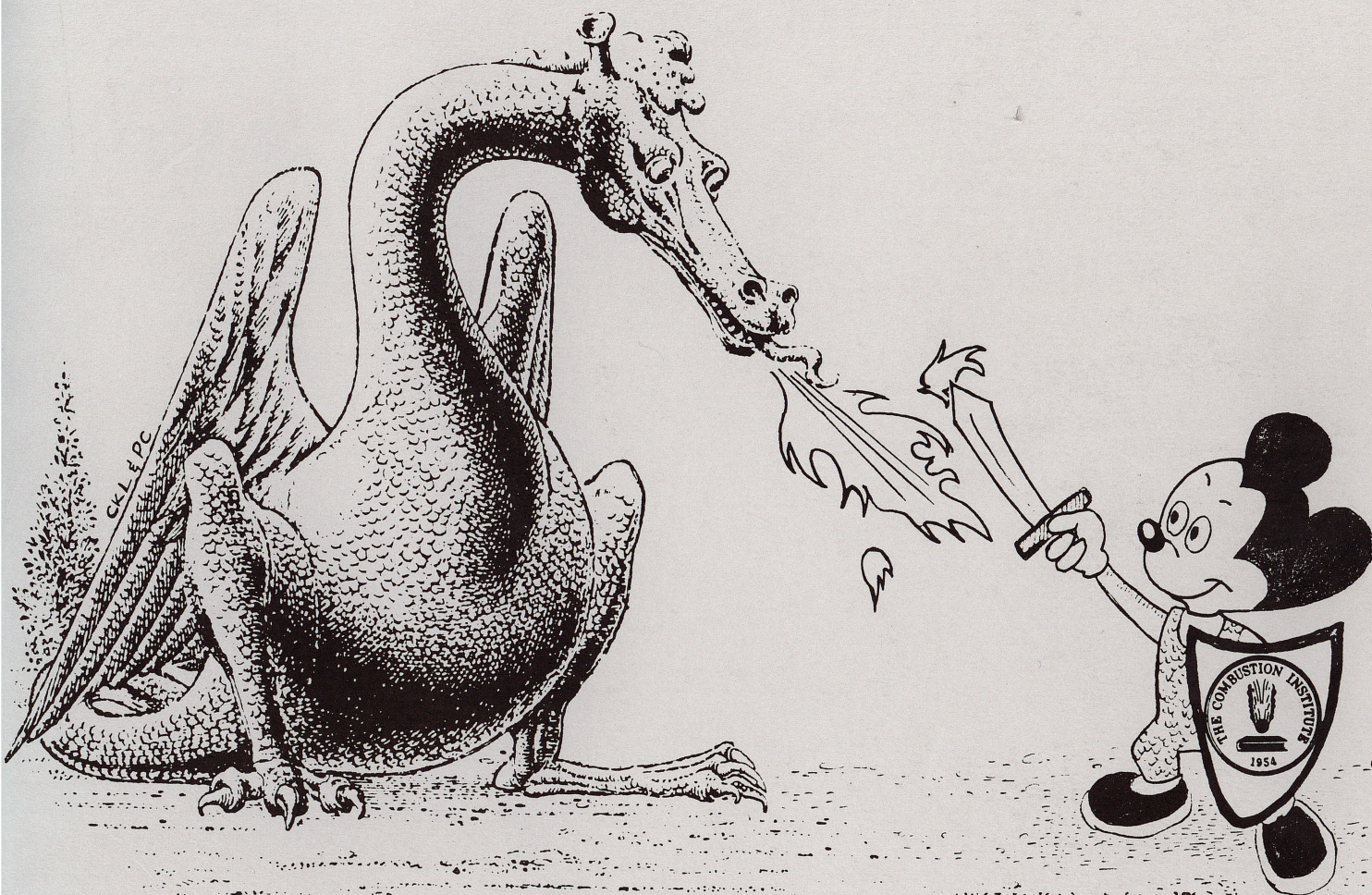


CHEMICAL AND PHYSICAL PROCESSES IN COMBUSTION



1990 FALL TECHNICAL MEETING

The Eastern Section of The Combustion Institute
December 3 - 5, Orlando, Florida

EASTERN SECTION OF THE COMBUSTION INSTITUTE - 1990 FALL TECHNICAL MEETING

SUNDAY, DECEMBER 2, 1990, 6:30 - 9:00 P.M. -- REGISTRATION

MONDAY, DECEMBER 3, 1990

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| 8:10 a.m. | A. | Invited Speaker -- "Multi-Dimensional Laser Diagnostics for Flame Studies," Marshall Long, Kevin Lyons, and Jonathan Frank, Yale University. |
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| Session A - 1 | | Chemical Kinetics |
| Chairperson: | | Richard A. Yetter Princeton University |
| | | |
| 9:00 a.m. | 1. | "The Pyrolysis of Cyclopentadiene," M. B. Colket, United Technologies Research Center. |
| 9:20 a.m. | 2. | "Oxidation of Cyclopentadiene at 1070 K," R. G. Butler, K. Brezinsky, and I. Glassman, Princeton University. |
| 9:40 a.m. | 3. | "Oxidation of Methyl <i>tert</i> -Butyl Ether," T. J. Held, F. L. Dryer, and T. S. Norton, Princeton University. |
| 10:00 a.m. | 4. | "The High Temperature Oxidation of Toluene: Experiment and Model Compared," J. L. Emdee, K. Brezinsky, and I. Glassman, Princeton University. |
| 10:20 a.m. | | Coffee Break |
| 10:40 a.m. | 5. & 6. | "Chemical Reactions in Fuel-Rich Flames at High Pressure," H. G. Wolfhard, W. A. Jeffrey, and R. J. Lewis, Institute for Defense Analyses. |
| 11:20 a.m. | 7. | "A New Variable Pressure Flow Reactor (VPFR) For Kinetics Studies From 1 ATM to 15 ATM," M. L. Vermeersch, T. Held, R. A. Yetter, Y. Stein, and F. L. Dryer, Princeton University. |
| 11:40 a.m. | 8. | "Propane Oxidation Through the NTC Region: A Comparison of Results at 10 and 15 Atmospheres," D. N. Koert, D. L. Miller, and N. P. Cernansky, Drexel University. |
| 12:00 | | Lunch |

