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PROFESSIONAL BIOSKETCH

Chung K. Law received a B.S. in Physics from the University of Alberta in 1968, an M.A.Sc. in Aerospace Studies from the University of Toronto in 1970, and a Ph.D. in Engineering Physics from the University of California at San Diego in 1973. He was on the faculties of Northwestern University from 1976 to 1984 and the University of California at Davis from 1984 to 1988. In 1988 he joined Princeton University, where he has been the Robert H. Goddard Professor of Mechanical and Aerospace Engineering since 1995.

Law's research interests are in combustion, propulsion, heat and mass transfer, energy, alternate fuels, and the environment. He has published over 340 journal-class articles in these areas. For his research accomplishments he has been honored with the Curtis W. McGraw Research Award of the American Society for Engineering Education (ASEE) in 1984, a Silver Medal and the Egerton Gold Medal of the Combustion Institute in 1990 and 2006 respectively, the Propellants and Combustion Award, the Energy Systems Award, and the Pendray Aerospace Literature Award of the American Institute of Aeronautics and Astronautics (AIAA) in 1994, 1999, and 2004 respectively, the Heat Transfer Memorial Award, in Science, of the American Society of Mechanical Engineers (ASME) in 1997, an Outstanding Alumnus Award from the University of California at San Diego in 2000 and from the Hong Kong Polytechnic University in 2007, and several best conference paper awards. He is a fellow of the AIAA, ASME, and the American Physical Society (APS), a member of the U.S. National Academy of Engineering (NAE), and a past president (2000-2004) of the Combustion Institute.

CURRICULUM VITAE

Education	3
Employment	3
Research statistics	4
Editorial service	4
Professional society activities	5
Honors, awards, and recognitions	7
Best paper awards and feature articles	8
Doctoral students supervised	9
Journal publications	12
Reports and preprints	39
Conference-wide plenary, keynote, and invited lectures, and institutional named lectures.....	63
Invited departmental seminars and technical session talks	66
Contributed and obligatory talks	74
Funded research projects	85

Education

- 1973 Ph.D. in Engineering Physics
University of California at San Diego
- 1970 M.A.Sc. in Aerospace Studies
University of Toronto
- 1968 B.Sc. in Physics
University of Alberta

Employment

- 1988- *Robert H. Goddard Professor (1995-)*
Professor (1988-1995)
Associate Chair (1996-1998)
Department of Mechanical and Aerospace Engineering
Princeton University
- 1984-1988 *Professor (Step V, 1984-87; Step VI, 1987-88)*
Department of Mechanical Engineering
University of California at Davis
- 1976-1984 *Professor (1981-84)*
Associate Professor (1976-81)
Department of Mechanical and Nuclear Engineering
Northwestern University
- 1975-1976 *Member of Professional Research Staff*
Department of Aerospace and Mechanical Sciences
Princeton University
- 1973-1975 *Associate Senior Research Engineer*
General Motors Research Laboratories

Research Statistics

Major areas of research specialization:

Combustion and propulsion, heat and mass transfer, energy, alternate fuels, pollution and the environment.

Academic and research supervision:

Supervised the dissertation research of over 20 doctoral students. Dissertation titles and current positions separately listed.

Supervised the research of over 50 post-doctoral and junior visiting fellows.

Publications:

Over 340 papers published in journals and other rigorously-refereed media. Publication citations separately listed.

Author of *Combustion Physics*, Cambridge University Press, 2006.

Invited lectures:

Over 40 conference-wide plenary/keynote lectures and named/major institutional lectures.

Over 130 invited departmental seminars and invited lectures at technical sessions.

Research funding:

Principal investigator of contracts and grants totaling about \$15 M from 1977 to 2004. Specifics of the awards separately listed.

Patents:

"Diazo alkanes and diazo alkanols as combustion modifiers for liquid hydrocarbon ramjet fuels;" Inventors: R. S. Miller, R. M. Moriarty and C. K. Law; U.S. Patent No. 4,741,742; Date of Patent: May 3, 1988.

Editorial Service

Member, Editorial Board, *Combustion and Flame* (1985-94).

Deputy Editor, *Combustion and Flame* (1997-2002).

Member, Editorial Advisory Board, *Combustion Science and Technology* (1986-90).

Associate Editor, *Combustion Science and Technology* (1990-97).

Associate Editor, *AIAA Journal* (1989-94).

Member, Editorial Advisory Board, *Progress in Energy and Combustion Science* (1991-).

Member, Editorial Advisory Board, *Journal of Propulsion and Power* (2002-).

Member, Editorial Board, *International Journal of Green Energy* (2007-).

Professional Society Activities

American Institute of Aeronautics and Astronautics (AIAA)

Member, Propellants and Combustion Technical Committee (1979-81, 1989-92).

Chair, Awards Subcommittee, Propellants and Combustion Technical Committee (1990-92).

Member, Fellow Grade Committee (1995, 1996).

Chair, Pendray Aerospace Literature Award Committee (2005-2007).

American Society of Mechanical Engineers (ASME) - Heat Transfer Division

Member, Committee on Heat Transfer in Energy Systems (1977-82).

Member, Committee on Heat Transfer in Fire and Combustion Systems (1980-2005);
charter member.

Chair, Committee on Heat Transfer in Fire and Combustion Systems (1989-92).

Member, Committee on Honors and Awards (1992-95).

Combustion Institute

Member, Board of Advisors, Central States Section (1982-85).

Member, Executive Committee, Western States Section (1984-88).

Papers chair, Western States Section (1987-88).

Member, Executive Committee, Eastern Section (1989-91).

Papers chair, Eastern Section (1989-91).

Member, Program Subcommittee of the International Symposia (1979-).

Member, Program Advisory Subcommittee, 23rd and 25th International Symposia.

Chair, Technical Program Committee, 24th International Symposium.

Member, Board of Directors (1992-2004).

Honorary member, Board of Directors (2004-).

Member, Executive Committee (1992-).

Chair, Publications Committee (1994-1999).

Vice president and president-elect (1997-2000).

President (2000-2004).

Other:

Member (1987-2005), Chair (1997-2005), Combustion Science Disciplinary Working Group, NASA.

Member (1997-2004), Microgravity Research Advisory Subcommittee, NASA.

Member (1997-2000), Space Station Utilization Advisory Subcommittee, NASA.

Director, Air Force Research in Aero Propulsion Technology (1990-94).

Member, Advisory Board, Combustion Research Facilities, Sandia National Lab. (2000-2004).

Honors, Awards, and Recognitions

Faculty Research Initiation Grant Award of the Engineering Foundation, 1977 (Inaugural year; two awards given). Faculty Research Continuation Grant Award of the Engineering Foundation, 1979.

Outstanding Instructor (top 3% university wide), Associated Student Government of Northwestern University, 1979, 1982.

Ralph R. Teetor Award of the Society of Automotive Engineers (SAE), 1979.

Plenary Lecturer, and Certificate of Recognition for Research in Thermal Engineering, First ASME-JSME Thermal Engineering Joint Conference, Honolulu, Hawaii, 1983.

Curtis W. McGraw Research Award, American Society for Engineering Education (ASEE), "For outstanding early achievement in research," awarded to an engineering educator under 40, 1984.

Fellow, American Society of Mechanical Engineers (ASME), 1989.

Fellow, American Institute of Aeronautics and Astronautics (AIAA), 1992.

Propellants and Combustion Award, AIAA. "For outstanding technical contributions to aeronautical or astronautical combustion engineering," 1994.

Heat Transfer Memorial Award - Science, ASME, "For outstanding contributions to heat and mass transfer in chemically reacting flows," 1997.

Energy Systems Award, AIAA, "For outstanding contributions to the science and technology of combustion in chemical energy systems," 1999.

Outstanding Alumnus Award, School of Engineering, University of California at San Diego, "In recognition of career achievements and contributions to higher education," 2000.

Guest Professor Appointments: Tienjin University (1983); Institute of Mechanics, Chinese Academy of Science (1997); Tsinghua University (2001), University of Science and Technology of China (2007).

Member, National Academy of Engineering (NAE), 2002.

Highly Cited Researcher, in Engineering; recognized by the Institute for Scientific Information (ISI) as one of the hundred highly cited authors in engineering world-wide, in the inaugural year (2002) of establishing the Highly Cited Researchers database.

Pendray Aerospace Literature Award, AIAA, "For outstanding and sustained contributions to the aerospace literature, particularly in the areas of combustion and propulsion," 2004.

Alfred C. Egerton Gold Medal, the Combustion Institute, "For distinguished, continuing and encouraging contributions to the field of combustion," 2006.

Fellow. American Physical Society (APS), 2006.

Plenary Lecturer, 31st International Symposium on Combustion, Heidelberg, Germany, 2006.

Outstanding Alumnus Awards, Hong Kong Polytechnic University, 2007.

Best Paper Awards and Feature Articles

Silver Medal, the Combustion Institute, "For an outstanding paper presented at the Twenty-Second Symposium (International) on Combustion," 1990. (Paper entitled: "Experimental and numerical determination of laminar flame speeds of methane/(Ar, N₂, CO₂)-air mixtures as function of stoichiometry, pressure and flame temperature," by D. L. Zhu, F. N. Egolfopoulos and C. K. Law).

Best Paper, Joint Technical Meeting of the Central and Eastern States Sections of the Combustion Institute, 1993. (Paper entitled: "Ignition in nonpremixed counterflowing hydrogen versus heated air: I. computational study with detailed and simplified chemistry," by T. G. Kreutz and C. K. Law).

Best Paper, Microgravity Science and Space Processing Symposium, AIAA, 1998. (Paper entitled: "On burner-supported spherical diffusion flames under micro-buoyancy conditions," by C. J. Sung, D. L. Zhu, S. D. Tse, and C. K. Law).

Best Paper, selected from papers presented at the propellants and combustion sessions at the 36th and 37th AIAA/ASME/SAE/ASEE Joint Propulsion Conferences, and the 39th AIAA Aerospace Sciences Meeting, presented at the 38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, 2002. (Paper entitled: "Laminar burning rates and Markstein lengths of CH₄/O₂/Inert mixtures at high pressures," by G. Rozenchan, S.D. Tse, D.L. Zhu, and C.K. Law).

Best Paper, selected from papers presented at the propellants and combustion sessions at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and the 42nd Aerospace Sciences Meeting; award presented at the 41st AIAA/ASME/SAE/ASEE Joint Propulsion Conference, 2005. (Paper entitled: "Dynamics of droplet-film collision," by K.L. Pan and C.K. Law, AIAA Paper 2005-0352).

Feature article, 50th anniversary issue of *Combustion and Flame*, 2007. Article entitled: "The effect of flame structure on soot formation and transport in turbulent nonpremixed flames using direct numerical simulation," by D.O. Lignell, J.H. Chen, P.J. Smith, T.F. Lu, and C.K. Law, *Combustion and Flame*, Vol. 151, pp. 2-8 (2007).

