 – 3:15	Conclusion	
3:00	Concluding Remarks	Lynn Orr, <i>Global Climate and Energy Project</i>
3:15	ADJOURN	