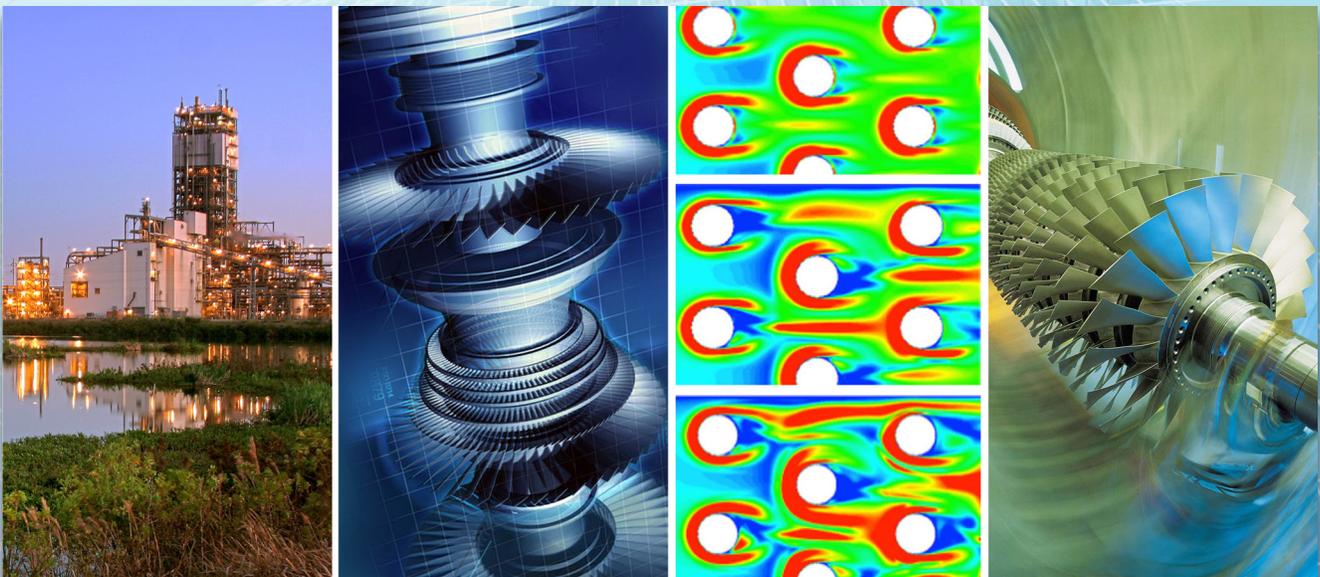


2012 University Turbine Systems Research Workshop

*Co-organized by the U.S. Department
of Energy, National Energy Technology
Laboratory & University of California at Irvine*



**October 2–4, 2012
Irvine, CA**



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7:30 a.m. Meeting Registration/Continental Breakfast – Grand Foyer B

PLENARY SESSION – KEYNOTE PRESENTATIONS – Salon A

Moderator: *Richard Dennis, U.S. Department of Energy,
National Energy Technology Laboratory*

8:30 a.m. **Welcome and Introduction – Salon A**
*Gregory Washington, Dean, Henry Samueli School of Engineering,
University of California at Irvine*

8:50 a.m. **H₂ Turbine Development for IGCC with CCS – Project Overviews and
Technical Issues**
Roger Schonewald, GE Power & Water and John Marra, Siemens Energy

10:20 a.m. **BREAK – Grand Foyer B**

10:35 a.m. **U.S. Department of Energy, Fossil Energy Hydrogen Turbine Program
Overview**
*Richard Dennis, U.S. Department of Energy,
National Energy Technology Laboratory*

11:00 a.m. **South Coast AQMD's Gas Turbine Experience-Regulations and Operations**
*Mohsen Nazemi, Deputy Executive Officer, Engineering & Compliance Office
South Coast Air Quality Management District*

12:00 p.m. **LUNCH – Terrace Court**

1:00 p.m. **Overview of Energy R&D at the University of California Irvine**
Scott Samuelsen, University of California at Irvine

1:30 p.m. **BREAK – Grand Foyer B**

1:45 p.m.