Doctoral Students Supervised

1. S. H. Chung, '83
Dissertation Title: "Studies on the structure of diffusion flames"
Current Position: Professor, Seoul National University
2. C. H. Wang, '83
"Combustion and micro-explosion of multicomponent droplets"
Professor, Taiwan National University
3. P. Cho, '84
"Catalytic ignition and heat release of fuel/air mixtures"
Professor, Michigan Technological University
4. A. L. Randolph, '86
"Experimental investigation of the gasification mechanism and soot characteristics of pure and multicomponent fuel droplets"
Director of Engine Development, Hendrick Motorsports
5. B. H. Chao, '87
"On the structure, propagation, extinction and stability of laminar premixed flames in dissociation equilibrium"
Associate Professor, University of Hawaii
6. R. A. Axelbaum, '88
"A fundamental study of soot formation in diffusion flames"
Associate Professor, Washington University
7. F. N. Egolfopoulos, '90
"An experimental and computational study on the propagation and kinetic structure of laminar premixed flames"
Professor, University of Southern California
8. A. Lee, '90
"Droplet combustion and gasification mechanisms of multicomponent and reactive materials"
Research Staff, National Institute of Health
9. H. G. Im, '94
"Theoretical studies of supersonic ignition and unsteady flame phenomena"
Associate Professor, University of Michigan
10. C. J. Sung, '94
"On the structure, response, and stabilization of stretched flames"
Professor, Case Western Reserve University
11. J. Qian, '97
"Droplet and flame dynamics in combustion phenomena"
Director, Tribeca Investments, Citigroup

12. C. G. Fotache, '97
"Ignition in convective-diffusive systems"
Manager, United Technologies Research Center
13. C. J. Sun, '98
"Aerodynamics of stretched flames"
Research Staff, Exxon Production Research Company
14. B. T. Helenbrook, '98
"Theoretical studies of ignition and flame dynamics"
Associate Professor, Clarkson University
15. S. G. Davis, '98
"An experimental and kinetic modeling study of the pyrolysis and oxidation of selected C₃-C₈ hydrocarbons"
Research Staff, Exponent
16. J. C. Lylegian, '00
"Experiments and kinetic modeling of the roles of chlorine and chloromethane in flame environments"
Scientist, Technology Development, General Applied Science Laboratories (GASL)
17. E. W. Christiansen, '02
"Pulsating instability and extinction in flames"
Research Staff, Exponent
18. J. D. Blouch, '02
"Ignition in laminar and turbulent nonpremixed counterflow"
Research Staff, GE Research Laboratories, Schenectady
19. K.L. Pan, '04
"Dynamics of droplet collision and flame-front motion"
Assistant Professor, National Taiwan University, Taiwan
20. T.F. Lu, '04
"Comprehensive reduction and application of chemical reaction mechanisms"
Research Staff, Princeton University
21. X.L. Zheng, '06
"Studies on ignition of hydrogen and hydrocarbons"
Assistant Professor, Stanford University
22. J. Yuan, '06
"A numerical study of coupled hydrodynamic and diffusional-thermal instabilities in flame propagation"
Staff, Bloomberg Financial Service, New York

23. S.W. Yoo, '06
"On the structure and dynamics of stationary and rotating spherical diffusion flames"
Research Staff, GE Research Laboratories, Cincinnati

JOURNAL PUBLICATIONS*

1971

1. "Diffraction of strong shock waves by a sharp compressive corner," by C. K. Law and I. I. Glass, *Canadian Aeronautics and Space Institute Transactions*, Vol. 4, No. 1, pp. 2-12 (1971).

1972

2. "Kinetics and convection in the combustion of alkane droplets," by C. K. Law and F. A. Williams, *Combustion and Flame*, Vol. 19, pp. 393-405 (1972).

1973

3. "A theory for the influence of solid heterogeneity on L^* instability," by C. K. Law and F. A. Williams, *Combustion Science and Technology*, Vol. 6, pp. 335-345 (1973).
4. "A simplified theoretical model for the vapor-phase combustion of metal particles," by C. K. Law, *Combustion Science and Technology*, Vol. 7, No. 5, pp. 197-212 (1973).

1974

5. "Combustion of magnesium particles in oxygen-inert atmospheres," by C. K. Law and F. A. Williams, *Combustion and Flame*, Vol. 22, pp. 383-405 (1974).
6. "Surface reaction model for metal particle combustion," by C. K. Law, *AIAA Journal*, Vol. 12, No. 11, pp. 1612-1613 (1974).

1975

7. "Asymptotic theory for ignition and extinction in droplet burning," by C. K. Law, *Combustion and Flame*, Vol. 24, pp. 89-98 (1975).
8. "A theory for monodisperse spray vaporization in adiabatic and isothermal systems," by C. K. Law, *International Journal of Heat and Mass Transfer*, Vol. 18, pp. 1285-1292 (1975).
9. "Quasi-steady droplet vaporization theory with property variations," by C. K. Law, *Physics of Fluids*, Vol. 18, No. 11, pp. 1426-1432 (1975).
10. "Effects of internal heat transfer on pure droplet vaporization," by C. K. Law, *Letters in Heat and Mass Transfer*, Vol. 2, No. 6, pp. 515-520 (1975).

1976

11. "Unsteady droplet combustion with droplet heating," by C. K. Law, *Combustion and Flame*, Vol. 26, pp. 17-22 (1976).

* Includes major invited review/position papers delivered at conferences, and original or major review papers published in books.

12. "Multicomponent droplet combustion with rapid internal mixing," by C. K. Law, *Combustion and Flame*, Vol. 26, pp. 219-233 (1976).
13. "Models for metal particle combustion with extended flame zones," by C. K. Law, *Combustion Science and Technology*, Vol. 12, pp. 113-124 (1976).
14. "Quasi-steady diffusion flame theory with variable specific heats and transport coefficients," by C. K. Law and H. K. Law, *Combustion Science and Technology*, Vol. 12, pp. 207-216 (1976).
15. "Laminar boundary layer analyses for parallel streams with interfacial mass transfer," by C. K. Law, *AIAA Journal*, Vol. 14, No. 10, pp. 1497-1500 (1976).

1977

16. "Adiabatic spray vaporization with droplet temperature transient," by C. K. Law, *Combustion Science and Technology*, Vol. 15, Nos. 1 and 2, pp. 65-73 (1977).
17. "Motion of a vaporizing droplet in a constant cross flow," by C. K. Law, *International Journal of Multiphase Flow*, Vol. 3, pp. 299-303 (1977).
18. "Unsteady droplet combustion with droplet heating. II: conduction limit," by C. K. Law and W. A. Sirignano, *Combustion and Flame*, Vol. 28, pp. 175-186 (1977).
19. "Theory of convective, transient, multicomponent droplet vaporization," by C. K. Law, S. Prakash and W. A. Sirignano, *Sixteenth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, pp. 605-617 (1977).
20. "Theory of quasi-steady one-dimensional diffusional combustion with variable properties including distinct binary diffusion coefficients," by C. K. Law and H. K. Law, *Combustion and Flame*, Vol., 29, pp. 269-275 (1977).
21. "Application of a class of distribution functions to drop-size data by logarithmic least-squares technique," by J. M. Tishkoff and C. K. Law, *ASME Transaction, Journal of Engineering for Power*, Vol. 99, Series A, No. 4, pp. 684-688 (1977).
22. "A model for the combustion of oil/water emulsion droplets," by C. K. Law, *Combustion Science and Technology*, Vol. 17, Nos. 1 and 2, pp. 29-38 (1977).
23. "Comments on regions of various forms of Mach reflection and its transition to regular reflection," by C. K. Law and I. I. Glass, *Acta Astronautica*, Vol. 4, pp. 939-941 (1977).

1978

24. "Transient heating and liquid-phase mass diffusion in fuel droplet vaporization," by W. A. Sirignano and C. K. Law, *Evaporation and Combustion of Fuels*, ACS Advances in Chemistry Series, Vol. 166, American Chemical Society, New York, pp. 1-26 (1978).
25. "Theory of thermal ignition in fuel droplet burning," by C. K. Law, *Combustion and Flame*, Vol. 31, pp. 285-296 (1978).

26. "Internal boiling and superheating in vaporizing multicomponent droplets," by C. K. Law, *AIChE Journal*, Vol. 24, No.4, pp. 626-632,(1978).
27. "On the stagnation-point ignition of a premixed combustible," by C. K. Law, *International Journal of Heat and Mass Transfer*, Vol. 21, pp. 1363-1368 (1978).
28. "A preliminary study on the utilization of water-in-oil emulsions in diesel engines," by D. H. Cook and C. K. Law, *Combustion Science and Technology*, Vol. 18, Nos. 5 and 6, pp. 217-221 (1978).
29. "Deflagration and extinction of fuel droplet in a weakly-reactive atmosphere," by C. K. Law, *Journal of Chemical Physics*, Vol. 68, No. 9, pp. 4218-4221 (1978).
30. "Ignition of a combustible mixture by a hot particle," by C. K. Law, *AIAA Journal*, Vol. 16, pp. 628-630 (1978).

1979

31. "Combustion characteristics of droplets of coal/oil and coal/oil/water mixtures," by C. K. Law, H. K. Law, and C. H. Lee, *Energy*, Vol. 4, pp. 329-339 (1979).
32. "Thermal ignition analysis in boundary layer flows," by C. K. Law and H. K. Law, *Journal of Fluid Mechanics*, Vol. 92, pp. 97-108 (1979).
33. "Transient ignition of a combustible by stationary isothermal bodies," by C. K. Law, *Combustion Science and Technology*, Vol. 19, Nos. 5 and 6, pp. 237-242 (1979).
34. "Fuel spray vaporization in humid environment," by C. K. Law and M. Binark, *International Journal of Heat and Mass Transfer*, Vol. 22, pp. 1009-1020 (1979).

1980

35. "Combustion and agglomeration of coal-oil mixtures in furnace environments," by K. Miyasaka and C. K. Law, *Combustion Science and Technology*, Vol. 24, pp. 71-82 (1980).
36. "Droplet combustion in a reactive environment," by P. Botros, C. K. Law, and W. A. Sirignano, *Combustion Science and Technology*, Vol. 21, pp. 123-130 (1980).
37. "Combustion characteristics of water-in-oil emulsion droplets," by C. K. Law, C. H. Lee, and N. Srinivasan, *Combustion and Flame*, Vol. 37, pp. 125-143 (1980).
38. "An ignition criterion for droplets in sprays," by C. K. Law and S. H. Chung, *Combustion Science and Technology*, Vol. 22, pp. 17-26 (1980).
39. "Gas-phase quasi-steadiness and fuel vapor accumulation effects in droplet burning," by C. K. Law, S. H. Chung, and N. Srinivasan, *Combustion and Flame*, Vol. 38, pp. 173-198 (1980).

1981

40. "On the fire-resistant nature of oil/water emulsions," by C. K. Law, *Fuel*, Vol. 60, No. 10, pp. 998-999 (1981).

41. "Lean-limit extinction of propane/air mixtures in the stagnation-point flow," by C. K. Law, S. Ishizuka, and M. Mizomoto, *Eighteenth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, pp. 1791-1798 (1981).
42. "Combustion of strongly-interacting linear droplet arrays," by K. Miyasaka and C. K. Law, *Eighteenth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, pp. 283-292 (1981).
43. "Flat-plate ignition with reactant consumption," by C. K. Law and H. K. Law, *Combustion Science and Technology*, Vol. 25, pp. 1-8 (1981).

1982

44. "Catalytic extension of extinction limits of stretched premixed flames," by C. K. Law and G. I. Sivashinsky, *Combustion Science and Technology*, Vol. 29, pp. 277-286 (1982).
45. "A theory for the free-convective burning of a condensed fuel particle," by A. C. Fernandez-Pello and C. K. Law, *Combustion and Flame*, Vol. 44, pp. 97-112 (1982).
46. "A unified criterion for the convective extinction of fuel particles," by X. P. Wu, C. K. Law, and A. C. Fernandez-Pello, *Combustion and Flame*, Vol. 44, pp. 113-124 (1982).
47. "Explosions with chain branching: induction period analysis," by A. K. Sen and C. K. Law, *Combustion Science and Technology*, Vol. 28, pp. 75-80 (1982).
48. "Mechanisms of droplet combustion," by C. K. Law, *Proc. of the Second International Colloquium on Drops and Bubbles*, JPL Publication 82-7 (D. H. Le Croisette, ed.), pp. 39-53 (1982). **Invited Paper**
49. "Effects of heat loss, preferential diffusion and flame stretch on flame-front instability and extinction of propane/air mixtures," by S. Ishizuka, K. Miyasaka, and C. K. Law, *Combustion and Flame*, Vol. 45, pp. 293-308 (1982).
50. "A d^2 -law for multicomponent droplet vaporization and combustion," by C. K. Law and H. K. Law, *AIAA Journal*, Vol. 20, No. 4, pp. 522-527 (1982).
51. "On the opening of premixed Bunsen flame tips," by C. K. Law, S. Ishizuka, and P. Cho, *Combustion Science and Technology*, Vol. 28, pp. 89-96 (1982).
52. "A theoretical study of ignition in the laminar mixing layer," by C. K. Law and H. K. Law, *J. Heat Transfer*, Vol. 104, pp. 329-337 (1982).
53. "Recent advances in droplet vaporization and combustion," by C. K. Law, *Progress in Energy and Combustion Science*, Vol. 8, No. 3, pp. 171-201 (1982).
54. "On stability of premixed flames in stagnation-point flow," by G. I. Sivashinsky, C. K. Law, and G. Joulin, *Combustion Science and Technology*, Vol. 28, pp. 155-159 (1982).
55. "Steady state diffusion flame structure with Lewis number variations," by C. K. Law and S. H. Chung, *Combustion Science and Technology*, Vol. 29, pp. 129-145 (1982).

