

SESSION SCHEDULES: A1, B1, C1
Monday, April 21 10:20 AM - Noon

SESSION A1: DIAGNOSTICS I

Room Rast A, Session Chair: Robert Hancock, Wright Patterson Air Force Base

10:20 – 10:40

BARRIER OPTIMIZATION BY OPTICAL ANALYSIS OF COMPRESSED HYDROGEN GAS LEAKS. Seydou Diop, Ajay Agrawal, and Robert Schefer, University of Alabama, Tuscaloosa

10:40 – 11:00

SIMULTANEOUS HYDROXYL AND PRESSURE TIME-SERIES MEASUREMENTS IN A SELF-EXCITED ACOUSTICALLY-DRIVEN TUBE COMBUSTOR., M. W. Gluesenkamp, K. K. Vendatesan, A. C. Noble, G. B. King, N. M. Laurendeau, Purdue University; K. M. Kopp-Vaughn, M. W. Renfro, University of Connecticut

11:00 – 11:20

AN INJECTION-SEEDED OPTICAL PARAMETRIC (OP) AND PULSE DYE-AMPLIFIED (PDA) LASER SOURCE FOR COMBUSTION DIAGNOSTICS. A. H. Bhuiyan, D. R. Richardson, S. V. Naik, R. P. Lucht, Purdue.

11:20 – 11:40

SINGLE-SHOT MEASUREMENTS OF NITRIC OXIDE IN ATMOSPHERIC-PRESSURE FLAMES USING VIBRATIONAL ELECTRONIC-RESONANCE-ENHANCED COHERENT ANTI-STOKES RAMAN SCATTERING. Ning Chai, Sameer V. Naik, Robert P. Lucht, and Normand M. Laurendeau, Purdue, Sukesh Roy ISSI, James R. Gord AFRL

11:40 – 12:00

SIMULTANEOUS WATER VAPOR CONCENTRATION AND TEMPERATURE MEASUREMENTS IN UNSTEADY HYDROGEN FLAMES. D. Blunck, S. Basu, Y. Zheng, J. Gore, Purdue University.

SESSION B1: IC ENGINES I

Room Rast B, Session Chair: Steve Ciatti, Argonne National Laboratory

10:20 – 10:40

ANALYSIS OF CYCLIC VARIABILITY IN SPARK-ASSISTED HCCI COMBUSTION USING A DOUBLE WIEBE FUNCTION. William J. Glewen, University of Wisconsin-Madison, Robert M. Wagner, K. Dean Edwards, C. Stuart Daw, ORNL

10:40 – 11:00

DIESEL ENGINE AUTOIGNITION AND FLAME STRUCTURE IN HIGH- AND LOW-TEMPERATURE COMBUSTION MODES. , Satbir Singh, GM R&D, R. D. Reitz, University of Wisconsin, M. P. B. Musculus, SNL.

11:00 – 11:20

INDICATION OF THE LEVEL OF CYLINDER PRESSURE RISE RATE OF AN INTERNAL COMBUSTION ENGINE USING VIBRATION AND ACOUSTIC EMISSIONS. , J. Massey, J. Drallmeier, Missouri University of Science and Technology.

11:20 – 11:40

ON THE QUANTITATIVE DEFICIENCIES OF IDEAL AIR-STANDARD ENGINE CYCLES. R. Shyani, T J. Jacobs, J.A. Caton, Texas A&M University

11:40 – 12:00

AN ACTIVE VAPOR UTILIZATION SYSTEM FOR EMISSIONS REDUCTIONS IN GASOLINE-FUELLED VEHICLES. John Crawford, Michael J. Aliff, Marcus D. Ashford, University of Alabama, Tuscaloosa.

SESSION C1: CATALYTIC AND HETEROGENEOUS COMBUSTION

Wilson Tiered Room, 2nd floor, Session Chair: Randy L. Vander Wal, NASA Glenn

10:20 – 10:40

CATALYTIC EFFECTS OF CUO ON REACTIONS LEADING TO POLYCYCLIC AROMATIC HYDROCARBONS. Nimesh B. Poddar, Mary J. Wornat, Louisiana State University

10:40 – 11:00

EFFECT OF MASS TRANSFER ON THE PERFORMANCE OF SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEMS. Nimrod Kapas, Tariq Shamim, University of Michigan - Dearborn; Paul Laing, Ford Motor Company

11:00 – 11:20

EFFECT OF CERIA NANOPARTICLES ON TOLUENE IGNITION DELAY TIMES.