MONDAY, DECEMBER 3, 1990

8:10 a.m. A. Invited Speaker -- "Multi-Dimensional Laser Diagnostics for Flame Studies," Marshall Long, Kevin Lyons, and Jonathan Frank, Yale University.

Session B - 1 Flame Spread

Chairperson: Vahid Motevalli
Worcester Polytechnic Institute

9:00 a.m. 49. "Upward Flame Spread on Vertical Walls Made of Practical, Finite-Thickness Materials," C. I. Kim and A. K. Kulkarni, The Pennsylvania State University.

9:20 a.m. 50. "An Accurate Integral Model for Parabolic Equations: Application to the Heat-Up and Pyrolysis of Walls," M. M. Delichatsios and M. A. Delichatsios, Factory Mutual Research Corporation.

9:40 a.m. 51. "Flame Spreading Over Thin Solid Fuels in Oxidizing and Reactive Atmospheres," E. V. Roegner and P. D. Ronney, Princeton University.

10:00 a.m. 52. "A Generalized Correlation for Forward Heat Flux in Upward Flame Spread," C. I. Kim and A. K. Kulkarni, The Pennsylvania State University.

10:20 a.m. Coffee Break

10:40 a.m. 53. "Flame Temperature and Radiative Effects on Flame Spread over Thermally Thick Fuels," J. West, S. Bhattacharjee and R. A. Altenkirch, Mississippi State University.

11:00 a.m. 54. "An Analysis of Flame Spread Rates Across the Surface of a Urethane-Resin Solid," A. F. Durkin, H. G. Eaton, P. A. Tatem, F. W. Williams, Naval Research Laboratory.

11:20 a.m. 55. "Extinction Criteria for Buoyant Nonpremixed Flames," I. K. Puri, University of Illinois.

11:40 a.m. 56. "Underventilated Flame Spread Within Polyvinylchloride Endotracheal Tubes," J. B. Stern, G. W. Sidebotham, The Cooper Union for the Advancement of Science and Art, and G. L. Wolf, State University of New York.

12:00 Lunch

MONDAY, DECEMBER 3, 1990

8:10 a.m. A. Invited Speaker -- "Multi-Dimensional Laser Diagnostics for Flame Studies," Marshall Long, Kevin Lyons, and Jonathan Frank, Yale University.

Session C - 1 Supersonic Combustion and Detonation

Chairperson: Joseph E. Shepherd
Rensselaer Polytechnic Institute

9:00 a.m. 99. "A Computational Study of Compressibility, Heat Release, and Extinction in a High Speed Reacting Mixing Layer," C. J. Steinberger, C. K. Madnia, and P. Givi, State University of New York at Buffalo.

9:20 a.m. 100. "Simultaneous Temperature and Multi-Species Measurement in a Supersonic Reacting Flow by a KrF Excimer Laser," T. S. Cheng, J. A. Wehrmeyer, and R. W. Pitz, Vanderbilt University, O. Jarrett, Jr., and G. B. Northam, NASA Langley Research Center.

9:40 a.m. 101. "A Reacting Flow Shock Tunnel Designed for Optical Diagnostic Applications," T. E. Parker, M. E. Allen, S. J. Davis, K. Donohue, R. R. Foutter, H. H. Legner, and W. T. Rawlins, Physical Sciences, Inc.

10:00 a.m. 102. "Measurements in Gas Phase Detonation Waves Using Planar Laser-Based Diagnostics," T. J. Anderson, United Technologies Research Center, and E. K. Dabora, University of Connecticut.

10:20 a.m. Coffee Break

10:40 a.m. 103. "An Investigation of the Steady Flame Propagation in a Duct," C. O. Lee and M. Sichel, The University of Michigan.

11:00 a.m. 104. "Anatomy of a Marginal Detonation," E. S. Oran, The Naval Research Laboratory, D. A. Jones, Materials Research Laboratory, D.S.T.O., M. Sichel, The University of Michigan.

11:20 a.m. 105. "Structures of Shock and Detonation Waves in Supersonic Flows Around Wedges," C. Li, Berkeley Research Associates, K. Kailasanath and E. S. Oran, Naval Research Laboratory.

11:40 a.m. 106. "Mach Reflection of Detonation Waves," J. E. Shepherd, J. Meltzer, A. Sabet, and R. Akbar, Rensselaer Polytechnic Institute.

12:00 Lunch

MONDAY, DECEMBER 3, 1990

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| 1:10 p.m. | B. | Invited Speaker -- "The Chemistry of Hazardous Waste Incineration," Wing Tsang, National Institute of Standards and Technology. |
| Session A - 2 Waste Combustion | | |
| Chairperson: | David L. Miller | Drexel University |
| 2:00 p.m. | 9. | "The Role of Chlorine Induced Inductive Destabilization Versus Bond Energy Reduction on High Temperature Displacement Reactions of Chlorinated Hydrocarbons," B. Dellinger and P. H. Taylor, University of Dayton Research Institute. |
| 2:20 p.m. | 10. | "Laser Photolysis/Laser-Induced Fluorescence Kinetic Studies of OH-CH ₃ Cl and OH-CH ₂ Cl ₂ H Atom Metathesis from 292 to 955 K," P. H. Taylor, S. McCarron, and B. Dellinger, University of Dayton Research Institute. |
| 2:40 p.m. | 11. | "Methyl Chloride/Propane Combustion in a Fluidized Bed Combustor," J. J. Bloomer and D. L. Miller, Drexel University. |
| 3:00 p.m. | 12. | "Inhibition of Ethylene/Air Combustion in a Jet-Stirred Reactor by Methyl Chloride," J. Brouwer, R. B. Barat, J. W. Bozzelli, J. P. Longwell, and A. F. Sarofim, Massachusetts Institute of Technology and New Jersey Institute of Technology. |
| 3:20 p.m. | | Refreshment Break |
| 3:40 p.m. | 13. | "Experimental Investigation on the Pyrolysis and Oxidation of Chloroform in a Tubular Flow Reactor," Y. S. Won and J. W. Bozzelli, New Jersey Institute of Technology. |
| 4:00 p.m. | 14. | "Mechanisms of the High-Temperature Oxidative Pyrolysis of Chloroform and Carbon Tetrachloride," P. H. Taylor and B. Dellinger, University of Dayton Research Institute. |
| 4:20 p.m. | 15. | "Photo-Induced Decomposition of Dichloromethane in Reducing Atmospheres," A. T. Poulos, S. Gulati, and M. Lavid, Energia, Inc. |
| 4:40 p.m. | 16. | "The High Temperature Photolytic Destruction of 3,3' 4,4'-Tetrachlorobiphenyl Using Simulated Solar Radiation," J. L. Graham and B. Dellinger, University of Dayton Research Institute. |
| 5:00 p.m. | 17. | "Gas Phase Photochemical Dechlorination of Trichloroethylene Studied in a Tubular Flow Reactor," A. T. Poulos, S. K. Gulati, and M. Lavid, Energia, Inc. |
| 5:20 p.m. | | Adjourn |
| 5:30 p.m. | | Executive Committee Meeting |

MONDAY, DECEMBER 3, 1990

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| 1:10 p.m. | B. | Invited Speaker -- "The Chemistry of Hazardous Waste Incineration," Wing Tsang, National Institute of Standards and Technology. |
| Session B - 2 Pool and Enclosure Fires | | |
| Chairperson: | Baki M. Cetegen | University of Connecticut |
| 2:00 p.m. | 57. | "Transient Scalar Properties of Luminous Pool Flames," Y. R. Sivathanu and J. P. Gore, University of Maryland. |
| 2:20 p.m. | 58. | "Measurement of Radiative Feedback to the Fuel Surface of a Pool Fire," A. Hamins, M. Klassen, J. Gore, and T. Kashiwagi, National Institute of Standards and Technology. |
| 2:40 p.m. | 59. | "Experimental Study of Puffing Behavior in Pool Fires," B. M. Cetegen and T. Ahmed, University of Connecticut. |
| 3:00 p.m. | 60. | "Characteristics of Confined Fire-Plume-Driven Ceiling Jets," C. Ricciuti and V. Motevalli, Worcester Polytechnic Institute. |
| 3:20 p.m. | | Refreshment Break |
| 3:40 p.m. | 61. | "Flow Through Horizontal Vents in Compartment Fires," Y. Jaluria and Q. Tan, Rutgers University. |
| 4:00 p.m. | 62. | "Buoyant Convection in an Inclined Enclosure," R. G. Rehm, H. R. Baum, D. W. Lozier, H. C. Tang and J. S. Sims, National Institute of Standards and Technology. |
| 4:20 p.m. | 63. | "Effect of Natural Convection on the Criteria for Thermal Explosion," W. T. Vyn, Hazards Tesing Co. |
| 4:40 p.m. | 64. | "Overview of a Model for Predicting the Generation Rate and Distribution of Products of Combustion in Two-Layer Fire Environments," L. Y. Cooper, National Institute of Standards and Technology. |
| 5:00 p.m. | 65. | "Carbon Monoxide Yields from Hexane-Fueled Compartment Fires," D. T. Gottuk and R. J. Roby, Virginia Polytechnic Institute and State University. |
| 5:20 p.m. | | Adjourn |
| 5:30 p.m. | | Executive Committee Meeting |

MONDAY, DECEMBER 3, 1990

1:10 p.m. B. Invited Speaker -- "The Chemistry of Hazardous Waste Incineration," Wing Tsang, National Institute of Standards and Technology.

Session C - 2 Diagnostics

Chairperson: Robert W. Pitz
Vanderbilt University

2:00 p.m. 107. "Effects of Multimodal and Out-of-Range Particles to the Response of Fraunhofer Diffraction Particle Sizing Instruments," J. H. Koo and M. J. Kneer, FMC Corporation.

2:20 p.m. 108. "Resonance-Enhanced Multiphoton Ionization (2+2) of NO at 452 nm for Flame Diagnostics," R. C. Sausa, S. L. Howard, R. J. Locke, A. J. Kotlar, and A. W. Miziolek, U. S. Army Ballistic Research Laboratory.

2:40 p.m. 109. "Fluorescence Lifetime Imaging: An Approach for Fuel Equivalence Ratio Imaging," T. Q. Ni and L. A. Melton, University of Texas at Dallas.

3:00 p.m. 110. "Vibrational Thermally Assisted Laser Induced Fluorescence of $A^2\Sigma^+$ OH for Temperature Measurement in Flames," R. G. Joklik, National Institute of Standards and Technology.

3:20 p.m. Refreshment Break

3:40 p.m. 111. "Droplet Effects on CARS for Fuel-Air Ratio Determination in Diesel Spray Combustion," L. R. Boedeker and G. M. Dobbs, United Technologies Research Center.

4:00 p.m. 112. "Construction of a Three-Color Pyrometer for Applications in Coal Combustion," Y. A. Levendis and K. R. Estrada, Northeastern University.

4:20 p.m. 113. "Fuel Droplet Temperature Using A Modified Exciplex Fluorescence Thermometry System," T. R. Hanlon and L. A. Melton, University of Texas at Dallas.

4:40 p.m. 114. "Velocity Measurement in Combustion Flow Environments by Photolysis of H_2O and Laser Induced Fluorescence of OH," L. R. Boedeker, United Technologies Research Center.

5:00 p.m. 115. "Measurement of Electric Field and Electrical Conductivity in Propane-Air Flames by using Rydberg State Stark Spectroscopy," M. J. Wolf, University of Dayton Research Institute, and B. N. Ganguly, Aero Propulsion and Power Laboratory, Wright-Patterson Air Force Base.

5:20 p.m. Adjourn

5:30 p.m. Executive Committee Meeting

TUESDAY, DECEMBER 4, 1990

8:10 a.m. C. Invited Speaker -- "Current Problems of Gas Turbine Combustion," Sanjay Correa, G.E. Research and Development Center.

Session A - 3 Chemical Kinetics

Chairperson: Phillip R. Westmoreland
University of Massachusetts

9:00 a.m. 18. " H_2/O_2 Three-Body Rates at High Temperatures," W. J. Marinelli, W. J. Kessler, L. G. Piper, and W. T. Rawlins, Physical Sciences, Inc.

9:20 a.m. 19. "On the Specific Rate of Bimolecular Exchange Reaction of H with O_2 : Discrepancy at $T \geq 1600$ K, and a Wider Perspective," G. L. Schott, Los Alamos National Laboratory.

9:40 a.m. 20. "Measurement of the Rate Coefficient of Reaction $CO + OH \rightarrow CO_2 + H$," C.-L. Yu, C. Wang, and M. Frenklach, The Pennsylvania State University.

10:00 a.m. 21. "Theoretical Study of the Reaction of Small Radicals with HNO ," M. R. Soto, M. Page, and M. L. McKee, Naval Research Laboratory.

10:20 a.m. Coffee Break

10:40 a.m. 22. "QRRK Chemical Activation Analysis on Reactions of CH with N_2 , O_2 and NO: Importance in Prompt NO Formation," H. Karim and J. Bozzelli, New Jersey Institute of Technology, and A. M. Dean, Exxon Research and Engineering Co.

11:00 a.m. 23. "Ab Initio Studies of the Potential Energy Surface of $H H B O$," M. R. Soto, M. McKee, and M. Page, Naval Research Laboratory.

11:20 a.m. 24. "Laser-Induced Fluorescence of CH in a Laminar CH_4 /Air Diffusion Flame: Diagnostic Issues and Chemical Rate Analysis," T. S. Norton and K. C. Smyth, National Institute of Standards and Technology.

11:40 a.m. 25. "Laser-Based Spectroscopic Studies and Detailed Chemical Modeling of $CH_4/O_2/Ar$ and $C_2H_4/O_2/Ar$ Low Pressure Flames," R. C. Sausa, S. L. Howard, R. J. Locke, A. J. Kotlar, and A. W. Miziolek, Ballistic Research Laboratory, J. S. Bernstein, J. B. Choi, A. Fein, and T. A. Cool, Cornell University.

12:00 Lunch

TUESDAY, DECEMBER 4, 1990

- 8:10 a.m. C. Invited Speaker -- "Current Problems of Gas Turbine Combustion," Sanjay Correa, G.E. Research and Development Center.
- Session B - 3 Pyrolysis, Metal Combustion, and Catalytic Combustion**
- Chairperson: Alessandro Gomez
Yale University
- 9:00 a.m. 66. "Comparison of Experimental and Theoretical Pyrolysis Results for a Charring Fuel," Y. Chen, S. S. Tewari and M. Sibulkin, Brown University.
- 9:20 a.m. 67. "Characterization of Transient Pyrolysis Process in Charring Material," Y. Chen, V. Motevalli, Worcester Polytechnic Institute, M. A. Delichatsios, Factory Mutual Research Corp.
- 9:40 a.m. 68. "The Transition from Smoldering to Glowing to Flaming Combustion," Y. Chen, C. W. Kauffman, M. Sichel, J. Fangrat and Y. Guo, The University of Michigan.
- 10:00 a.m. 69. "A New Definition and Theory of Metal Pyrophoricity," I. Glassman, P. Papas and K. Brezinsky, Princeton University.
- 10:20 a.m. Coffee Break
- 10:40 a.m. 70. "Coated Boron Particles by a Diffusion Flow Method," W. Felder, R. J. Gill, and D. Baker, AeroChem Research Laboratories, Inc., C. Gotzmer, Naval Surface Warfare Center/White Oak.
- 11:00 a.m. 71. "Simplex Method and Duality Theory in Liquid Metal Combustion," S. H. Chan and C. C. Tan, University of Wisconsin-Milwaukee.
- 11:20 a.m. 72. "Modeling of Catalytic Combustion of Methyl Chloride over a Mn-based Catalyst," S. L. Hung and L. D. Pfefferle, Yale University.
- 11:40 a.m. 73. "Fuel-Rich Catalytically Stabilized Combustion of Hexane," G. Kraemer and L. D. Pfefferle, Yale University.
- 12:00 Lunch

TUESDAY, DECEMBER 4, 1990

- 8:10 a.m. C. Invited Speaker -- "Current Problems of Gas Turbine Combustion," Sanjay Correa, G.E. Research and Development Center.
- Session C - 3 Turbulent Combustion**
- Chairperson: Peck Cho
Michigan Technological University
- 9:00 a.m. 116. "Flame Surface Properties of Neutrally Stable Premixed Flames in Isotropic Turbulence," S. Kwon, M.-S. Wu, J. F. Driscoll and G. M. Faeth, The University of Michigan.
- 9:20 a.m. 117. "On DNS and LES of Reacting Compressible Homogeneous Turbulence," C. K. Madnia and P. Givé, State University of New York at Buffalo.
- 9:40 a.m. 118. "Effects of Chemical Energy Release and Spanwise Excitation on the Dynamics of Transitional Reactive Free Shear Flows," F. F. Grinstein and K. Kailasanath, Naval Research Laboratory.
- 10:00 a.m. 119. "Visualization of Turbulent Premixed Flame Fronts: Comparison Between Mie-Scattering and OH-Fluorescence Imaging," T. -W. Lee, G. L. North and D. L. Santavicca, The Pennsylvania State University.
- 10:20 a.m. Coffee Break
- 10:40 a.m. 120. "Turbulence Measurements in a Propagating, Premixed Flame," B. D. Videto and D. A. Santavicca, The Pennsylvania State University.
- 11:00 a.m. 121. "Turbulent Combustion Modeling Applied to Confined Explosions of Gas/Air Mixtures," F. Tamanini, Factory Mutual Research Corporation.
- 11:20 a.m. 122. "Experiments on Liquid Mixing and Reaction in an Isolated 2 D Vortex," B. M. Cetegen and N. Mohamad, University of Connecticut.
- 11:40 a.m. 123. "A Numerical/Experimental Study of a Buoyant Jet Diffusion Flame," L. - D. Chen, J. -G. Lee, and S. H. Wu, The University of Iowa, V. Vilimpoc and L. P. Goss, System Research Laboratories, Inc., R. W. Davis and E. F. Moore, National Institute of Standards and Technology, W. M. Roquemore, Aero Propulsion and Power Laboratory, Wright-Patterson Air Force Base.
- 12:00 Lunch

TUESDAY, DECEMBER 4, 1990

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| 1:10 p.m. | D. | Invited Speaker -- "Some Challenges in Engine Combustion," Frediano V. Bracco, Princeton University. |
| Session A - 4 | | Laminar Flames |
| Chairperson: | | Mitchell Smooke Yale University |
| 2:00 p.m. | 26. | "On Closure in Activation Energy Asymptotics of Premixed Flames," C. K. Law, B. H. Chao, and A. Umemura, Princeton University. |
| 2:20 p.m. | 27. | "Preferential Thermal and Multi-Component Species Transport in a Strained, Laminar Diffusion Flame," J. C. Hermanson, A. Vranos, United Technologies Research Center. |
| 2:40 p.m. | 28. | "Experimental Studies of Laminar Burning Velocity and Autoignition of Hydrocarbon Fuels," H. Hu and L. A. Kennedy, The Ohio State University, J. C. Keck, Massachusetts Institute of Technology. |
| 3:00 p.m. | 29. | "An Experimental Study of Premixed Flame Thickness in Opposed Jet Flow," S. Li and P. Cho, Michigan Technological University. |
| 3:20 p.m. | | Refreshment Break |
| 3:40 p.m. | 30. | "The Effect of Inert Diluent Addition on Diffusion Flame Height in an Oxygen Atmosphere," T. F. Richardson, R. J. Santoro, and M. J. Kirby, The Pennsylvania State University. |
| 4:00 p.m. | 31. | "Flammability of a Weakly Stretched Premixed Flame: The Effect of Radiative Loss," J. A. Platt and J. S. T'ien, Case Western Reserve University. |
| 4:20 p.m. | 32. | "On Flames Near the Rich-Flammability Limit of Hydrogen-Air Mixtures," K. Kailasanath, K. Ganguly, and G. Patnaik, Naval Research Laboratory. |
| 4:40 p.m. | 33. | "A Laminar Vortex Interacting With a Premixed Flame - Measurements Compared To Analysis," Wm. L. Roberts and J. F. Driscoll, University of Michigan. |
| 5:00 p.m. | 34. | "Radiation Properties of Strongly Radiating Stretched Laminar Flamelets," J. H. Jang and J. P. Gore, University of Maryland at College Park. |
| 5:20 p.m. | | Adjourn |
| 5:30 p.m. | | General Business Meeting (all members are invited) |
| 6:30 p.m. | | Reception and Banquet |

TUESDAY, DECEMBER 4, 1990

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| 1:10 p.m. | D. | Invited Speaker -- "Some Challenges in Engine Combustion," Frediano V. Bracco, Princeton University. |
| Session B - 4 | | Sprays and Spray Combustion |
| Chairperson: | | George Gogos Rutgers University |
| 2:00 p.m. | 74. | "Observation of Liquid Jets From a Microliter Syringe," Q. Jun and C. E. Polymeropoulos, Rutgers University. |
| 2:20 p.m. | 75. | "Jet Breakup under Acoustic Pressure Oscillations," S. Pal, R. J. Santoro, H. M. Ryan, C. Simchick, H. R. Jacobs, The Pennsylvania State University. |
| 2:40 p.m. | 76. | "Atomization and Evolution of Liquid Fuel Electrosprays," A. Gomez and T. Keqi, Yale University. |
| 3:00 p.m. | 77. | "Spray Characteristics of an Impinging Four-Jet Rocket Injector," P. Vassallo and N. Ashgriz, State University of New York at Buffalo. |
| 3:20 p.m. | | Refreshment Break |
| 3:40 p.m. | 78. | "Secondary Atomization of Aluminum/RP-1 Liquid Rocket Slurry Fuels," S. R. Turns, D. C. Mueller and M. J. Scott, The Pennsylvania State University. |
| 4:00 p.m. | 79. | "Prediction of the Diluent Effects on the Structure of a Spray Flame," C.-Y. Lin and S. R. Gollahalli, University of Oklahoma. |
| 4:20 p.m. | 80. | "Turbulence-Radiation Mutual Interaction in Multiphase Diffusion Flames," S. H. Chan and C. F. Chern, University of Wisconsin - Milwaukee. |
| 4:40 p.m. | 81. | "The Structure of a Swirl-Stabilized Kerosene Spray Flame," C. Presser, A. K. Gupta and H. G. Semerjian, National Institute of Standards and Technology. |
| 5:00 p.m. | 82. | "A Coupled Solid-Liquid Model for Dropwise Evaporative Cooling," M. Di Marzo, P. Tartarini, Y. Liao, University of Maryland, H. Baum, D. Evans, National Institute of Standards and Technology. |
| 5:20 p.m. | | Adjourn |
| 5:30 p.m. | | General Business Meeting (all members are invited) |
| 6:30 p.m. | | Reception and Banquet |

TUESDAY, DECEMBER 4, 1990

- 1:10 p.m. D. Invited Speaker -- "Some Challenges in Engine Combustion,"
Frediano V. Bracco, Princeton University.
- Session C - 4 Soot**
- Chairperson: Meredith B. Colket, III
United Technologies Research Center
- 2:00 p.m. 124. "Formation of Large Species in Sooting Flames by Free Radical
and Ionic Mechanisms," H. F. Calcote and R. J. Gill, AeroChem
Research Laboratories, Inc.
- 2:20 p.m. 125. "Large Ion Formation in a Sooting and Near Sooting
Benzene/Oxygen Flame," D. G. Keil and H. F. Calcote,
AeroChem Research Laboratories, Inc.
- 2:40 p.m. 126. "The Influence of Soot Particles on CO Production in Diffusion
Flames," R. Puri and R. J. Santoro, The Pennsylvania State
University.
- 3:00 p.m. 127. "Influence of Fuel-Bound Sulfur on Soot Formation in Laminar
Diffusion Flames of Liquid Hydrocarbons," Ö. L. Gülder, B.
Glavincevski, M. F. Baksh, and G. F. Burton, National Research
Council of Canada.
- 3:20 p.m. Refreshment Break
- 3:40 p.m. 128. "Generation and Characterization of Acetylene Smokes," T. G.
Cleary, R. A. Fletcher, G. W. Mulholland, and L. K. Ives,
National Institute of Standards and Technology.
- 4:00 p.m. 129. "A Unifying Phenomenological Model for Smoke-Point Laminar
Flames," M. A. Delichatsios, Factory Mutual Research
Corporation.
- 4:20 p.m. 130. "A Fractal Cluster Interpretation of Laser Scattering and
Extinction Measurements in a Sooting Flame," R. J. Hall and P. A.
Bonczyk, United Technologies Research Center.
- 4:40 p.m. 131. "The Effect of Swirl on In-Cylinder Soot Evolution in a DI Diesel
Engine," W. Lee, T. A. Litzinger, and R. J. Santoro, The
Pennsylvania State University.
- 5:00 p.m. 132. "Oxides of Nitrogen Emissions from Hydrocarbon Jet Flames: Fuel
Effects and Flame Radiation," S. R. Turns and F. H. Myhr, The
Pennsylvania State University.
- 5:20 p.m. Adjourn
- 5:30 p.m. General Business Meeting (all members are invited)
- 6:30 p.m. Reception and Banquet

WEDNESDAY, DECEMBER 5, 1990

- 8:10 a.m. E. Invited Speaker -- "High Energy Density Materials
Combustion," Richard S. Miller, Office of Naval Research,
Andrzej W. Miziolek, Ballistic Research Laboratory.
- Session A - 5 Laminar Flames**
- Chairperson: Paul D. Ronney
Princeton University
- 9:00 a.m. 35. "Reaction Mechanism for Prediction of NO, NH, CH, CN and OH
in Rich Laminar Methane Flame," H. Karim and J. Bozzelli, New
Jersey Institute of Technology, and A. M. Dean, Exxon Research
and Engineering Co.
- 9:20 a.m. 36. "Study of the C₄H₈O and C₄H₆O Compounds in a Two-Stage
Butane Flame," C. Corre, R. Minetti, J-F. Pauwels, and L-R.
Sochet, Universite des Sciences et Techniques de Lille, and F. L.
Dryer, Princeton University.
- 9:40 a.m. 37. "Comparisons of Methane/Air Diffusion Flame Structure Data
with Predictions of 'Full' Chemical Mechanisms," J. H. Miller,
George Washington University, and K. C. Smyth, National
Institute of Standards and Technology.
- 10:00 a.m. 38. "Numerical Calculations of the Structures of Flames Burning CH₄
and NO₂," M. Bui-Pham and K. Seshadri, University of
California, San Diego.
- 10:20 a.m. Coffee Break
- 10:40 a.m. 39. "Detailed Mechanism Reduction for Flame Modeling," H. Wang
and M. Frenklach, The Pennsylvania State University.
- 11:00 a.m. 40. "Reduced Chemistry and Simplified Transport Modeling of
Premixed and Nonpremixed Combustion," M. D. Smooke, Yale
University, and V. Giovangigli, Ecole Polytechnique.
- 11:20 a.m. 41. "Use of Single Step Chemistry in Multi-Dimensional Flame
Modeling," G. Patnaik and K. Kailasanath, Naval Research
Laboratory.
- 11:40 a.m. 42. "State Relationships for CH₄+C₂H₂/Air Diffusion Flames," S.
M. Skinner and J. P. Gore, University of Maryland.
- 12:00 Lunch

WEDNESDAY, DECEMBER 5, 1990

- 8:10 a.m. E. Invited Speaker -- "High Energy Density Materials Combustion," Richard S. Miller, Office of Naval Research, Andrzej W. Miziolek, Ballistic Research Laboratory.
- Session B - 5 Droplets and Droplet Combustion**
Chairperson: Benjamin D. Shaw
The University of Connecticut
- 9:00 a.m. 83. "A Photographic Study of Droplet Impact on a Hot Surface," S. Chandra, University of Toronto, and C. T. Avedisian, Cornell University.
- 9:20 a.m. 84. "An Experimental Investigation of the Droplet Vaporization and Combustion of Alcohol Fuels," A. Lee, C. K. Law, and A. Makino, Princeton University.
- 9:40 a.m. 85. "Unsupported Methanol/Toluene Mixture Droplets Burning at Low Gravity," G. S. Jackson, C. T. Avedisian, and J. C. Yang, Cornell University.
- 10:00 a.m. 86. "Initial Observations on the Burning Rate of n-Heptane Droplets from the NASA-LeRC 5 Second Zero-Gravity Facility," J. M. Card, University of California, San Diego, M. Y. Choi, Princeton University.
- 10:20 a.m. Coffee Break
- 10:40 a.m. 87. "On Azeotropic Gasification of Miscible Multicomponent Droplets," B. D. Shaw, The University of Connecticut.
- 11:00 a.m. 88. "Absorption of Intermediates and Products in Free-Falling Droplet Combustion," M. Y. Choi, S. Y. Cho, Y. S. Stein and F. L. Dryer, Princeton University.
- 11:20 a.m. 89. "High Pressure versus Low Pressure Modelling of Liquid Fuel Droplet Vaporization," H. Jia and G. Gogos, Rutgers University.
- 11:40 a.m. 90. "Observations of the Burning Behavior of Hydrocarbon Droplets in Reduced Pressures Environments," M. Y. Choi and F. L. Dryer, Princeton University, J. B. Haggard, Jr. and B. Borowski, NASA-Lewis Research Center.
- 12:00 Lunch

WEDNESDAY, DECEMBER 5, 1990

- 8:10 a.m. E. Invited Speaker -- "High Energy Density Materials Combustion," Richard S. Miller, Office of Naval Research, Andrzej W. Miziolek, Ballistic Research Laboratory.
- Session C - 5 Energetic Materials and Ignition**
Chairperson: Arthur M. Mellor
Vanderbilt University
- 9:00 a.m. 133. "Unimolecular Decomposition of 1,3,5- Trioxane: Comparison of Theory and Experiment," H. K. Aldridge, X. Liu, M. C. Lin Emory University, and C. F. Melius, Sandia National Laboratory.
- 9:20 a.m. 134. "Kinetics and Mechanisms of CN Reactions with N₂O and CO₂," N. S. Wang, D. L. Yang, M. C. Lin, Emory University, and C. F. Melius, Sandia National Laboratory.
- 9:40 a.m. 135. "Reaction Pathways for Bound Nitro Compounds," G. F. Adams, C. F. Chabalowski, and B. M. Rice, U. S. Army Ballistic Research Laboratory.
- 10:00 a.m. 136. "Shock Tube Studies of the Ignition of Triethanol Ammonium Nitrate in Nitrous Oxide," R. A. Beyer, U. S. Army Ballistic Research Laboratory.
- 10:20 a.m. Coffee Break
- 10:40 a.m. 137. "NO Absorption Studies in Solid Propellant Flames," M. W. Teague, J. A. Vanderhoff and A. J. Kotlar, U. S. Army Ballistic Research Laboratory.
- 11:00 a.m. 138. "Short-Duration Autoignition Temperature Measurement for Hydrocarbon Fuels," N. P. Bryner and K. C. Smyth, National Institute of Standards and Technology.
- 11:20 a.m. 139. "Photochemical Seeding in the Ignition Induction Period of Methane/Air Mixtures," M. Lavid, A. T. Poulos, J. Stevens, and D. McMeill, M. L. Energia, Inc.
- 11:40 a.m. 140. "Comparison of Laser Spark and Electrode Spark Ignition in Laminar Propane-Air Mixtures," C. M. Ho and D. A. Santavicca, The Pennsylvania State University.
- 12:00 Lunch

WEDNESDAY, DECEMBER 5, 1990

Session A - 6 Microgravity Combustion

Chairperson: Howard D. Ross
NASA Lewis Research Center

- 1:10 p.m. 43. "Measurement of Temperature in Microgravity Laminar Diffusion Flames," M. Y. Bahadori and R. B. Edelman, Science Applications International Corporation, R. G. Sotos and D. P. Stocker, NASA Lewis Research Center.
- 1:30 p.m. 44. "Observations of Candle Flames in Low Pressure and Low Gravity," H. D. Ross, NASA Lewis Research Center, J. S. T'ien, Case Western Reserve University, and D. L. Dietrich, Sverdrup Technology Inc.
- 1:50 p.m. 45. "G-Jitter Response of Microgravity Gas Diffusion Flames," U. G. Hegde, Sverdrup Technology, Inc.
- 2:10 p.m. 46. "Comparison of Predicted to Measured Mass Flux Rates in Flames Supported on a Rotating Fuel Surface," K. C. Midkiff, M. Vedha-Nayagam, B. Mahalingam, University of Alabama and Wyle Laboratories.
- 2:30 p.m. 47. "Radiative Ignition of Thin Cellulosic Sheet in a Microgravity Environment," G. Kushida, H. R. Baum, and T. Kashiwagi, National Institute of Standards and Technology.
- 2:50 p.m. 48. "Ignition in a Low-gravity Environment," J. S. Goldmeer, M. Haghdoust, G. Y. Jumper, Jr., V. Motevalli, Worcester Polytechnic Institute.
- 3:10 p.m. Adjourn

WEDNESDAY, DECEMBER 5, 1990

Session B - 6 Coal and Coke Combustion, and Combustion Processing

Chairperson: Fokion N. Egolfopoulos
Princeton University

- 1:10 p.m. 91. "An Assessment of Particle Shape and Thermal Property Assumptions: Implications for Coal Combustion Modeling," D. J. Maloney, E. R. Monazam, S. Ramanathan and J. N. D. Dodoo, Morgantown Energy Technology Center.
- 1:30 p.m. 92. "Computation of 3-D Aerothermo Chemical Field in a Coal Fired Combustor," A. U. Chatwani, A. Turan, and D. B. Stickler, Avco Research Laboratory.
- 1:50 p.m. 93. "The Reduction of Nitrogen Oxides Emissions from Coal Burning Rijke Pulse Combustors by Air Staging," B. T. Zinn, E. A. Powell, F. Chen, and N. Miller, Georgia Institute of Technology.
- 2:10 p.m. 94. "Combustion Behavior of Carbon Cenospheres Derived from Pyrolysis of Residual Oil in Furnaces," P. S. Northrop, Mobil R & D, Y. A. Levendis, Northeastern University, and G. R. Gavalas, California Institute of Technology.
- 2:30 p.m. 95. "Some Observations on the Oxidation Properties of Heavy Fuel Coke Particulates," S. Huey, F. L. Dryer, I. Heilweil, and R. A. Yetter, Princeton University.
- 2:50 p.m. 96. "Formation of High T_c Superconductors in a Flame," M. R. Zachariah and Serge Huzarewicz, National Institute of Standards and Technology.
- 3:10 p.m. 97. "Oxidation and Pyrolysis of Silane During Particle Formation," M. R. Zachariah, National Institute of Standards and Technology.
- 3:30 p.m. 98. "Predicted Kinetics for $\text{SiH}_2 + \text{O}_2$: Association with Multiple Isomerization," F. Communal and P. R. Westmoreland, University of Massachusetts.
- 3:50 p.m. Adjourn

WEDNESDAY, DECEMBER 5, 1990

Session C - 6

Practical Combustion

Chairperson:

Richard J. Roby
Virginia Polytechnic Institute and State University

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| 1:10 p.m. | 141. | "Some Geometry Related Problems in the Numerical Simulation of Incinerator Flows," M. Ravichandran and F. C. Gouldin, Cornell University. |
| 1:30 p.m. | 142. | "Evaluation of the Recently Developed Shell Premixed Burner Number as a Predictor of Combustion Performance," S. G. Pande, D. R. Hardy, and C. S. Mitchell, Geo Centers Inc. and Naval Research laboratory. |
| 1:50 p.m. | 143. | "The Characterization of the Flowfield of a Dump Combustor," R. S. Gabruk, AIL Research, L. A. Roe, Virginia Polytechnic Institute and State University, A. S. Nejad, and S. Ahmed, Experimental Research Branch, Wright-Patterson Air Force Base. |
| 2:10 p.m. | 144. | "The Interaction Between Fluid Mechanics and Combustion in a Helmholtz Type Pulse Combustor," J. M. Tang, B. R. Daniel, J. I. Jagoda, and B. T. Zinn, Georgia Institute of Technology. |
| 2:30 p.m. | 145. | "Experimental Measurement of Combustion Noise and Comparison to a Predictive Model," W. J. Westerman and L. A. Roe, Virginia Polytechnic Institute and State University. |
| 2:50 p.m. | 146. | "The Aerodynamic Field of Opposed Radial Jets in a Swirling Cylindrical Duct Flow," C. D. Richards and G. S. Samuelsen, University of California, Irvine. |
| 3:10 p.m. | 147. | "Sonic Probe Sampling in Particle Laden Combustion Flows," R. Puri and R. J. Santoro, The Pennsylvania State University. |
| 3:30 p.m. | | Adjourn |