1983

56. "Structure and extinction of convective diffusion flames with general Lewis numbers," by S. H. Chung and C. K. Law, *Combustion and Flame*, Vol. 52, pp. 59-79 (1983).
57. "An experimental study of extinction and stability of stretched premixed flames," by S. Ishizuka and C. K. Law, *Nineteenth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, pp. 327-335 (1983).
58. "Percolation in combusting sprays I: transition from cluster combustion to percolate combustion in non-premixed sprays," by A. R. Kerstein and C. K. Law, *Nineteenth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, pp. 961-969 (1983).
59. "On the mixed-convective flame structure in the stagnation point of a fuel particle," by A. C. Fernandez-Pello and C. K. Law, *Nineteenth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, pp. 1037-1044 (1983).
60. "Gas-phase transient diffusion in droplet vaporization and combustion," by M. Matalon and C. K. Law, *Combustion and Flame*, Vol. 50, pp. 219-229 (1983).
61. "Thermal and catalytic inhibition of ignition through reactant depletion," by C. K. Law and S. H. Chung, *Combustion Science and Technology*, Vol. 32, pp. 307-312 (1983).

1984

62. "Charts (on SI units) of thermodynamic properties of burned gas in chemical equilibrium for several fuel-air mixtures," by C. K. Wu and C. K. Law, *SAE Technical Paper No. 841410* (1984).
63. "On the flame-sheet assumption and flame temperature determination in combustion modeling," by S. H. Chung and C. K. Law, *Combustion Science and Technology*, Vol. 35, pp. 297-310 (1984).
64. "Heat and mass transfer in combustion: fundamental concepts and analytical techniques," by C.K. Law, *Proc. of ASME-JSME Joint Thermal Engineering Conference*, (Y. Mori and W. J. Yang, Ed.), Vol. 2, pp. 535-559 (1983). **Plenary Paper**; also in *Progress in Energy and Combustion Science*, Vol. 10, pp. 295-318 (1984).
65. "Extinction of premixed flames by stretch and radiative loss," by S. H. Sohrab and C. K. Law, *International Journal of Heat and Mass Transfer*, Vol. 27, pp. 291-300 (1984).
66. "A formulation of combined forced and free convection past horizontal and vertical surfaces," by M. S. Raju, X. Q. Liu and C. K. Law, *International Journal of Heat and Mass Transfer*, Vol. 27, pp. 2215-2224 (1984).
67. "An invariant derivation of flame stretch," by S. H. Chung and C. K. Law, *Combustion and Flame*, Vol. 55, pp. 123-125 (1984).
68. "Combustion and micro-explosion of freely-falling multicomponent droplets," by C. H. Wang, X. Q. Liu, and C. K. Law, *Combustion and Flame*, Vol. 56, pp. 175-197 (1984).

69. "Burke-Schumann flame with streamwise and preferential diffusion," by S. H. Chung and C. K. Law, *Combustion Science and Technology*, Vol. 37, pp. 21-47 (1984).
70. "Importance of dissociation equilibrium and variable transport properties on estimation of flame temperature and droplet burning rate," by S. H. Chung and C. K. Law, *Combustion and Flame*, Vol. 55, pp. 225-235 (1984).
71. "On a slowly evaporating droplet near a hot plate," by A. Sen and C. K. Law, *International Journal of Heat and Mass Transfer*, Vol. 27, pp. 1418-1421 (1984).
72. "Simulation of fuel droplet gasification in SI engines," by X. Q. Liu, C. H. Wang, and C. K. Law, ASME Transaction, *Journal of Engineering for Power*, Vol. 106, pp. 849-853 (1984).

1985

73. "Transient ignition of a combustible by a hot body," by T. Y. Xiong and C. K. Law, *AIAA J.*, Vol. 23, No. 6, pp. 889-892 (1985).
74. "Interactive vaporization and combustion of binary droplet systems," by T. Y. Xiong, C. K. Law, and K. Miyasaka, *Twentieth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, pp. 1781-1787 (1985).
75. "On the determination of laminar flame speeds from stretched flames," by C. K. Wu and C. K. Law, *Twentieth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, pp. 1941-1949 (1985).
76. "An experimental investigation on flame interaction and the existence of negative flame speeds," by S. H. Sohrab, Z. Y. Ye, and C. K. Law, *Twentieth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, pp. 1957-1965 (1985).
77. "Effects of preferential diffusion on the burning intensity of curved flames," by M. Mizomoto, Y. Asaka, S. Ikai, and C. K. Law, *Twentieth Symposium (International) on Combustion*, The Combustion Institute, Pittsburgh, PA, pp. 1933-1939 (1985).
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171. "Effects of stretch in propagating spherical flames," by C. J. Sun, C. J. Sung, and C. K. Law, Paper No. 96F-103, Fall Technical Meeting of the Western States Section of the Combustion Institute, Los Angeles, CA, Oct. 28-29, 1996.
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193. "Structural sensitivity, response and extinction of unsteady counterflow flames," by C. J. Sung and C. K. Law, AIAA Paper No. 98-0555, 36th Aerospace Sciences Meeting, Reno, NV, January 12-15, 1998.
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- 1999**
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207. "Structure and transient response of spherical flames," by C. K. Law, S. D. Tse, L. He, D. L. Zhu, and C. J. Sung, Proc. of Fifth International Microgravity Combustion Workshop, Cleveland, OH, pp. 73-76, May, 1999.
208. "Near-limit high pressure spherical flame propagation in microgravity," by C. K. Law, S. D. Tse, and D. L. Zhu, Proc. of Fifth International Microgravity Combustion Workshop, Cleveland, OH, pp. 433-436, May, 1999.
209. "The role of hydrodynamic instability in flame-vortex interaction," by J. Qian, C. K. Law, and G. Tryggvason, 33rd National Heat Transfer Conference, Albuquerque, NM, August 15-17, 1999.
210. "A comprehensive mechanism of C_2H_x and C_3H_x fuel combustion," by H. Wang, A. Laskin, Z. M. Djuricic, C. K. Law, S. G. Davis, and D. L. Zhu, Paper No. 25, Fall Tech. Meeting of the Eastern States Section of the Combustion Institute, Raleigh, NC, Oct. 11-13, 1999.
211. "Non-premixed ignition of n-heptane and iso-octane in a laminar counterflow" by J. D. Blouch and C. K. Law, Paper No. 45, Fall Tech. Meeting of the Eastern States Section of the Combustion Institute, Raleigh, NC, Oct. 11-13, 1999.
212. "On the establishment of stationary flame balls," by L. He, S. D. Tse, and C. K. Law, Paper No. 83, Fall Tech. Meeting of the Eastern States Section of the Combustion Institute, Raleigh, NC, Oct. 11-13, 1999.

213. "On the branched-chain mechanism of hydrogen-chlorine reactions: laminar flame speed experiments and kinetic modeling of $H_2/Cl_2/N_2$ mixtures," by J. C. Leylegian, C. K. Law, and H. Wang, Paper No. 84, Fall Tech. Meeting of the Eastern States Section of the Combustion Institute, Raleigh, NC, Oct. 11-13, 1999.

2000

214. "Pulsating instability in rich hydrogen/air premixed flames," by C. J. Sung and C. K. Law, AIAA Paper No. 2000-0577, 38th Aerospace Sciences Meeting, Reno, NV, January 10-13, 2000.
215. "On the development of detailed and reduced reaction mechanisms for combustion modeling," by C. K. Law, C. J. Sung, and H. Wang, AIAA Paper No. 2000-0806, 38th Aerospace Sciences Meeting, Reno, NV, January 10-13, 2000.
216. "Theoretical studies of spray detonation: propagation and quenching in particle laden mixtures," by C. K. Law and Y. Ju, Proceedings of the Thirteenth ONR Propulsion Meeting, pp. 178-183, Minneapolis, MN, August 10-12, 2000.
217. "Modeling of flame dynamics in complex flows," by C. K. Law, Proceedings of the Third International Symposium on Scale Modeling, Nagoya, Japan, Sept. 10-13, 2000.

2001

218. "Detonation, propagation and quenching in gas-particle mixtures," by Yiguang Ju and C. K. Law, AIAA Paper No. 2001-0477, 39th Aerospace Sciences Meeting, Reno, NV, January 8-11, 2001.
219. "Complex CSP for chemistry reduction and analysis," by Tianfeng Lu, Yiguang Ju and C. K. Law, AIAA Paper No. 2001-0943, 39th Aerospace Sciences Meeting, Reno, NV, January 8-11, 2001.
220. "Laminar burning rates and Markstein lengths of CH_4/O_2 /inert mixtures at high pressures," by G. Rozenchen, S. D. Tse, D. L. Zhu, and C. K. Law, AIAA Paper No. 2001-1080, 39th Aerospace Sciences Meeting, Reno, NV, January 8-11, 2001.
221. "A computational study on oscillatory extinction of spherical diffusion flames," by E. W. Christiansen, S. D. Tse, and C. K. Law, AIAA Paper No. 2001-1084, 39th Aerospace Sciences Meeting, Reno, NV, January 8-11, 2001.
222. "Determination of laminar flame speeds using digital particle image velocimetry," by T. Hirasawa, C. J. Sung, Z. W. Yang, H. Wang, and C. K. Law, Paper No. 138, 2nd Joint Meeting of the US Sections of the Combustion Institute, Oakland, CA, March 25-28, 2001.
223. "Effects of aerodynamic stretch and curvature on flame pulsation," by C. J. Sung, A. Makino, and C. K. Law, Paper No. 262, 2nd Joint Meeting of the US Sections of the Combustion Institute, Oakland, CA, March 25-28, 2001.
224. "Outwardly propagating flames at elevated pressures," by C.K. Law, G. Rozenchan, S.D. Tse, and D.L. Zhu, Paper No. 627, Sixth International Microgravity Combustion Workshop, Cleveland, OH, May 22-24, 2001.

225. "Structure and stability of micro-buoyant spherical diffusion flames," by C. K. Law, W. S. Yoo, E. W. Christiansen, and S. D. Tse, Paper No. 651, Sixth International Microgravity Combustion Workshop, Cleveland, OH, May 22-24, 2001.
226. "Structure and scaling of weakly-buoyant, nearly-spherical diffusion flames," by W. S. Yoo, S. D. Tse, and C. K. Law, Paper No. A063, the Third Asia-Pacific Conference on Combustion, Seoul, Korea, June 24-27, 2001.
227. "Some aspects of chemical kinetics on the ignition length in C-J detonation for PDE applications," by C. K. Law, T. F. Lu, and Y. Ju, 14th ONR Propulsion Meeting, Chicago, Illinois, August 8-10, 2001.

2002

228. "Development of comprehensive detailed and reduced reaction mechanisms for combustion modeling," by C. K. Law, C. J. Sung, H. Wang, and T. Lu, AIAA Paper 2002-0331, 40th Aerospace Sciences Meeting and Exhibit, Reno, NV, January 14-17, 2002. **Invited Paper**

2003

229. "Ignition of premixed hydrogen/air by heated counterflow under reduced and elevated pressures," by X. L. Zheng and C. K. Law, Third Joint Meeting of the US Sections of the Combustion Institute, Chicago, IL, March 17-19, 2003.
230. "A computational simulation of the dynamics of cell evolution in flame propagation," J. Yuan, Y. Ju, and C.K. Law, Third Joint Meeting of the US Sections of the Combustion Institute, Chicago, IL, March 17-19, 2003.
231. "Analysis of radiation induced instability of stretched premixed flames," by S. Minaev, Y. Ju, and C. K. Law, Third Joint Meeting of the US Sections of the Combustion Institute, Chicago, IL, March 17-19, 2003.
232. "Cellular instabilities and self-acceleration of expanding spherical flames," by C. K. Law and O. C. Kwon, Paper No. 46, 7th International Workshop on Microgravity Combustion and Chemically Reacting Flows, Cleveland, OH, June 3-6, 2003.
233. "Oscillatory extinction of spherical diffusion flames," by C. K. Law, S. W. Yoo, and E. W. Christiansen, Paper No. 62, 7th International Workshop on Microgravity Combustion and Chemically Reacting Flows, Cleveland, OH, June 3-6, 2003.

2004

234. "Approaches to mechanism reduction for hydrocarbon oxidation: ethylene," by T. F. Lu and C. K. Law, Paper No. AIAA 2004-1326, 42nd Aerospace Sciences Meeting, Reno, NV, Jan. 5-8, 2004.
235. "On the dynamics of head-on droplet collision: experiment and simulation," by K. L. Pan and C. K. Law, Paper No. AIAA 2004-1159, 42nd Aerospace Sciences Meeting, Reno, NV, Jan. 5-8, 2004.