B. Rotavera, E.L. Petersen, Texas A&M University; A. Kumar, S. Seal, University of Central Florida

11:20 – 11:40

NUMERICAL MODELING OF FLAME PROPAGATION THROUGH PULVERIZED COAL CLOUD IN O₂/CO₂., Li Qiao, Purdue University.

11:40 – 12:00

BLOW-OFF BEHAVIOR FOR OXY-COAL FLAMES WITH VARYING OXYGEN-ENRICHMENT IN N₂ AND CO₂ ENVIRONMENTS. Ari Roisman, Melissa Holtmeyer, Scott A. Skeen, Richard L. Axelbaum, Washington University in St. Louis

SESSION SCHEDULES: A2, B2, C2
Monday, April 21 1:20 PM – 3 PM

SESSION A2: REACTION KINETICS I

Room Rast A, Session Chair: Shiju Thomas, Louisiana State University

1:20 – 1:40

USING MBMS FOR CHARACTERIZATION AND KINETICS IN HYDROCARBON AND OXYGENATE FLAMES, Phillip R. Westmoreland, Wenjun Li, University of Massachusetts; M. Chaos, Frederick L. Dryer, Princeton University; Terrill A. Cool, Matthew E. Law, Bin Yang, Juan Wang, Cornell University; Nils Hansen, Tina Kasper, Sandia National Laboratories; Katharina Kohse-Höinghaus, Universität Bielefeld; , Patrick Oßwald, Ulf Struckmeier, Charles K. Westbrook, Lawrence Livermore Laboratory.

1:40 – 2:00

AN EXPERIMENTAL STUDY OF AUTOIGNITION OF METHYLCYCLOHEXANE, Gaurav Mittal and Chih-Jen Sung, Case Western Reserve University

2:00 – 2:20

HOMOGENEOUS MERCURY OXIDATION USING SIMULATED FLUE GAS IN A FLOW REACTOR. Hyukjin Oh, Kalyan Annamalai, Jerald A. Caton, Texas A&M University; Robert P. Lucht, Purdue University

2:20 – 2:40

PRESSURE DEPENDENT DISSOCIATION OF PHENYL IODIDE IN A DIAPHRAGMLESS SHOCK TUBE., R. S. Tranter, Argonne National Lab

2:40 – 3:00

ASSESSMENT OF ZERO-DIMENSIONAL APPROACH FOR MODELING RAPID COMPRESSION MACHINE EXPERIMENTS, Gaurav Mittal, Mandhapat P. Raju, and Chih-Jen Sung, Case Western Reserve University

SESSION B2: LAMINAR FLAMES I

Room Rast B, Session Chair: John Abraham, Purdue University.

1:20 – 1:40

LAMINAR FLAME SPEEDS OF METHANE AND ETHANE FUEL MIXTURES IN AIR AT INTERMEDIATE PRESSURES. J. de Vries, E.L. Petersen, G. Bourque

1:40 – 2:00

SPARK-PLACEMENT EFFECTS ON FLAME PROPAGATION IN A HYDROGEN-AIR STRATIFIED MIXING LAYER. Rebecca Owston, John Abraham, Purdue University

2:00 – 2:20

COMPARISON OF CHEMICAL-KINETICS MECHANISMS THROUGH PREDICTING A NON-PREMIXED ETHYLENE JET FLAME, V. Katta, W. Roquemor, R. Santoro, Air Force Research Laboratory.

2:20 – 2:40

MODIFIED HYDRO-THERMO-DIFFUSIVE STRUCTURES OF LAMINAR PREMIXED FLAMES AND NORMAL SHOCK WAVES, S. Sohrab, Northwest University.