PARALLEL SESSIONS

	Conference Theater	Salon B	Trabuco
Session	Combustion	Aero/Heat Transfer	Materials
Moderator	<i>Mark Freeman</i>	<i>Robin Ames</i>	<i>Briggs White</i>
1:45	Combustion Dynamics in Multi-Nozzle Combustors – Domenic A. Santavicca, Penn State University – Tim Lieuwen, Georgia Institute of Technology	Steady and Unsteady Conjugate Heat Transfer in Turbine Cooling – Tom I-P Shih, Purdue University/Ames Lab	Multilayer Thermal Barriers Microstructure & Property Control via Thermal Spray – Sanjay Sampath, Stony Brook University
2:35	Turbulent Flame Speeds and NO_x Kinetics of HHC Fuels with Contaminants and High Dilution Levels – Eric Petersen, Texas A&M University	Effects of Hot Streak and Phantom Cooling on Heat Transfer in a Cooled Turbine Stage Including Particulate Deposition – Jeffrey Bons, Ohio State University	Turbine Thermal Management - Materials and Aero Thermal Accomplishments – Mary Anne Alvin, U.S. Department of Energy, National Energy Technology Laboratory

3:45 p.m.

Lab Tour – University of California at Irvine – Buses will depart from the hotel

6:00 p.m.

Poster Session/Reception – Grand Foyer B

WEDNESDAY, OCTOBER 3, 2012

7:00 a.m.

Meeting Registration/Continental Breakfast – Grand Foyer B

Moderator:

William H. Day, Leonardo Technologies, Inc.

8:15 a.m.

Future Trends in Gas Turbine Development – OEM Panel: Salon A

GE Energy - Geoffrey D. Myers

Siemens - Susan Scofield

MHI - Carlos Koeneke

Solar Turbines Incorporated - Hee-Koo Moon

Rolls-Royce Energy Systems, Inc. - Jonathan Li

9:45 a.m.

BREAK – Grand Foyer B

10:00 a.m.

PARALLEL SESSIONS

	Conference Theater	Salon B	Trabuco
Session	Combustion	Aero/Heat Transfer	Materials
Moderator	<i>Mark Freeman</i>	<i>Robin Ames</i>	<i>Briggs White</i>
10:00	Modeling Flashback and Flame Propagation in Hydrogen-Rich Gas Turbines – Venkat Raman, University of Texas at Austin	Aerodynamics and Heat Transfer Studies of Parameters Specific to the IGCC-Requirements: Endwall Contouring, Leading Edge Filletting, and Blade Tip Ejection Under Rotating Turbine Condition – Meinhard T. Schobeiri, Texas A&M University	Hafnia-Based Thermal Barrier Coatings for Advanced Hydrogen Turbine Technology – Chintalapalle V. Ramana, University of Texas at El Paso
10:50	Ignition Characteristics of High Hydrogen Content Fuels: Experimental and Computational Studies – Margaret Wooldridge, University of Michigan	Cooling Strategies for Vane Leading Edges in a Syngas Environment – Forrest Ames, University of North Dakota	Computational Design and Experimental Validation of New Thermal Barrier System – Shizhong Yang, Southern University and A&M College
11:40	Structure and Dynamics of Fuel Jets Injected into a High-Temperature Subsonic Cross Flow – Robert P. Lucht, Purdue University	Improving Durability of Turbine Components Through Trenched Film Cooling and Contoured Endwalls – David Kistenmacher, University of Texas at Austin – Amy Mensch, Pennsylvania State University	Degradation of TBC Systems in Environments Relevant to Advanced Gas Turbines for IGCC Systems – Brian Gleeson, University of Pittsburgh

12:30 p.m.

LUNCH – Terrace Court

Moderator:

Heather Quedenfeld, U.S. Department of Energy, National Energy Technology Laboratory

PLENARY SPEAKER – Salon A

1:30 p.m.

Unconventional Natural Gas: An LCA with a Conventional Answer
James Littlefield, Booz Allen Hamilton

2:20 p.m.

PARALLEL SESSIONS

	Conference Theater	Salon B	Trabuco
Session	Combustion	Aero/Heat Transfer	Materials
Moderator	<i>Mark Freeman</i>	<i>Robin Ames</i>	<i>Briggs White</i>
2:20	Experimental Investigation and Large-Eddy Simulation of Syngas Combustion – Matthias Ihme, University of Michigan	NETL Heat Transfer Studies in a High Temperature Test Rig – Doug Straub, U.S. Department of Energy, National Energy Technology Laboratory	Low-Conductivity, High-Durability Thermal Barrier Coatings for IGCC Engines – Eric Jordan, University of Connecticut
3:10	Turbulent Flame Propagation Characteristics of High Hydrogen Content Fuels – Tim Lieuwen, Georgia Institute of Technology	Impacts of Particulates on External and Internal Flow Paths – Karen A. Thole, Pennsylvania State University	An Alternative Low-Cost Process for Deposition of MCrAlY Bond Coats for Advanced Syngas/Hydrogen Turbine Applications – Ying Zhang, Tennessee Tech University

4:00 p.m.

Coffee Break – Grand Foyer B

4:15 p.m.

PARALLEL SESSIONS

	Conference Theater	Salon B	Trabuco
Session	Combustion	Aero/Heat Transfer	Materials
Moderator	<i>Joseph Stoffa</i>	<i>Robin Ames</i>	<i>Briggs White</i>
4:15	Combustion R&D Status Facilitated Discussion	Aero/Heat R&D Status Facilitated Discussion	Materials R&D Status Facilitated Discussion

6:00 p.m.

Workshop Dinner – Salon A

Grid Ramifications: The Future of Plug-In Vehicles

Tim Brown, Technology Manager Sustainable Transportation and Energy

Advanced Power and Energy Program

University of California at Irvine

7:30 a.m. Meeting Registration/Continental Breakfast – Grand Foyer B

PLENARY SESSION – Salon A

Moderator: Heather Quedenfeld, U.S. Department of Energy,
National Energy Technology Laboratory

8:30 a.m. The UTSR Impact, Key Accomplishments, Benefits to OEMs, and Status of Fellowship

William H. Day, Leonardo Technologies Inc.

9:00 a.m. PARALLEL SESSIONS

	Conference Theater	Salon B	Trabuco
Session	Combustion	Aero/Heat Transfer	Materials
Moderator	Mark Freeman	Robin Ames	Briggs White
9:00	Development of Criteria for Flameholding Tendencies Within Premixer Passages for High Hydrogen Content Fuels – Vincent McDonell, University of California at Irvine	FTT Aerothermal Research in Support of DOE Initiatives/Goals – James Downs, Florida Turbine Technologies, Inc.	Development of Spallation-Resistant Coatings: Preliminary Results – Matt Cavalli, University of North Dakota
Session	Combustion	Materials	Materials
10:00	An Experimental and Chemical Kinetics Study of the Combustion of Syngas and High-Hydrogen Content Fuels – Robert J. Santoro, Pennsylvania State University	Mechanisms Underpinning Degradation of Protective Oxides and Thermal Barrier Coatings in High Hydrogen Content - Fueled Turbines – Daniel Mumm, University of California at Irvine	Coating Issues in Coal-Derived Synthesis Gas/Hydrogen-Fired Turbines – Bruce A. Pint, Oak Ridge National Laboratory

11:00 a.m. BREAK – Grand Foyer B

PLENARY SESSION – Salon A

Moderator: Heather Quedenfeld, U.S. Department of Energy,
National Energy Technology Laboratory

11:15 a.m. Open Discussion and Workshop Summary (including updates from Breakout Sessions on Day 2) with box lunch – Salon A

12:00 p.m. Closing Comments and Wrap-up – Salon A

12:30 p.m. Adjourn