236. "Response of rotating diffusion flames with general Lewis numbers," by S.W. Yoo, J. Qian, J.K. Bechtold, and C.K. Law, Paper No. 04S-18, Spring Technical Meeting of the Western States Section of the Combustion Institute, the Combustion Institute, Davis, CA, March 29-30, 2004.

2005

237. "Dynamics of droplet-film collision," by K.L. Pan and C.K. Law, Paper No. AIAA 2005-0352, 43rd Aerospace Sciences Meeting, Reno, NV, Jan. 10-13, 2005.
238. "Nonlinear analysis of pulsating instabilities in diffusion flame," by H.Y. Wang, J.K. Bechtold, and C.K. Law, Paper No. AIAA 2005-0544, 43rd Aerospace Sciences Meeting, Reno, NV, Jan. 10-13, 2005.
239. "On the transition to cellular propagation of expanding spherical flames," by G. Jomaas, C.K. Law, and J.K. Bechtold, Paper No. AIAA 2005-0713, 43rd Aerospace Sciences Meeting, Reno, NV, Jan. 10-13, 2005.
240. "An experimental study on the response of spherical diffusion flames subjected to rotation and nonequidiffusion," by S. Yoo, D.L. Zhu, C.K. Law, and K. Sacksteder, Paper No. AIAA 2005-1141, 43rd Aerospace Sciences Meeting, Reno, NV, Jan. 10-13, 2005.
241. "Linear time reduction of large kinetic mechanisms with directed relation graph:n-heptane and iso-octane," T.F. Lu and C.K. Law, Paper No. C13, 4th Joint Meeting of the US Sections of the Combustion Institute, Philadelphia, Pa, March 20-23, 2005.
242. "Thermochemical and kinetic analyses on oxidation of isobutenyl radical and 2-hydroperoxymethyl-2-propenyl radical," X.L. Zheng, H.Y. Sun, and C.K. Law Paper No. C20, 4th Joint Meeting of the US Sections of the Combustion Institute, Philadelphia, Pa, March 20-23, 2005.
243. "Experimental determination of laminar flame speeds and kinetic modeling of hydrogen/chlorine combustion," J. C. Leylegian, H.Y. Sun, and C.K. Law, Paper No. C40, 4th Joint Meeting of the US Sections of the Combustion Institute, Philadelphia, Pa, March 20-23, 2005.
244. "Pulsating and hydrodynamic instabilities for large Lewis number flames," J. Yuan, Y. Ju, and C.K. Law, Paper No. F10, 4th Joint Meeting of the US Sections of the Combustion Institute, Philadelphia, Pa, March 20-23, 2005.
245. "On the off-stoichiometric peaking of adiabatic flame temperatures," C.K. Law, A. Makino, and T.F. Lu, Paper No. F13, 4th Joint Meeting of the US Sections of the Combustion Institute, Philadelphia, Pa, March 20-23, 2005.
246. "Forced oscillation in diffusion flames near resonance," H.Y. Wang, J.K. Bechtold, and C.K. Law, Paper No. F26, 4th Joint Meeting of the US Sections of the Combustion Institute, Philadelphia, Pa, March 20-23, 2005.
247. "Flame propagation with hydrodynamic and body-force instabilities in vortical flows," by K.L. Pan, C.K. Law, and C.H. Wang, the Sixth Asian Computational Fluid Dynamics Conference, Taiwan, Oct. 24-27, 2005.

248. "Ignition of the butene isomers: an experimental and kinetics study," by X.L. Zheng, H.Y. Sun, and C.K. Law, Paper No. 05F-9, Fall Technical Meeting of the Western States Section of the Combustion Institute, Stanford, CA, Oct. 17-18, 2005.

2006

249. "Large eddy simulation of soot formation in turbulent premixed flames," H. El-Asrag, S. Menon, T.F. Lu, and C.K. Law, AIAA Paper 2006-0153, 44th Aerospace Sciences Meeting, Reno, NV, Jan. 9-12, 2006.
250. "Study of turbulent premixed flame thickness using direct numerical simulation," R. Sankaran, E. Hawkes, J.H. Chen, T.F. Lu, and C.K. Law, AIAA Paper 2006-0165, 44th Aerospace Sciences Meeting, Reno, NV, Jan. 9-12, 2006.
251. "A convective-diffusive reaction zone structure model for turbulent detonations," by M. Radulescu, A. Matsuo, and C.K. Law, AIAA Paper 2006-0951, 44th Aerospace Sciences Meeting, Reno, NV, Jan. 9-12, 2006.
252. "Simulations of cavity-stabilized flames in supersonic flows using reduced chemical kinetic mechanisms," by J.W. Liu, C.J. Tam, T.F. Lu, and C.K. Law, AIAA paper 2006-4862, 42nd Joint Propulsion Conference, Sacramento, CA, July 9-12, 2006.

2007

253. "Multiple criticality in hydrocarbon ignition," by W. Liu and C.K. Law, AIAA Paper 2007-1425, 45th Aerospace Sciences Meeting, Reno, NV, Jan. 8-11, 2007.
254. "Development of an experimental database and kinetic models for surrogate jet fuels," by M. Colket, T. Edwards, S. Williams, N. Cernansky, D.L. Miller, F.N. Egolfopoulos, P. Lindstedt, K. Seshadri, F.L. Dryer, C.K. Law, D. Friend, D.B. Lenhert, H. Pitsch, A. Sarofim, M. Smooke, and W. Tsang, AIAA Paper 2007-xxxx, 45th Aerospace Sciences Meeting, Reno, NV, Jan. 8-11, 2007.
255. "Development of an experimental database and kinetic models for surrogate diesel fuels," by J.T. Farrell, N.P. Cernansky, F.L. Dryer, D.G. Friend, C.A. Hergart, C.K. Law, R.M. McDavid, C.J. Mueller, A.K. Patel, H. Pitsch, SAE Paper 2007-01-0201, 2007.
256. "Experiments on ethylene/O₂/diluent mixtures: laminar flame speeds with preheat and ignition delays at high pressures," by K. Kumar, G. Mittal, C.J. Sung, and C.K. Law, Paper No. A21, Fifth US Combustion Meeting, San Diego, CA, March 25-28, 2007.
257. "Direct numerical simulations of soot formation and transport in non-premixed turbulent ethylene flames," by D. Lignell, J.H. Chen, P. Smith, T.F. Lu and C.K. Law, Paper No. B01, Fifth US Combustion Meeting, San Diego, CA, March 25-28, 2007.
258. "Direct numerical simulation of stationary lean premixed methane-air flames under intense turbulence," by R.Sankaran, E.R. Hawkes, C.S. Yoo, J.H. Chen, T.F. Lu, and C.K. Law, Paper No. B09, Fifth US Combustion Meeting, San Diego, CA, March 25-28, 2007.

259. "An efficient reduced mechanism for methane oxidation with NO_x chemistry," by T.F. Lu and C.K. Law, Paper No. C17, Fifth US Combustion Meeting, San Diego, CA, March 25-28, 2007.
260. "A reduced mechanism for heptane oxidation," by T.F. Lu and C.K. Law, Paper No. C21, Fifth US Combustion Meeting, San Diego, CA, March 25-28, 2007.
261. "On the controlling mechanisms in multicomponent droplet gasification," by H.Q. Zhang and C.K. Law, Paper No. G10, Fifth US Combustion Meeting, San Diego, CA, March 25-28, 2007.
262. "Theory of bouncing and coalescence in droplet collision," by P. Zhang and C.K. Law, Paper No. G16, Fifth US Combustion Meeting, San Diego, CA, March 25-28, 2007.
263. "Effects of cellular instabilities on the blast initiation of weakly unstable detonations," by M.I. Radulescu, G. J. Sharpe, and C.K. Law, 21st ICDERS Meeting, Poitiers, France, July 23-27, 2007.
264. "Direct numerical simulation of extinction and re-ignition in a nonpremixed turbulent ethylene jet flame," by D.O. Lignell, J.H. Chen, T.Lu and C.K. Law, Paper No. 07F-56, Fall Tech. Meeting of the Western States Section Meeting of the Combustion Institute, Sandia National Lab., Livermore, CA, Oct. 16-17, 2007.
265. "Nonlinear effects in the experimental determination of laminar flame properties from stretched flames," A.P. Kelley and C.K. Law, Paper No. B-11, Technical Meeting of the Eastern Section of the Combustion Institute, Charlottesville, VA, Oct. 21-24, 2007.
266. "Stretch effects on the stability of spherical premixed flames," by G. Jomaas and C.K. Law, Paper No. B31, Technical Meeting of the Eastern Section of the Combustion Institute, Charlottesville, VA, Oct. 21-24, 2007.
267. "Effects of ethylene addition on counterflow ignition and flame propagation in methane/ethylene mixtures," by W. Liu, Y. Huang, T. F. Lu, D. L. Zhu and C. K. Law, Paper No. B10, Technical Meeting of the Eastern Section of the Combustion Institute, Charlottesville, VA, Oct. 21-24, 2007.
268. "Role of the Knudsen layer in determining surface reaction rates based on sticking coefficients," by Peng Zhang and Chung K. Law, Paper No. C25, Technical Meeting of the Eastern Section of the Combustion Institute, Charlottesville, VA, Oct. 21-24, 2007.
269. "Theory of head-on collision of binary droplets: bouncing, coalescence, and interface evolution," by P. Zhang and C.K. Law, Paper No. BF00005, 60th annual Meeting of the Div. of Fluid Dynamics, APS, Salt Lake City, Utah, Nov. 18-20, 2007.

2008

270. "Towards accommodating realistic fuel chemistry in large-scale computation," by C.K. Law and T.F. Lu, AIAA-2008-0969, 46th Aerospace Sciences Meeting, Reno, NV, Jan. 7-10, 2008. ****Invited Paper**.**
271. "The role of hydrogen addition in the facilitation of CO and hydrocarbon ignition," by W. Liu and C.K. Law, Paper No. AIAA-2008-0994, 46th Aerospace Sciences Meeting, Reno, NV, Jan. 7-10, 2008.

272. "Development of non-stiff reduced mechanisms for direct numerical simulations," by T.F. Lu and C.K. Law, AIAA-2008-1010, 46th Aerospace Sciences Meeting, Reno, NV, Jan. 7-10, 2008.
273. "Analysis of a turbulent lifted hydrogen/air jet flame from direct numerical simulation with computational singular perturbation," by T.F. Lu and C.K. Law, AIAA-2008-1013, 46th Aerospace Sciences Meeting, Reno, NV, Jan. 7-10, 2008.
274. "Experimental determination of the critical radius for spherical flame propagation," by A.P. Kelley, G. Jomaas, and C.K. Law, Paper No. AIAA-2008-1054, 46th Aerospace Sciences Meeting, Reno, NV, Jan. 7-10, 2008.
275. "An experimental study on the self-acceleration of spherical flames," by G. Jomaas and C.K. Law, Paper No. AIAA-2008-1414, 46th Aerospace Sciences Meeting, Reno, NV, Jan. 7-10, 2008.

CONFERENCE-WIDE PLENARY, KEYNOTE, AND INVITED LECTURES, AND INSTITUTIONAL NAMED LECTURES

1. "Mechanisms of droplet combustion," Second International Colloquium on Drops and Bubbles, Monterey, CA, Nov. 19-21, 1981. ****Keynote Lecture****
2. "Heat and mass transfer in combustion: fundamental concepts and analytical techniques," ASME-JSME Joint Thermal Engineering Conference, Honolulu, HI, Mar. 20-24, 1983. ****Plenary Lecture****
3. "Dynamics of stretched flames," Eastern Section/Combustion Institute Meeting, Clearwater Beach, FL, Dec. 3-5, 1984. ****Invited Paper****
4. "Behavior of non-dilute sprays," AFOSR/ARO Workshop on Non-Dilute Sprays, Sandia Laboratories, Livermore, CA, Mar. 20-21, 1985. ****Lead Talk****
5. "Recent advances in multicomponent and propellant droplet vaporization and combustion," ASME Winter Annual Meeting, Anaheim, CA, Dec. 8-12, 1986. ****Invited Paper****
6. "Single droplet considerations in spray combustion processes - experimental overview," Workshop on Mass, Momentum and Energy Exchange in Combusting Sprays: Droplet Studies, Sandia National Laboratories, Livermore, CA, March 28-29, 1988. ****Lead Talk****
7. "Dynamics of stretched flames," Twenty-Second Symposium (International) on Combustion, Seattle, WA, Aug. 15-19, 1988. ****Invited Paper****
8. "Some recent advances in droplet combustion," Third International Colloquium on Drops and Bubbles, Monterey, CA, Sept. 19-21, 1988. ****Keynote Paper****
9. "Mechanisms of ignition, extinction and flame stabilization in subsonic and supersonic flows," Workshop on Supersonic Combustion, NASA Langley Research Center, Hampton, VA, Oct. 2-4, 1989. ****Invited Position Paper****
10. "Combustion in microgravity: opportunities, challenges, and progress," AIAA 28th Aerospace Science Meeting, Reno, Nevada, Jan. 8-12, 1990. ****Keynote Paper****
11. "Some recent advances in the gasification of multicomponent and reactive fuel droplets," Third ASME/JSME Thermal Engineering Joint Conference, Reno, Nevada, March 20, 1991. ****Invited Paper****
12. "Combustion in microgravity," U.S.-Taiwan Workshop on Space Processing, Taipei, Taiwan, April 16, 1991. ****Invited Talk****
13. "The role of aerodynamics in flames," National Taiwan University, Taipei, Taiwan, June 23, 1994.
"Ignition and flame stabilization in supersonic flows," National Cheng Kung University, Tainan, Taiwan, June 24, 1994.
"The role of chemistry in flames," National Tsinghua University, Hsinchu, Taiwan, June 26, 1994.
****National Science Council Lectureship****

14. "Fundamental droplet processes in spray vaporization and combustion," School of Mechanical Engineering, Purdue University, Nov. 17, 1994. **Graduate Colloquium**
15. "Dynamics of droplet collision," IUTAM Symposium on the Mechanics and Combustion of Droplets and Sprays, Tainan, Taiwan, Dec. 5-8, 1994. **Keynote Lecture**
16. "Vaporization and combustion of high-energy-density liquid propellants," 35th Israel Annual Conference on Aerospace Space Sciences, Haifa, Israel, February 15-16, 1995. **Plenary Lecture**
17. "Fundamental droplet processes in spray vaporization and combustion," 3rd Asian-Pacific International Symposium on Combustion and Energy Utilization, Hong Kong, Dec. 11-15, 1995. **Keynote Lecture**
18. "Kinetics and transport in nonpremixed ignition of hydrogen versus heated air," Symposium on Recent Advances in Clean Gaseous Combustion Research, Eindhoven University of Technology, Eindhoven, The Netherlands, Jan. 30, 1997. **Keynote Lecture**
19. "Dynamics of droplet collision," Asia-Pacific Conference on Combustion (ASPACC 97), Osaka University, Osaka, Japan, May 12-15, 1997. **Plenary Lecture**
20. "The role of chemistry in combustion," and "The role of aerodynamics in combustion," College of Engineering, University of Illinois, Chicago, IL, Nov. 3-5, 1997. **Paul M. Chung Distinguished Lecture Series**
21. "Aerodynamics of flames," Fourth Asian-Pacific International Symposium on Combustion and Energy Utilization, Bangkok, Thailand, December 8-11, 1997. **Keynote Lecture**
22. "Advances and opportunities in laminar flames," Second Asia-Pacific Conference on Combustion, Tainan, Taiwan, May 9-12, 1999. **Keynote Lecture**
23. "Issues on droplet combustion and gas-phase unsteadiness," Gordon Research Conference on Gravitational Effects in Physico-Chemical Systems, Henniker, NH, June 27 - July 2, 1999. **Invited Lecture**
24. "Accomplishments and challenges in combustion science," First International Conference on Engineering Thermophysics, Beijing, China, August 19-22, 1999. **Invited Lecture**
25. "Modeling of flame dynamics in complex flows," Third International Symposium on Scale Modeling, Nagoya, Japan, Sept. 10-13, 2000. **Invited Lecture**
26. "Frontiers of combustion: from microgravity to microengines," College of Engineering, the University of Florida, Gainesville, FL, Oct. 19, 2000. **Benton Lecture**
27. "The role of chemical kinetics and laminar flames in the modeling of turbulent flames," APS Division of Fluid Dynamics Conference, Washington, D.C., Nov. 19-21, 2000. **Invited Lecture**
28. "Advances and needs in flame research," Second Joint US Sections Meeting of the Combustion Institute, Oakland, CA, March 26-28, 2001. **Invited Talk**

29. "Frontiers of combustion: from microgravity to microengines," Tsinghua University, Beijing, China, April 23, 2001. ****Inaugural Lecture as Guest Professor****
30. "The role of chemical kinetics and laminar flames in turbulent flame modeling," Technical Meeting of the Canadian Section of the Combustion Institute, Montreal, Canada, May 13-16, 2001. ****Keynote Lecture****
31. "Hydrogen economy in the global carbon problem," Forum on New Challenges in Energy and Combustion, National Central University, Jungli, Taiwan, March 27, 2003. ****Conference Keynote Lecture****
32. "Advances and needs in flame research," Thirteenth Technical Meeting of the Taiwan Section of the Combustion Institute, Taipei, Taiwan, March 29, 2003. ****Conference Keynote Lecture****
33. "Ignition kinetics and flame dynamics in hydrogen combustion," Third Mediterranean Combustion Symposium, Marrakech, Morocco, June 9-13, 2003. ****Conference Keynote Lecture****
34. "Combustion characteristics of energetic liquid propellants," National Aerospace Conference, National Cheng Kung University, Tainan, Taiwan, Dec. 19, 2003. ****Conference Keynote Lecture****
35. "From atomic to cosmic: A panoramic view of combustion," Eighth Aisinjoro-Soo Lecture, University of Illinois, Urban-Champaign, Oct. 12, 2004.
36. "The role of combustion in hydrogen economy," Seventh Asian-Pacific International Symposium on Combustion and Energy Utilization, Hong Kong, Dec. 15-17, 2004. ****Conference Keynote Lecture****
37. "The role of combustion in hydrogen economy," International Green Energy Conference, University of Waterloo, Waterloo, Ontario, Canada, June 13-15, 2005. ****Conference Keynote Lecture****
38. "Fifty years of magnificent combustion research in Japan," 43rd Symposium (Japanese) on Combustion, Tokyo, Japan, Dec. 5-7, 2005. ****Conference Plenary Lecture****
39. "Combustion at a crossroads: status and prospects," Hottel Lecture, 31st International Symposium on Combustion, Heidelberg, Germany, August 7-11, 2006. ****Conference Plenary Lecture****
40. "Dynamics of droplet collision," Technical Meeting of the Institute for Liquid Atomization and Spray Systems (ILASS), Chicago, IL, May 15-17, 2007. ****Conference Keynote Lecture****
41. "The role of combustion in climate change and energy sustainability," Sixth Asian-Pacific Conference on Combustion (ASPACC 07), Nagoya, Japan, May 21-23, 2007. ****Conference Opening Lecture****
42. "The role of combustion in aerospace and space studies," I.I. Glass Memorial Lecture, University of Toronto Institute for Aerospace Studies, Toronto, Canada, June 7, 2007.

INVITED DEPARTMENTAL SEMINARS AND TECHNICAL SESSION TALKS*

1. "Combustion of hydrocarbon droplets," General Motors Research Laboratories, Warren, MI, Mar., 1973.
2. "Experimental studies on metal particle combustion," Cornell University, Ithaca, NY, Apr., 1974.
3. "Theoretical studies on spray combustion," Guggenheim Seminar, Princeton University, Princeton, NJ, Nov., 1974.
4. "On the combustion of multicomponent droplets," Guggenheim Seminar, Princeton University, Princeton, NJ, Oct. 1975.
5. "Combustion characteristics of multicomponent droplets," Northwestern University, Evanston, IL, Nov. 1975.
6. "Combustion of water-in-oil emulsions and coal-oil mixtures," Department of Mechanical Engineering, University of Utah, Feb. 13, 1979.
7. "Combustion of water-in-oil emulsions and coal-oil mixtures," Department of Mechanical Engineering, Illinois Institute of Technology, Feb. 14, 1979.
8. "Combustion of water-in-oil emulsions and coal-oil mixtures," Department of Aerospace Engineering, University of Michigan, Feb. 27, 1979.
9. "Combustion characteristics of water-in-oil emulsions and coal-oil mixtures," Fluid Dynamics Colloquia, Northwestern University, Apr. 17, 1979.
10. "Water/oil emulsions in combustion," Sandia Laboratories, Albuquerque, NM, June 5, 1979.
11. "Combustion of water-in-oil emulsions and coal-oil mixtures," Department of Mechanical Engineering, Ohio State University, Columbus, OH, Nov. 29, 1979.
12. "Combustion of water-in-oil emulsions and coal-oil mixtures," Department of Energy Engineering, University of Illinois, Chicago, IL, Feb. 5, 1980.
13. "Effect of water on spray vaporization and combustion," Ford Motor Co., Dearborn, MI, Mar. 25, 1980.
14. "Combustion of water-in-oil emulsions and coal-oil mixtures," Chevron Research Co., Richmond, CA, June 20, 1980.
15. "Mechanisms of droplet combustion," Department of Mechanical Engineering, University of Kentucky, Lexington, KY, Nov. 6, 1980.
16. "Combustion characteristics of coal-oil mixtures," Department of Mechanical Engineering, Carnegie-Mellon University, Pittsburgh, PA, Feb. 18, 1981.

* Contents of talks with the same or similar titles can be quite different because of the continuous updating of research results.

17. "Mechanisms of droplet combustion," Sandia Laboratories, Livermore, CA, Apr. 20, 1981.
18. "Mechanisms of droplet combustion," Department of Mechanical Engineering, University of California, Davis, CA, Oct. 23, 1981.
19. "Ignition, extinction, and stability of premixed flames," Department of Mechanical Engineering, University of California, Berkeley, CA, Nov. 24, 1981.
20. "Ignition, extinction, and stability of premixed flames," Sandia Laboratories, Livermore, CA, Dec. 22, 1981.
21. "Mechanisms of droplet combustion," Department of Mechanical Engineering, University of Hawaii, Honolulu, HI, Jan. 29, 1982.
22. "Extinction and stability of premixed flames," Department of Mechanical Engineering, University of Hawaii, Honolulu, HI, Mar. 12, 1982.
23. "Extinction and stability of stretched premixed flames," School of Mechanical Engineering, Purdue University, West Lafayette, IN, Apr. 13, 1982.
24. "Combustion of water/oil emulsions," Science and Technology Laboratory, International Harvester, Hinsdale, IL, May 6, 1982.
25. "Extinction, stability, and interaction of premixed flames," Department of Mechanical Engineering, University of California, Davis, CA, Apr. 14, 1983.
26. "Combustion and micro-explosion of multicomponent droplets," Department of Mechanical Engineering, University of Texas, Austin, TX, May 2, 1983.
27. "Extinction, stability, and interaction of premixed flames," Department of Mechanical Engineering, University of Texas, Austin, TX, July 18, 1983.
28. "Extinction, stability, and interaction of stretched premixed flames," National Conference of Engineering Thermal Physics, Nanking, China, Sept. 16-18, 1983.
29. "Combustion of multicomponent droplets," Annual Meeting of the Chinese Society of Engineering Thermophysics, Xian, China, Oct. 10-14, 1983.
30. "Combustion of multicomponent droplets," Department of Mechanical Engineering, Drexel University, Philadelphia, PA, Mar. 26, 1984.
31. "Propagation, extinction, and interaction of stretched premixed flames," Department of Mechanical Engineering, Princeton University, Princeton, NJ, Apr. 2, 1984.
32. "Combustion of multicomponent droplets," Department of Chemical Engineering, University of California, Davis, CA, Oct. 12, 1984.
33. "Asymptotic analysis of combustion phenomena," Colloquium Series in Applied Mathematics and Theoretical Dynamics, University of California, Davis, CA, Jan. 24, 1985.

34. "Recent advances in droplet combustion," Department of Mechanical Engineering, University of California, Berkeley, CA, Feb. 21, 1985.
35. "Combustion of multicomponent droplets," Ballistic Research Laboratory, Aberdeen Proving Ground, Aberdeen, MD, Mar. 5, 1985.
36. "Dynamics of stretched premixed flames," Department of Mechanical Engineering, McGill University, Montreal, Quebec, Canada, Mar. 6, 1985.
37. "Recent advances in droplet combustion," Department of Mechanical Engineering, Cornell University, Ithaca, NY, Apr. 30, 1985.
38. "Heat and mass transfer in combustion," Department of Applied Mechanics and Engineering Sciences, University of California, San Diego, CA, Oct. 11, 1985.
39. "Dynamics of stretched flames," Department of Mechanical Engineering, University of California, Davis, CA, Jan. 30, 1986.
40. "Recent advances in droplet combustion," Department of Mechanical Engineering, Louisiana State University, Baton Rouge, LA, Feb. 18, 1986.
41. "Dynamics of stretched flames," Department of Mechanical Engineering, University of Oklahoma, Norman, OK, Feb. 19, 1986.
42. "Recent advances in droplet combustion," Department of Mechanical Engineering, Texas A&M University, College Station, TX, Feb. 20, 1986.
43. "Recent advances in droplet combustion," Department of Mechanical Engineering, University of Texas, Arlington, TX, Feb. 21, 1986.
44. "Recent advances in droplet combustion," Department of Mechanical Engineering and Aerospace Engineering, Princeton University, Princeton, NJ, April 1, 1986.
45. "Dynamics of stretched flames," Department of Mechanical Engineering, University of Colorado, Boulder, CO, April 14, 1986.
46. "Combustion of high energy propellants," Martin Marietta Research Lab., Baltimore, MD, July 28, 1986.
47. "Recent advances in droplet combustion," Department of Mechanical Engineering, Washington State University, Pullman, WA, Sept. 10, 1986.
48. "Recent studies on the structure of laminar premixed flames," Department of Mechanical Engineering, University of California, Berkeley, CA, Oct. 22, 1986.
49. "Recent advances in multicomponent droplet combustion," Department of Mechanical Engineering, University of California, Davis, CA, April 9, 1987.
50. "Incineration of chlorinated hydrocarbons," Workshop on Research in Engineering and System Analysis for the Control of Toxic Substances, University of California, Los Angeles, CA, Oct. 21-22, 1987.

51. "Structure, propagation, and stability of laminar premixed flames," Department of Mechanical Engineering, Stanford University, Palo Alto, CA, Nov. 4, 1987.
52. "Blending strategy for the incineration of chlorinated hydrocarbons," Workshop on Incineration Technologies for Municipal, Toxic and Hospital Wastes, National Science Foundation, Washington, DC, April 18-19, 1988.
53. "On flame extinction and flammability limits of combustibles," Department of Mechanical and Aerospace Engineering, Rutgers University, New Brunswick, NJ, Nov. 2, 1988.
54. "Vaporization, combustion, and collisional dynamics of fuel droplets," Department of Mechanical Engineering, University of Pennsylvania, Philadelphia, PA, Feb. 9, 1989.
55. "Extinction and flammability of gaseous combustibles," Department of Mechanical Engineering, Yale University, New Haven, CT, Feb. 22, 1989.
56. "Extinction and flammability of gaseous combustibles," Department of Mechanical Engineering, Pennsylvania State University, University Park, PA, March 16, 1989.
57. "Extinction mechanisms in premixed flames," Department of Mechanical Engineering and Mechanics, Drexel University, Philadelphia, PA, April 6, 1989.
58. "Droplet collision and coalescence," Workshop on Spray Processes, ASME National Heat Transfer Conference, Philadelphia, PA, Aug. 7-9, 1989.
59. "Structure, stabilization and propagation of laminar premixed flames," Department of Chemical Engineering, Illinois Institute of Technology, Chicago, IL, Sept. 9, 1989.
60. "Recent advances in droplet vaporization and combustion," Department of Mechanical Engineering, University of Maryland, Baltimore, MD, March 16, 1990.
61. "Mechanisms of extinction, stabilization, and flammability of premixtures," Hottel Lecture, Massachusetts Institute of Technology, Cambridge, MA, Oct. 25, 1990.
62. "Recent advances in droplet vaporization and combustion," United Technologies Research Center, East Hartford, CT, Nov. 2, 1990.
63. "Extinction, stabilization, and flammability in premixed systems," Department of Applied Mechanics and Engineering Sciences, University of California at San Diego, CA, Feb. 7, 1991.
64. "Extinction, stabilization, and flammability in premixed systems," Department of Mechanical Engineering, University of California at Irvine, CA, Feb. 7, 1991.
65. "Recent advances in multicomponent and reactive droplet vaporization and combustion," Department of Mechanical Engineering, University of California at Irvine, CA, Feb. 8, 1991.
66. "Recent advances in droplet combustion," Department of Aeronautics and Astronautics, National Cheng Kung University, Tainan, Taiwan, April 19, 1991.

67. "Extinction, stabilization and flammability in combustion systems," Department of Power Mechanical Engineering, National Tsing Hua University, Hsinchu, Taiwan, April 22, 1991.
68. "Extinction, stabilization and flammability in combustion systems," Department of Mechanical Engineering, National Taiwan University, Taipei, Taiwan, April 23, 1991.
69. "Extinction, stabilization and flammability in combustion systems," Department of Mechanical Engineering, University of Sydney, Sydney, Australia, June 18, 1991.
70. "Intrinsic transport and chemistry in combustion phenomena," The Sixth Toyota Conference, Nagoya, Japan, Oct. 11-14, 1992.
71. "Ignition, extinction and flame stabilization in subsonic and supersonic flows," ONERA, France, June 28, 1993.
72. "Fundamental combustion phenomena in microgravity," Comet 7, Orlean, France, June 30, 1993.
73. "Some recent results on fundamental combustion phenomena," BP Research, July 15, 1993.
74. "The role of chemistry in aerothermochemistry," Colloquium on Combustion on the Occasion of the 70th Birthday of Prof. I. Glassman, Princeton University, Princeton, NJ, Oct. 28, 1993.
75. "Droplet processes relevant to diesel additives for soot reduction," Diesel Low Emission Additive Workshop, BP Research, Sunbury, England, Sept. 22-23, 1994.
76. "Recent advances in the aerodynamics of flames," School of Mechanical Engineering, Purdue University, Nov. 18, 1994.
77. "Some recent contributions in flame and spray processes," NIST, March 7, 1995.
78. "Coupling chemistry and transport in combustion phenomena," Department of Mechanical Engineering, University of California, Berkeley, CA, March 13, 1995.
79. "Some recent contributions in flame and spray phenomena," Department of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY, April 4, 1995.
80. "On the structure and response of stretched premixed flames," Department of Mechanical Engineering, Washington State University, Pullman, WA, Aug. 15, 1995.
81. "Fundamental droplet processes in spray vaporization and combustion," Department of Mechanical Engineering, Carnegie-Mellon University, Pittsburgh, PA, Nov. 19, 1995.
82. "Realistic and efficient chemical kinetic mechanisms in combustion modeling," Air Force/NASA Workshop on Supersonic Combustion, Newport News, VA, June 14-16, 1996.
83. "Towards quantitative description of laminar flamelets," Technical University of Eindhoven, Eindhoven, The Netherlands, Jan. 27, 1997.
84. "Fundamental droplet processes in spray vaporization and combustion," Department of Mechanical Engineering, University of Delaware, Newark, DE, Feb. 28, 1997.

85. "The role of aerodynamics in combustion," Institute of Mechanics, Chinese Academy of Sciences, Beijing, China, June 23, 1997.
86. "The role of chemistry in combustion," Institute of Mechanics, Chinese Academy of Sciences, Beijing, China, June 23, 1997.
87. "Fundamental droplet processes in spray vaporization and combustion," Institute of Mechanics, Chinese Academy of Sciences, Beijing, China, June 25; Department of Thermal Engineering, Chongqing University, Chongqing, China, July 3; College of Astronautics, Northwestern Polytechnical University, Xian, China, July 5, 1997.
88. "Ignition of hydrogen in air," No. 11 Research Institute, China Aerospace Corporation, Beijing, China, July 7, 1997.
89. "Ignition in convective-diffusive systems," Wright-Patterson Air Force Base, August 13, 1997.
90. "Forced and intrinsic unsteady flame phenomena," Turbulent Combustion Workshop, Sandia National Laboratories, Livermore, CA, August 18-21, 1997.
91. "Aerodynamics of laminar premixed flames," Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI, September 19, 1997.
92. "Dynamics of droplet collision, " Department of Mechanical Engineering, Stanford University, Palo Alto, CA, March 11, 1998.
93. "Kinetics and transport in nonpremixed ignition of hydrogen by heated air," Graduate Aeronautical Laboratories, Caltech, Pasadena, CA, March 13, 1998.
94. "Dynamics of droplet collision," Department of Mechanical Engineering, Case Western Reserve University, Cleveland, OH, April 10, 1998.
95. "Aerodynamics of laminar flames," Department of Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ, February 12, 1999.
96. "Advances and opportunities in laminar flames," National Heat Transfer Conference, Albuquerque, NM, August 15-17, 1999.
97. "Dynamics of droplet collision," Department of Chemical Engineering, University of Illinois, Chicago, IL, January 27, 2000.
98. "Some aspects of the ignition-extinction S-curves in combustion phenomena," Department of Theoretical and Applied Mechanics, University of Illinois at Urbana-Champaign, IL, Oct. 12, 2000.
99. "Aerodynamics and chemistry in flame propagation and modeling," Department of Mechanical Engineering, University of Pennsylvania, Philadelphia, PA, April 5, 2001.
100. "Aerodynamics of flames," Department of Engineering Mechanics, Tsinghua University, Beijing, China, April 24, 2001.

101. "The role of chemistry in flames," Department of Thermal Engineering, Tsinghua University, Beijing, China, April 25, 2001.
102. "Overview of NASA program on microgravity combustion," Space Studies Board, National Research Council, Washington, DC, October 23, 2001.
103. "Development of comprehensive detailed and reduced reaction mechanisms for combustion modeling," 40th Aerospace Sciences Meeting and Exhibit, Reno, NV, January 14-17, 2002.
104. "Aerodynamics and chemistry in flame propagation and modeling," Department of Mechanical Engineering, University of Calgary, Alberta, Canada, March 11, 2002.
105. "Combustion in high speed flows," JASON Summer Study – Hypersonics, La Jolla, CA, June 21, 2002.
106. "Droplet combustion of multicomponent and energetic fuels," Department of Mechanical Engineering, New Jersey Institute of Technology, Newark, N.J., Nov. 13, 2002.
107. "Chemical kinetics and flame dynamics in hydrogen combustion," Department of Mechanical Engineering, University of California, Riverside, CA, January 10, 2003.
108. "Fundamental processes in droplet combustion and collision," Department of Mechanical Engineering, City College of New York, New York, NY, Feb. 6, 2003.
109. "Combustion phenomena of interest to IC engines," Global Fuels Technology, BP Research, Naperville, IL, May 1, 2003.
110. "Hydrogen economy in the global carbon problem," Department of Mechanical Engineering, Hong Kong University of Science and Technology, Hong Kong, August 27, 2003.
111. "Some thoughts and action items in mechanism development for combustion applications," Workshop on the Simulation of the Combustion of Real Fuels, NIST, Gaithersburg, MD, Sept. 4-5, 2003.
112. "Properties of propane combustion," Strategic Planning Meeting, British Petroleum Corp., Chicago, IL, Nov. 20, 2003.
113. "Engineering the leader – a Princeton/personal perspective," School of Engineering, National Central University, Taiwan, Dec. 15, 2003
114. "Comprehensive description of chemistry in combustion modeling," Symposium on the Advancements in Combustion Theory, University of California at San Diego, La Jolla, CA, Jan. 10, 2004.
115. "Some recent contributions to combustion chemistry, flame theory, and droplet dynamics," NIST, Gaithersburg, MD, May 5, 2004.
116. "Role of laminar flamelets and reduced chemistry in turbulent flame modeling and simulation," Symposium of Advanced Combustion Modeling, Cranfield University, England, Sept. 21, 2004.

117. "Ignition kinetics and flame dynamics in hydrogen combustion," Department of Mechanical Engineering, Pennsylvania State University, September 30, 2004.
118. "From atomic to cosmic: A panoramic view of combustion," College of Engineering, National Central University, Jhongli, Taiwan, October 27, 2004.
119. "Frontiers of combustion: from microgravity to micro-engines," Department of Aerospace Engineering, Iowa State University, Ames, Iowa, November 4, 2004.
120. "From atoms to the cosmos: a panoramic view of combustion," Department of Mechanical and Aerospace Engineering, Princeton University, Princeton, NJ, March 25, 2005.
121. "Basic needs in scramjet lean blowout," Workshop on Scramjet Lean Blowout, JANNAF Conference, Charleston, S.C., June 16, 2005.
122. "Some issues on combustion and chemistry in high-energy-density fuels," DARPA Workshop on Future of Military Logistic Fuels, Rice University, Houston, TX, August 30, 2005.
123. "The role of combustion in hydrogen economy," Department of Mechanical Engineering, University of Connecticut, Storrs, Ct., September 30, 2005.
124. "Ignition kinetics and flame dynamics in hydrogen combustion," Workshop on Research Frontiers for Combustion in Hydrogen Economy, National Science Foundation, March 9-10, 2006.
125. "The role of combustion in science and technology," Princeton Environmental Institute Faculty Seminar, Princeton University, Princeton, NJ, April 11, 2006.
126. "Physical and experimental perspectives in flamefront instability," Third Conference in Frontiers in Applied and Computational Mathematics, New Jersey Institute of Technology, Newark, NJ, May 15-16, 2006.
127. "The role of combustion in global warming," Department of Mechanical Engineering, University of Hawaii, Manoa, HI, September 7, 2006.
128. "Development of computationally accessible reaction mechanisms in chemical propulsion," JANNAF Propulsion Conference, San Diego, CA, Dec. 4-8, 2006.
129. "Some aspects of combustion at elevated pressures," JANNAF Propulsion Conference, San Diego, CA, Dec. 4-8, 2006.
130. "Ignition kinetics and flame dynamics in hydrogen combustion," School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, December 19, 2006.
131. "From atomic to cosmic: A panoramic view of combustion," School of Engineering Open Lecture, Hong Kong Polytechnic University, Hong Kong, April 13, 2007.
132. "Development of computationally accessible reaction mechanisms for simulation of combustion processes," Ford Research Laboratories, Dearborn, MI, Sept. 28, 2007.
133. "Towards accommodating realistic chemistry in large-scale simulations," 46th Aerospace Sciences Meeting, Reno, NV, Jan. 6-10, 2008.

CONTRIBUTED AND OBLIGATORY TALKS

1. "Some theoretical aspects of the influence of solid heterogeneity on L^* instability," AIAA 10th Aerospace Sciences Meeting, San Diego, CA, Jan. 17-20, 1972.
2. "On a class of models for droplet combustion," AIAA 12th Aerospace Sciences Meeting, Washington, DC, Jan. 30-Dec. 1, 1974.
3. "A one-dimensional theory for spray vaporization in adiabatic and isothermal systems," Fall Technical Meeting of the Western States Section of The Combustion Institute, Northridge, CA, Oct. 21-22, 1974.
4. "Flat-plate combustion of multicomponent liquid fuels," Fall Technical Meeting of the Eastern States Section of The Combustion Institute, Brookhaven Laboratories, Upton, NY, Nov. 6, 1975.
5. "A simplified model for the combustion of fuel/water emulsion droplets," Fall Technical Meeting of the Eastern States Section of The Combustion Institute, Drexel University, Philadelphia, PA, Nov. 18-19, 1976.
6. "Ignition and combustion of fuel spray jets," Project SQUID Meeting, University of California at San Diego, La Jolla, CA, Mar. 22-25, 1977.
7. "Analysis of thermal ignition lag in fuel droplet combustion," Spring Technical Meeting of the Central States Section of The Combustion Institute, NASA Lewis Research Center, Cleveland, OH, Mar. 28-30, 1977.
8. "An analysis of the combustion of water-in-fuel emulsion droplets," Water-in-Oil Emulsion Conference, Department of Transportation, Cambridge, MA, Apr. 20-21, 1977.
9. "Internal boiling and superheating in vaporizing multicomponent droplets," Fall Technical Meeting of the Western States Section of The Combustion Institute, Stanford University, Stanford, CA, Oct. 18-19, 1977.
10. "On the stagnation-point ignition of a premixed combustible," Fall Technical Meeting of the Eastern States Section of The Combustion Institute, United Technology Research Center, East Hartford, CT, Nov. 11-12, 1977.
11. "Combustion studies of water/oil emulsions," ARO Third Workshop on Engine Combustion, Purdue University, Lafayette, IN, Jan. 25-26, 1978.
12. "Combustion studies of coal-in-oil droplets," DOE Coal-Oil Mixture Meeting, Pittsburgh Energy Research Center, Pittsburgh, PA, Jan. 30, 1978.
13. "On the ignition of a combustible mixture by hot bodies," Spring Technical Meeting of the Western States Section of The Combustion Institute, University of Colorado, Boulder, CO, Apr. 18-19, 1978.
14. "Disruptive combustion of coal-oil-mixture droplets," First International Symposium on Coal-Oil Mixture Combustion, St. Petersburg, FL, May 8-10, 1978.

15. "Combustion of coal-in-oil droplets," DOE Coal-Oil Mixture Meeting, Pittsburgh, PA, Sept. 8-9, 1978.
16. "Fundamental studies on emulsion combustion," Conference on Emulsified Fuels in Combustion, Department of Transportation, Cambridge, MA, Sept. 12-13, 1978.
17. "Theoretical studies on heterogeneous combustion," DOE/Basic Energy Sciences Combustion Research Contractors' Meeting, Sandia Laboratory, Livermore, CA, Oct. 17-19, 1978.
18. "Catalytic initiation of gas-phase combustion of hydrocarbon fuels," Project SQUID Meeting, New Haven, CT, Oct. 17-20, 1978.
19. "Combustion characteristics of droplets of coal/oil and coal/oil/water mixtures," 1978 Midwestern Energy Conference, Chicago, IL, Nov. 19-21, 1978.
20. "Combustion characteristics of oil/water/coal emulsions," Fall Technical Meeting of the Eastern States Section of The Combustion Institute, Miami Beach, FL, Nov. 29-Dec. 1, 1978.
21. "Thermal ignition analysis in boundary layer flows," ASME Winter Annual Meeting, San Francisco, CA, Dec. 10-15, 1978.
22. "Experimental and theoretical re-examination of the classical d^2 -law of droplet combustion," Spring Technical Meeting of the Western States Section of The Combustion Institute, Brigham Young University, Provo, UT, Apr. 23-24, 1979.
23. "Combustion of coal-in-oil droplets," DOE Coal-Oil Mixture Meeting, Pittsburgh, PA, May 31-June 1, 1979.
24. "Combustion studies of fuel/water emulsions," Fourth Engine Combustion Workshop, University of Wisconsin at Madison, WI, July 23-24, 1979.
25. "Theoretical studies on heterogeneous combustion," DOE/Basic Energy Sciences Combustion Contractors' Meeting, Brookhaven Laboratory, Upton, NY, Oct. 9-11, 1979.
26. "On the vapor pressure, boiling point, burning characteristics, and fire retardancy of water/oil emulsions," 1979 Fall Technical Meeting of the Western States Section of The Combustion Institute, Lawrence Livermore Laboratory, Berkeley, CA, Oct. 15-16, 1979.
27. "An ignition criterion for droplets in sprays," 1979 Technical Meeting of the Eastern States Section of The Combustion Institute, Georgia Institute of Technology, Atlanta, GA, Nov. 7-9, 1979.
28. "Combustion of water/oil emulsions and coal-oil mixtures," ASME-Chicago Section Meeting, Northwestern University, Evanston, IL, Nov. 10, 1979.
29. "Lean-limit extinction of propane/air mixtures in the stagnation-point flow," 1980 Spring Meeting of the Western States Section of the Combustion Institute, Irvine, CA, Apr. 21-22, 1980.
30. "Combustion and agglomeration of coal-oil-water mixtures in furnace environments," Third Symposium on Emulsified Fuel in Combustion, Cambridge, MA, May 13-14, 1980.

31. "Fundamental properties of water/oil emulsion combustion," Third Symposium on Emulsified Fuel in Combustion, Cambridge, MA, May 13-14, 1980.
32. "Combustion of strongly-interacting linear droplet arrays," 18th Symposium (International) on Combustion, Waterloo Canada, Aug. 16-22, 1980.
33. "A d^2 -law for the multicomponent droplet vaporization and combustion," AIAA 19th Aerospace Sciences Meeting, St. Louis, MO, Jan. 13-15, 1981.
34. "Effects of heat loss, preferential diffusion, and flame stretch on flame-front instability and extinction of propane/air mixtures," Central States Section of The Combustion Institute Meeting, Warren, MI, Mar. 23-24, 1981.
35. "Mechanisms of lean-limit extinction," Combustion Research Contractors' Meeting, NASA Lewis, April 7-8, 1981.
36. "A unified criterion for the convective extinction of fuel particles," AIAA 16th Thermophysics Conference, Palo Alto, CA, June 23-25, 1981.
37. "A theoretical study of ignition in the laminar mixing layer," 20th Joint ASME/AIChE National Heat Transfer Conference, Milwaukee, WI, Aug. 2-5, 1981.
38. "Catalytic combustion in a shear flow," Fifth Workshop on Catalytic Combustion, San Antonio, TX, Sept. 15-16, 1981.
39. "Mechanisms of droplet combustion," Contractors' Meeting of DOE/Basic Energy Sciences, Sandia Laboratories, Livermore, CA, Oct. 27, 1981.
40. "On the mixed-convective flame structure in the stagnation-point of a fuel particle," Nineteenth Symposium (International) on Combustion, Technion, Haifa, Israel, Aug. 9-13, 1982.
41. "An experimental study of extinction and stability of stretched premixed flames," Nineteenth Symposium (International) on Combustion, Technion, Haifa, Israel, Aug. 9-13, 1982.
42. "Combustion and micro-explosion of water/oil emulsions in high-pressure environments," ARO Engineer/Fuels Workshop, Southwest Research Institute, St. Antonio, TX, Dec. 6-8, 1982.
43. "Micro-explosion of fuel droplets under high pressure," Western States Section of The Combustion Institute Meeting, Los Angeles, CA, Oct. 17-18, 1983.
44. "Organic azides as jet fuel additives," JANNAF Propulsion Meeting, New Orleans, LA, Feb. 7-9, 1984.
45. "Combustion and micro-explosion of water/oil emulsions in high pressure environments," ARO Engines/Fuels Workshop, Philadelphia, PA, Mar. 27-28, 1984.
46. "A theoretical study of the interactive combustion of counterflow premixed flames," Western States Section of The Combustion Institute Meeting, Boulder, CO, Apr. 2-3, 1984.
47. "Lean-limit phenomena," NASA Fundamental Combustion Contractors' Meeting, NASA Lewis, Cleveland, OH, Apr. 16-18, 1984.

48. "Organic azides as jet fuel additives," AFOSR/ONR Contractors' Meeting, Pittsburgh, PA, June 20-21, 1984.
49. "Alcohol droplet vaporization in humid environment," National Heat Transfer Conference, Niagara Falls, NY, Aug. 6-8, 1984.
50. "Combustion and micro-explosion of organic azides," ONR/NAVAIR Workshop on Compact Ramjet Combustion Instabilities, Naval Postgraduate School, Monterey, CA, Oct. 24-25, 1984.
51. "Laminar flame speeds of hydrocarbon/air mixtures with hydrogen addition," Central and Western States Sections of The Combustion Institute Meeting, San Antonio, TX, Apr. 22-23, 1985.
52. "Droplet combustion of organic azides," AIAA/SAE/ASME/ASEE 21st Joint Propulsion Conference, Monterey, CA, July 8-10, 1985.
53. "Aerodynamic and kinetic processes in flames," AFOSR Contractors' Meeting, California Institute of Technology, Pasadena, CA, July 23-25, 1985.
54. "Combustion of liquid propellant droplets," JANNAF Regenerative Liquid Gun Propellant Spray Combustion Workshop, Aberdeen Proving Ground, MD, Aug. 26-27, 1985.
55. "Stability and stabilization of premixed flames," DOE Third Symposium on Energy Engineering Sciences, Pennsylvania State University, University Park, PA, Oct. 8-10, 1985.
56. "Organic azides as jet fuel additives," ONR Workshop on Combustion Instability in Compact Ramjets, Johns Hopkins University, Baltimore, MD, Oct. 16-17, 1985.
57. "Propagation and extinction of stretched premixed flames," Fall Technical Meeting of the Western States Section of The Combustion Institute, University of California, Davis, CA, Oct. 21-22, 1985.
58. "Combustion and micro-explosion of water/oil emulsions in high pressure environments," Sixth ARO Combustion/Fuels Workshop, University of California, Davis, CA, Mar. 17-18, 1986.
59. "Droplet combustion of HAN-based liquid propellants," Army Workshop on HAN-Based Liquid Propellants, Aberdeen Proving Ground, MD, July 29, 1986.
60. "Liquid-phase diffusional resistance in multicomponent droplet gasification," Twenty-First Symposium (International) on Combustion, Munich, Germany, Aug. 3-8, 1986.
61. "Time-resolved gasification and sooting characteristics of droplets of alcohol/oil blends and water/oil emulsions," 21st Symposium (International) on Combustion, Munich, Germany, Aug. 3-8, 1986.
62. "Flame curvature and preferential diffusion in the burning intensity of Bunsen flames," 21st Symposium (International) on Combustion, Munich, Germany, Aug. 3-8, 1986.
63. "Propagation and extinction of stretched premixed flames," 21st Symposium (International) on Combustion, Munich, Germany, Aug. 3-8, 1986.

64. "Vaporization, combustion, and microexplosion of droplets of organic azides," 23rd JANNAF Combustion Meeting, NASA-Langley, Oct. 20-24, 1986.
65. "Propagation and extinction of stretched premixed flames," Sandia Turbulent Flame Workshop, University of California, Davis, CA, April 21-22, 1987.
66. "Aerodynamic and kinetic processes in flames," AFOSR/ONR Contractor's Workshop, Pennsylvania State University, College Station, PA, June 22-26, 1987.
67. "Some issues related to stretched flames," US-Japan Workshop on Mathematical Combustion, Juneau, Alaska, Aug. 17-21, 1987.
68. "Kinetic effects in flame analysis," US-Japan Workshop on Mathematical Combustion, Juneau, Alaska, Aug. 17-21, 1987.
69. "Droplet combustion of HAN-based liquid propellants," Workshop on Liquid Propellants, Aberdeen Proving Ground, Aberdeen, MD, Aug. 25-27, 1987.
70. "Droplet extinction studies," Workshop on Hazardous Waste Incineration, University of California, Davis, CA, Sept. 14-15, 1987.
71. "Ignition and combustion of liquid gun propellants," Seventh Army Engine/Fuels Workshop, Detroit, MI, Oct. 13-14, 1987.
72. "Combustion studies of energetic liquid materials," ONR Contractor's Meeting, University of California, Berkeley, CA, Nov. 17-19, 1987.
73. "Structure and propagation of premixed and diffusion flames," Sixth Symposium on Energy Engineering Sciences, Argonne National Laboratories, Argonne, IL, May 4-6, 1988.
74. "Combustion of liquid propellant droplets," Army Workshop on Liquid Propellants, Piccatiny Proving Ground, NY, June 13, 1989.
75. "Kinetic and aerodynamic processes in flames," AFOSR Workshop, University of Michigan, Ann Arbor, MI, June 19-22, 1989.
76. "Combustion studies of energetic liquid materials," ONR Contractors' Meeting, Chicago, IL, Oct. 17-18, 1989.
77. "Burning rate enhancement of propellants of organic azides: effects of halide addition and pressure elevation," Spring Technical Meeting, Canadian and Western States Sections of The Combustion Institute, Banff, Alberta, April 28 - May 2, 1990.
78. "Structure and extinction of diffusion flames with flame radiation," Twenty-Third Symposium (International) on Combustion, Orlean, France, July 22-27, 1990.
79. "A kinetic criterion of flammability limits: the C-H-O-inert system," Twenty-Third Symposium (International) on Combustion, Orlean, France, July 22-27, 1990.
80. "Combustion of energetic liquid materials," ONR Contractors' Meeting, Newport, RI, Oct. 15-17, 1990.

81. "On closure in activation energy asymptotics of premixed flames," Technical Meeting of the Eastern Section of The Combustion Institute, Orlando, FL, Dec. 3-5, 1990.
82. "Extinction, stabilization, and flammability in combustion systems," Ninth Symposium on Energy Engineering Sciences, Argonne, IL, May 14, 1991.
83. "Aerodynamics and kinetic processes in flames," AFOSR Contractors' Meeting, Boulder, CO, June 10, 1991.
84. "Ignition studies of nonpremixed hydrocarbon/air combustion," ARO 10th Engine/Fuels Workshop, Madison, WI, June 2-3, 1992.
85. "Dynamics of droplet collision," AFOSR Contractors' Meeting, La Jolla, CA, June 15-19, 1992.
86. "A unified chain-thermal theory of fundamental flammability limits," 24th International Symposium on Combustion, Sydney, Australia, July 5-10, 1992.
87. "On the structure and stabilization mechanisms of planar and cylindrical premixed flames," Second International Microgravity Combustion Workshop, Cleveland, OH, Sept. 15-17, 1992.
88. "Combustion studies of energetic liquid materials," 5th ONR Propulsion Meeting, Washington, DC, Sept. 29 - Oct. 1, 1992.
89. "Ignition in nonpremixed counterflowing hydrogen versus heated air: I. computational study with detailed and simplified chemistry," Joint Technical Meeting of the Eastern and Central States Sections of the Combustion Institute, New Orleans, LA, March 15-17, 1993.
90. "Ignition in nonpremixed counterflowing hydrogen versus heated air: II. asymptotic analysis with reduced kinetic mechanics," Joint Technical Meeting of the Eastern and Central States Sections of the Combustion Institute, New Orleans, LA, March 15-17, 1993.
91. "On the tip opening of Bunsen flames," Joint Technical Meeting of the Eastern and Central States Sections of the Combustion Institute, New Orleans, LA, March 15-17, 1993.
92. "Studies on high pressure and unsteady flame phenomena," AFOSR Contractors' Meeting, Atlantic City, NJ, June 14-18, 1993.
93. "Combustion of energetic liquid materials," 6th ONR Propulsion Meeting, Boulder, CO, August 31 - Sept. 2, 1993.
94. "Ignition in the supersonic hydrogen/air mixing layer with reduced reaction mechanisms," 32nd Aerospace Sciences Meeting, Reno, NV, Jan. 10-13, 1994.
95. "Stabilization mechanisms and burning rates of cylindrical burner flames," 32nd Aerospace Sciences Meeting, Reno, NV, Jan. 10-13, 1994.
96. "Ignition in convective-diffusive systems," 10th ARO Engine Workshop, Princeton, NJ, March 14-15, 1994.

97. "Mechanisms and enhancement of flame stabilization," 12th Symposium on Energy Engineering Sciences, Argonne, IL, April 27-29, 1994.
98. "Droplet collision in liquid propellant combustion," AFOSR Contractors' Meeting, Lake Tahoe, CA, June 6-10, 1994.
99. "Burning rate enhancement and soot reduction through blending in chlorinated waste incineration," 25th International Symposium on Combustion, Irvine, CA, August 1-5, 1994.
100. "Combustion studies of energetic liquid materials," 7th ONR Propulsion Meeting, Buffalo, NY, Aug. 29-31, 1994.
101. "On the structural response of counterflow diffusion flames to strain rate variations," 33rd Aerospace Sciences Meeting, Reno, NV, Jan. 9-12, 1995.
102. "A numerical study of ignition in the supersonic hydrogen/air laminar mixing layer," 33rd Aerospace Sciences Meeting, Reno, NV, Jan. 9-12, 1995.
103. "Laminar burning rates and oxidation kinetics of premixed benzene/air and toluene/air flames," Joint Tech. Meeting of the Central and Western States Sections of the Combustion Institute, San Antonio, TX, April, 23-26, 1995.
104. "On burner-stabilized cylindrical premixed flame in microgravity," Third International Microgravity Combustion Conference, NASA-Lewis, Cleveland, OH, April 11-13, 1995.
105. "Combustion studies of energetic liquid materials," Eighth ONR Propulsion Meeting, San Diego, CA, Oct. 11-13, 1995.
106. "On ignition in counterflowing CO/H₂ and CO/H₂O versus heated air," Technical Meeting of the Eastern States Section of the Combustion Institute, Worcester, MA, Oct. 16-18, 1995.
107. "On the evolution of two-dimensional flame surfaces," 34th Aerospace Science Meeting, Reno, NJ, Jan. 15-18, 1996.
108. "On the extinction of counterflow diffusion flames in an oscillating flow field," 34th Aerospace Sciences Meeting, Reno, NV, Jan. 15-18, 1996.
109. "On ignition in counterflowing CO/H₂ versus heated air," 34th Aerospace Sciences Meeting, Reno, NV, Jan. 15-18, 1996.
110. "Droplet collision in liquid propellant combustion," AFOSR Contractors' Meeting, Virginia Beach, VA, June 3-6, 1996.
111. "Endothermic fuels for scramjets," AFOSR Workshop, Virginia Beach, VA, June 6, 1996.
112. "Ignition in convective-diffusive systems," ARO Contractors' Meeting, Virginia Beach, VA, June 3-6, 1996.
113. "Combustion studies of energetic liquid materials," ONR Contractors' Meeting, Alexandria, VA, Sept. 9-12, 1996.

114. "Characteristic dependence of adiabatic flame temperature on fuel equivalence ratio," Fall Tech. Meeting of the Western States Section of the Combustion Institute, Los Angeles, CA, Oct. 28-29, 1996.
115. "Effects of stretch in propagating spherical flames," Fall Tech. Meeting of the Western States Section of the Combustion Institute, Los Angeles, CA, Oct. 28-29, 1996.
116. "Stretch effects in counterflow and propagating spherical flames," 35th Aerospace Sciences Meeting, Reno, NV, Jan. 6-9, 1997.
117. "Stationary state multiplicities in diffusive-reactive systems: I. hydrogen versus heated air," 35th Aerospace Sciences Meeting, Reno, NV, Jan. 6-9, 1997.
118. "Pulsating instability in the fundamental flammability limits of rich hydrogen/air flames," Spring Tech. Meeting of the Western States Section of the Combustion Institute, Sandia Laboratories, Livermore, CA, April 14-15, 1997.
119. "Combustion studies of energetic liquid materials," Tenth ONR Contractors Meeting, Monterey, CA, October 7-10, 1997.
120. "Chemical kinetics and aerodynamics of ignition," ARO/AFOSR Contractors' Meeting, Long Beach, CA, June 29 - July 1, 1998.
121. "The role of hydrodynamic instability in flame/vortex interaction," 34th AIAA Joint Propulsion Conference, Cleveland, OH, July 12-15, 1998.
122. "Steady and pulsating propagation and extinction of rich hydrogen/air flames at elevated pressures," 37th Aerospace Sciences Meeting, Reno, NV, January 11-14, 1999.
123. "Structure and transient response of spherical flames," Fifth International Microgravity Combustion Workshop, Cleveland, OH, May 18-20, 1999.
124. "Physical and chemical processes in flames," AFOSR/ARO Contractors' Meeting, Bar Harbor, ME, June 14-16, 1999.
125. "Hydrodynamic instability in flame-vortex interaction," National Heat Transfer Conference, Albuquerque, NM, August 15-17, 1999.
126. "On the establishment of stationary flame balls," Fall Tech. Meeting of the Eastern States Section of the Combustion Institute, Raleigh, NC, Oct. 11-13, 1999.
127. "Pulsating instability in rich hydrogen/air premixed flames," 38th Aerospace Sciences Meeting, Reno, NV, Jan. 10-13, 2000.
128. "On the development of detailed and reduced reaction mechanisms for combustion modeling," 28th Aerospace Sciences Meeting, Reno, NV, Jan. 10-13, 2000.
129. "Chemical kinetics and aerodynamics of ignition," ARO/AFOSR Contractors' Meeting, Santa Fe, NM, June 11-14, 2000.

130. "Dynamics and extinction of non-adiabatic particle-laden flames," 28th International Combustion Symposium, Edinburgh, Scotland, July 30-August 4, 2000.
131. "Theoretical studies on spray detonation," ONR Contractors' Meeting, Minneapolis, MN, August 10-12, 2000.
132. "Dynamics of droplet collision and flamefront motion," AFOSR Contractors' Meeting, San Francisco, CA, August 14-16, 2000.
133. "Studies of spray detonation for PDE applications," 39th AIAA Aerospace Sciences Meeting, Reno, NV, Jan. 8-11, 2001.
134. "Theoretical studies of spray detonation for PDE applications," ONR Contractors' Meeting, Pasadena, CA, February 1-2, 2001.
135. "Outwardly propagating flames at elevated pressures," Sixth International Microgravity Combustion Workshop, Cleveland, May 21-24, 2001.
136. "Studies on high pressure and unsteady flame phenomena," AFOSR Contractors' Meeting, Los Angeles, CA, June 18-19, 2001.
137. "Turbulence and chemical kinetics of ignition," ARO Contractors' Meeting, Los Angeles, CA, June 18-19, 2001.
138. "Some aspects of chemical kinetics and heterogeneity in C-J detonation for PDE applications," 14th ONR Propulsion Meeting, Chicago, IL, August 8-10, 2001.
139. "Combustion of hydrogen and hydrogen/hydrocarbon mixtures," Seminar on Carbon Mitigation Initiative, