

**Fall Technical Meeting of the
Western States Section of the
Combustion Institute**

(WSS/CI 2013 Fall Meeting)

**Fort Collins, Colorado, USA
7 – 8 October 2013**

ISBN: 978-1-62993-584-3

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Red Hook, NY 12571



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2013 FALL TECHNICAL MEETING
WESTERN STATES SECTIONS OF THE COMBUSTION INSTITUTE
 Hosted by Colorado State University, Fort Collins
 Monday, 7 October 2013

7:15	Registration	
7:45	Welcome Address: Anthony Marchese, Department of Mechanical Engineering, Colorado State University (Durrell Center Conference Room A/B)	
	Welcoming Remarks: David McLean, Dean of Engineering, Colorado State University	
	Opening Remarks: Kalyanasundaram Seshadri, University of California, San Diego, WSSCI Chair	
8:15	Invited Presentation: Session Chair: Kalyanasundaram Seshadri, University of California, San Diego, WSSCI Chair Title: "Coupling detailed free radical mechanisms with transport" Speaker: Anthony M. Dean, Colorado School of Mines	
	Announcements: Anthony Marchese	
9:15	BREAK	
	Session 1A: Reaction Kinetics Room A: Durrell Center Session Chair: Seong-Young Lee	Session 1B: Coal and Biomass Room B: Durrell Center Session Chair: Vince McDonell
9:25	13F-01 USING THE IGNITION QUALITY TESTER (IQT) AS A TOOL FOR MECHANISM VALIDATION AND IMPROVEMENT *****3 <i>Eric Osecky¹, Gregory Bogin^{1,2}, Stephanie Villano¹, Matthew Ratcliff², Jon Luecke², Bradley Zigler², Anthony M. Dean¹</i> ¹ Colorado School of Mines ² National Renewable Energy Laboratory	13F-05 EXPERIMENTAL INVESTIGATION OF BIOMASS SMOLDERING IN A VENTILATED TEST BED *****6: <i>E.L. Belmont, C.C. Lo, B.T. Marvin, J.L. Ellzey</i> University of Texas at Austin
9:45	13F-02 INVESTIGATION OF ATTRITION RATES FOR COPPER-BASED CHEMICAL LOOPING OXYGEN CARRIER PARTICLES *****9 <i>C. Allen, C. Clayton, K. Whitty</i> University of Utah	13F-06 PERFORMANCE ASSESSMENT OF A BIOMASS DOWNDRAFT SEMI-*****7: GASIFIER BURNER WITH APPLICATION TO SOLID HUMAN WASTE COMBUSTION <i>Nathan Loveldi, John Mizia, Anthony J. Marchese, Morgan DeFoort</i> Colorado State University
10:05	13F-03 PYROLYSIS OF 2-METHOXYFURN IN A MICROREACTOR *****57 <i>Kimberly N. Urness¹, Grant Buckingham^{1,2}, David J. Robichaud², John W. Daily¹, G. Barney Ellison¹</i> ¹ University of Colorado ² National Renewable Energy Laboratory	13F-07 PYROLYSIS KINETICS OF ANISOLE AND OTHER SIMPLE LIGNIN MODEL COMPOUNDS *****86 <i>Yogesh Koirala¹, Stephanie Villano¹, Hans-Heinrich Carstensen², Anthony M. Dean¹</i> ¹ Colorado School of Mines ² Ghent University
10:25	13F-04 KINETICS STUDIES OF RADICAL-RADICAL REACTIONS (I): THE NO ₂ + N ₂ H ₃ SYSTEM *****63 <i>Hongyan Sun¹, Ghanshyam L. Vaghjiani¹, Steven D. Chambreaud¹, Adam Schenk¹, Chung K. Law²</i> ¹ Edwards Air Force Base ² Princeton University	13F-08 <i>IN-SITU</i> MEASUREMENTS OF SOOT PRODUCTION IN THE BERKELEY-DARFUR STOVE USING LASER EXTINCTION*****94 <i>Kathleen M. Lask¹, Paul R. Medwell², Cristian H. Birzer², Ashok J. Gadgil^{1,3}</i> ¹ University of California, Berkeley ² The University of Adelaide ³ Lawrence Berkeley National Laboratory
10:45	BREAK	
	Session 2A: Reaction Kinetics Room A: Durrell Center Session Chair: Hongyan Sun	Session 2B: Coal and Biomass Room B: Durrell Center Session Chair: Janet Ellzey
11:05	13F-09 INVESTIGATION OF TWO-STAGE FUEL INJECTION ON COMBUSTION INTENSITY AND SOOT FORMATION UNDER DIESEL ENGINE CONDITIONS *****3 <i>Khanh D. Cung¹, Anqi Zhang¹, Jeffrey Naber¹, Seong-Young Lee¹, Chol-Bum Kweo², Alessandro Montanaro³, Luigi Alloca³</i> ¹ Michigan Technological University ² US ARL ³ CNR	13F-13 THE EFFECT OF PRIMARY AND SECONDARY AIR FLOW RATES ON MEASURED GAS COMPOSITION IN A TOP-LIT UP-DRAFT SEMI-GASIFIER COOKSTOVE *****332 <i>Jessica Tryner, Darryl Beemer, Morgan DeFoort, Anthony J. Marchese</i> Colorado State University
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11:45	13F-11 RATE RULES, BRANCHING RATIOS, AND PRESSURE DEPENDENCE OF THE HO ₂ +OLEFIN ADDITION CHANNELS *****; : <i>Stephanie M. Villano¹, Hans-Heinrich Carstensen², Anthony M Dean¹</i> ¹ Colorado School of Mines ² Ghent University	13F-15 FLOW FIELD SIMULATION IN A HYPERTHERMAL TUBULAR REACTOR SYSTEM BY CFD AND DSMC METHODS *****36: <i>Qi Guan, Kimberly N. Urness, G. Barney Ellison, John W. Daily</i> University of Colorado
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12:25	LUNCH-On your own	