2:40 – 3:00

LAMINAR FLAME SPEEDS OF MOIST H₂/CO MIXTURES, Apurba K. Das, Kamal Kumar, and Chih-Jen Sung, Case Western Reserve University

SESSION C2: METALS and METAL SYSTEMS I

Wilson Tiered Room, 2nd floor, Session Chair: Michelle Pantoya, Texas Tech University

1:20 – 1:40

MEASUREMENT OF THE EFFECTS OF DETONATION WAVES ON REACTIVITY OF ALUMINUM, K. Chesterfield, P. Lynch, H. Krier, and N. Glumac, UIUC

1:40 – 2:00

THE GENERATION OF HIGH CONCENTRATION AND UNIFORM POWDER SUSPENSIONS IN MICROGRAVITY USING AN ELECTRIC PARTICULATE SUSPENSION (EPS) FOR STUDY OF FUEL RICH COMBUSTION.

Hua Xu, Gerald M. Colver, Iowa State University; Nathanael J. Greene, NASA-White Sands Test Facility

2:00 – 2:20

QUENCHING OF FUEL RICH AL POWDER-AIR MIXTURES IN MICROGRAVITY IGNITED BY HIGH ENERGY SPARKS USING AN ELECTRIC PARTICULATE SUSPENSION (EPS). Gerald M. Colver, Hua Xu, Iowa State University; Nathanael J. Greene, NASA-White Sands Test Facility

2:20 – 2:40

A CORRELATION FOR AL COMBUSTION IN THE TRANSITION REGIME, P. Lynch, H. Krier, N. Glumac, UIUC.

SESSION SCHEDULES: A3, B3, C3
Monday, April 21 3:20 PM – 5:00 PM

SESSION A3: DIAGNOSTICS II

Room Rast A, Session Chair: Sameer Naik, Purdue University

3:20 – 3:40

VELOCITY AND CH MEASUREMENTS IN PREMIXED H₂-ENRICHED FLAMES, S-R Zhu, and S. Acharya, Louisiana State University.

3:40 – 4:00

FREQUENCY AND SPATIAL DEPENDENCE OF CROSS CORRELATION VELOCIMETRY. S R. Rockwell and A. S. Rangwala, WPI.

4:00 – 4:20

NITRIC OXIDE CONCENTRATION AND LIFETIME MEASUREMENTS USING PICOSECOND TIME-RESOLVED LASER-INDUCED FLUORESCENCE.

K. K. Vendatesan, A. C. Noble, K. A. Kirkegaard G. B. King, N. M. Laurendeau, Purdue University; M. W. Renfro, University of Connecticut

4:20 – 4:40

FLAME STRUCTURE MEASUREMENTS AND PRINCIPAL COMPONENT ANALYSIS IN SELF-EXCITED ACOUSTICALLY-DRIVEN PREMIXED FLAMES. K. M. Kopp-Vaughan, M. W. Renfro, University of Connecticut; G. B. King and M. Gluesenkamp, Purdue University.

4:40 – 5:00

FIBER-OPTIC SPARK DELIVERY FOR GAS-PHASE LASER INDUCED BREAKDOWN SPECTROSCOPY, C. E. Dumitrescu, P. Puzinauskas, S. Olcmen, University of Alabama, Tuscaloosa.

SESSION B3: BIOFUELS

Room Rast B, Session Chair: Jerry Caton, Texas A&M University

3:20 – 3:40

BIOFUELS FOR NAVY USE: PROMISES AND PROBLEMS., H. D. Willauer, G. W. Mushrush, D. R. Hardy, J. H. Wynee, C. T. Lloyd, F. W. Williams, Naval Research Laboratory, J. W. Bauserman, Nova Research.

3:40 – 4:00

EFFECT OF FUEL INJECTION CONCEPT ON COMBUSTION PERFORMANCE OF LIQUID BIOFUELS. Benjamin M. Simmons, Heena V. Panchasara, and Ajay K. Agrawal, University of Alabama

4:00 – 4:20

A COMPARATIVE STUDY OF N-HEPTANE, METHYL ESTER, AND DIMETHYL ETHER AUTOIGNITION AND NO BEHAVIOR. Seth Hoffman, John Abraham, Purdue University;

4:20 – 4:40

PRELIMINARY CHARACTERIZATION OF BIODIESEL AND PETROLEUM DIESEL FUELS IN A MEDIUM-DUTY DIESEL ENGINE. Jason Esquivel, Brandon Tompkins, Timothy J. Jacobs, Texas A&M University

4:40 – 5:00

ASSESSMENT OF THE VALIDITY OF MODELING LIGHT BIOMASS COMBUSTION IN A FLUIDIZED-STOKER BOILER USING FLUENT COMMERCIAL FLOW SOFTWARE. X. Zhang and A. Ratner, University of Iowa.

SESSION C3: FIRE, SOOT, AND PARTICULATES

Wilson Tiered Room, 2nd floor, Session Chair: Ofodike A. Ezekoye

3:20 – 3:40

VALIDATION STUDY ON CLEAN EXTINGUISHING AGENT HOLD TIME CALCULATION METHODOLOGIES. Ali S. Rangwala, Todd M. Hetrick, Worcester Polytechnic Institute

3:40 – 4:00

EXAMINATION OF POLYMER DEGRADATION AND TRANSPORT USING POPULATION BALANCE TECHNIQUES. Morgan C. Bruns, Joseph H. Koo, and Ofodike A. Ezekoye, The University of Texas at Austin

4:00 – 4:20

FIRE SIGNATURES OF SPACECRAFT MATERIALS: GASES, CONDENSABLES AND PARTICULATES. Randy Vander Wal, Jane Novak, Vladimir Pushkarev

4:20 – 4:40

FINGERPRINTING SOOT (TOWARDS SOURCE IDENTIFICATION): PHYSICAL STRUCTURE AND CHEMICAL COMPOSITION. Randy L. Vander Wal, Vicky M. Bryg, Michael D. Hays

4:40 – 5:00

VAPORIZATION OF SINGLE- AND TWO-COMPONENT TiO₂ AND SiO₂ NANOPARTICLES AND THEIR RESULTING EMISSION SPECTRA. A. B. Barrett and E. L. Petersen, Texas A&M.

SESSION SCHEDULES: A4, B4, C4
Tuesday, April 22 9:00 AM – 10:20 AM

SESSION A4: REACTION KINETICS II

Room Rast A, Session Chair: Rob Tranter, Argonne National Laboratory

9:00 – 9:20

SIMPLIFIED CORRELATION MODELS FOR CO/H₂ CHEMICAL REACTION TIMES.

N.S. Donato and E. L. Petersen, Texas A&M University

9:20 – 9:40

EXPERIMENTS AND KINETICS MODELING OF METHANE-ETHANE-OXYGEN MIXTURES DILUTED IN ARGON. Christopher J. Aul, Eric L. Petersen, Texas A&M; Brian C. Walker, UCF; Henry J. Curran, National University of Ireland, Galway

9:40 – 10:00

POLYCYCLIC AROMATIC HYDROCARBONS FORMATION FROM 1,3-BUTADIENE PYROLYSIS. Shiju Thomas, Louisiana State University; Mary J. Wornat, Louisiana State University.

10:00 – 10:20

INTERPRETATION OF SHOCK-TUBE IGNITION MEASUREMENTS OF CERTAIN UNDILUTED ALKANE-AIR MIXTURES AT HIGHER PRESSURES AND LOWER TEMPERATURES., Eric L. Petersen, Texas A&M

SESSION B4: IC ENGINES II

Room Rast B, Session Chair: Marcus Ashford, University of Alabama

9:00 – 9:20

IGNITION IN PILOT-IGNITED NATURAL GAS ENGINES: MULTI-ZONE MODELING AND EXPERIMENTAL RESULTS. Sundar R. Krishnan, Argonne National Laboratory; Kalyan K. Srinivasan, Miss St. U. , K. Clark Midkiff, University of Alabama

9:20 – 9:40

USING CNG AND DIESEL IN THE CITY BUS TRANSPORT IN SKOPJE, ECOLOGICAL BENEFITS. Dame Dimitrovski, St. Cyril and Methodius University, Skopje, Macedonia

9:40 – 10:00

ON POSSIBLE PROCESSES FOR “REVERSIBLE” COMBUSTION WITH APPLICATION TO RECIPROCATING INTERNAL COMBUSTION ENGINES, K. T. Patrawala and J. A. Caton, Texas A&M

SESSION C4: METALS and METAL SYSTEMS II

Wilson Tiered Room, 2nd floor, Session Chair: Herman Krier, UIUC

9:00 – 9:20

HIGH-POWERED MICROSCOPY AND BURNING RATES OF SOLID COMPOSITE PROPELLANTS CONTAINING NANOPARTICLES, M. Stephens, E. Petersen, Texas A&M; D. Reid, M. Janish, S. Seal, University of Central Florida.

9:20 – 9:40

METHODOLOGY FOR MAKING METAL COMBUSTION RATE MEASUREMENTS IN A HETEROGENEOUS SHOCK TUBE, P. Lynch, H. Krier, N. Glumac, UIUC

9:40 – 10:00

ENERGY TRANSPORT IN NANOCOMPOSITE ENERGETIC MATERIALS: MECHANISMS VERSUS MODES, Steven Dean, Michelle L. Pantoya, Texas Tech University; Alex Gash, Lawrence Livermore National Laboratory

10:00 – 10:20

RAPID COMBUSTION OF ALUMINUM IN HYPERSONIC JETS PENETRATING THROUGH WATER, B. Fant, J. Rudolphi, H. Krier, N. Glumac, UIUC

SESSION SCHEDULES: A5, B5, C5
Tuesday, April 22 10:40 AM – 12:00 PM

SESSION A5: TURBULENT FLAMES

Room Rast A, Session Chair: Nick Glumac, UIUC

10:40 – 11:00

ASSESSMENT OF EMISSIONS PREDICTION CAPABILITY OF RANS BASED PDF MODELS FOR LEAN PREMIXED COMBUSTION OF METHANE. D. Parsons, J. Nanduri, I. Celik, W. Virginia University; P. Strakey, NETL

11:00 – 11:20

FLAME BRUSH DYNAMICS IN A HARMONICALLY OSCILLATING, TURBULENT JET FLAME. Sai Kumar Thumuluru, Karthik Periagaram, Tim Lieuwen, Georgia Institute of Technology

11:20 – 11:40

LARGE EDDY SIMULATION OF TURBULENT BUNSEN FLAMES WITH A THICKENED-FLAME APPROACH. Ashoke De, Sumanta Acharya, Louisiana State University

11:40 – 12:00

COMBUSTION DYNAMICS OF LEAN PREMIXED METHANE-AIR FLAME: EFFECT OF SWIRL AND PRESSURE. Yun Huang, Albert Ratner, University of Iowa

SESSION B5: LAMINAR FLAMES II/SPRAYS

Room Rast B, Session Chair: Michael Renfro, University of Connecticut

10:40 – 11:00

NUMERICAL INVESTIGATIONS OF EXTINCTION/REIGNITION OF LAMINAR DIFFUSION FLAMELETS UNDER OSCILLATING SCALAR DISSIPATION RATES. R. Venugopal and J. Abraham, Purdue University.

11:00 – 11:20

CANDLE WITH IMPROVED COMBUSTION. Susumu Matsuyama, Almond Lamp Corporation.

11:20 – 11:40

A COMPUTATIONAL EXAMINATION OF THE FLOW-BLURRING CONCEPT FOR LIQUID FUEL ATOMIZATION, Will Schreiber, University of Alabama, Tuscaloosa

SESSION C5: SESSION BURNERS AND BURNER SYSTEMS

Wilson Tiered Room, 2nd floor, Session Chair: Gaurav Mittal, Case Western Reserve University

10:40 – 11:00

VISUAL FLAME STRUCTURE OF HYDROGEN-RICH FLAMES IN A LOW-SWIRL BURNER. Daniel Sequera, Ajay K. Agrawal, University of Alabama

11:00 – 11:20

A NOVEL, FUEL-FLEXIBLE MESO-SCALE COMBUSTOR. S. Vijaykant, Ajay K. Agrawal, University of Alabama

11:20 – 11:40

STABILITY OF LIFTED FLAMES IN CENTERBODY BURNER. Viswanath Katta, William Roquemore, Air Force Research Laboratory, Wright-Patterson Air Force Base

11:40 – 12:00

NUMERICAL ANALYSIS OF COMBUSTION BEHAVIOR OF PULVERIZED COAL IN BLAST FURNACE RACEWAY. Fengguo Tian, Lijian Sun, Bin Wu, Chenn Q. Zhou Purdue University Calumet; Yongfu Zhao, United States Steel