1:40	Invited Presentation: Session Chair: Derek Dunn-Rankin Title: Hybrid Combustion and Solar Energy Based Power Generation Speaker: Fletcher Miller, San Diego State University (Durrell Center Conference Room A/B)	
	Session 3A: Kinetics Modeling/Diagnostics Room A: Durrell Center Session Chair: Anthony Marchese	Session 3B: Turbulent Flames Room B: Durrell Center Session Chair: Kalyanasundaram Seshadri
2:50	13F-17 GAS PHASE RADICAL CHEMISTRY AND ITS IMPACT ON LIGNIN MODEL COMPOUND REACTIVITY *****3; 3 <i>Samuele Sommariva, Anthony M. Dean</i> <i>Colorado School of Mines</i>	13F-21 EXPERIMENTAL INVESTIGATION OF FLASHBACK MECHANISM IN PREMIXED HIGH-HYDROGEN-CONTENT SWIRL FLAMES *****443 <i>Dominik Ebi, Noel T. Clemens</i> <i>University of Texas at Austin</i>
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6:00	RECEPTION – FORT COLLINS BREWERY	

Tuesday, 8 October 2013

7:15

Registration

7:45

Welcome: Anthony Marchese

8:15

Invited Presentation: Session Chair: Anthony Marchese

Title: "Combustion: A critical link between energy, development, and human health"

Speaker: Morgan DeFoort, Colorado State University

9:15

BREAK

**Session 5A: IC Engines
Room A: Durrell Center
Session Chair: Xinfeng Gao**

**Session 5B: Laminar Flames
Room B: Durrell Center
Session Chair: Jason Porter**

9:25

13F-31 A PHENOMENOLOGICAL RELATIONSHIP BETWEEN OCTANE NUMBER AND CETANE NUMBER AND THE IMPACT OF ALCOHOLS IN TRANSPORTATION FUELS 342
Marc E. Baumgardner¹, David Llanos², Anthony J. Marchese¹
¹Colorado State University ²Loyola Marymount University

13F-35 THE INFLUENCE OF CARBON MONOXIDE ON THE STRUCTURE AND EXTINCTION OF NONPREMIXED METHANE FLAMES *****5; 3
Georg Katzlinger¹, Vaishali Amin¹, Kalyanasundaram Seshadri¹, Ernst Pucher²
¹University of California, San Diego ²Vienna University of Technology

9:45

13F-32 PREDICTION OF NO_x EMISSIONS FROM PREMIXED NATURAL GAS AND HYDROGEN ENRICHED FLAMES STABILIZED WITH A LOW-SWIRL BURNER 358
Andrés Colorado, Vince McDonell
University of California, Irvine

13F-36 A NEW RADIATION MODEL FOR TABULATED CHEMISTRY BASED ON STEADY STATE FLAMELETS. *****5; ;
N. Burali¹, Y. Xuan¹, G. Blanquart²
¹Graduate Aerospace Laboratories ²California Institute of Technology

10:05

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D. Wise¹, R. Seiser¹, D. Olsen², R. Cattolica¹
¹University of California, San Diego ²Colorado State University

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California Institute of Technology

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Colorado State University

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Vinicius M. Sauer, Rosa E. Padilla, Derek Dunn-Rankin
University of California, Irvine

10:45

BREAK

**Session 6A: IC Engines
Room A: Durrell Center
Session Chair: Derek Dunn-Rankin**

**Session 6B: Heterogeneous
Room B: Durrell Center
Session Chair: Anthony Dean**

11:05

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Timothy L. Vaughn¹, Brie Hawley¹, Jessica Tryner¹, A. Lakshminarayanan¹, Daniel Olsen¹, Matthew Ratcliff², Robert L. McCormick², Anthony J. Marchese¹
¹Colorado State University ²National Renewable Energy Laboratory

13F-43 PRELIMINARY MODELING OF COUNTER-FLOW REACTIVE VOLATILIZATION FOR HIGH EQUIVALENCE RATIO PARTIAL OXIDATION OF LOW VOLATILITY FUELS *****6; 3
W.F. Northrop, A. Ghosh
University of Minnesota

11:25

13F-40 PERFORMANCE AND EMISSION EVALUATION OF STRAIGHT VEGETABLE OILS IN A TIER - II DIESEL ENGINE *****668
A. Lakshminarayanan, D. Olsen
Colorado State University

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A. Haug¹, B.C. Hogan¹, A.B. Donaldson¹, C.G. Parigger², D.M. Surmick²
¹New Mexico State University ²University of Tennessee

11:45

13F-41 COMBUSTION CHAMBER DESIGN CONSIDERATIONS FOR A COMPRESSION IGNITION ENGINE TO SPARK IGNITED NATURAL GAS ENGINE CONVERSION *****683
Robert Elgin, III¹, Chris Turner², Christopher L. Hagen¹
¹Oregon State University ²Czero Incorporated

13F-45 A SOPHISTICATED MODEL TO PREDICT ASH INHIBITION DURING COMBUSTION OF PULVERIZED CHAR PARTICLES *****6; 9
Christopher R. Shaddix, Yanqing Niu
Sandia National Laboratories

12:05

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A. Hockett¹, J. Barta², G. Hampson², B. Suhre², A.J. Marchese¹
¹Colorado State University ²Woodward Inc.

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Moshen Ayoobi, Ingmar Schoegl
Louisiana State University

1:00

ADJOURN

OPTIONAL: TOUR OF CSU ENGINES AND ENERGY CONVERSION LABORATORY AND NEW BELGIUM BREWING COMPANY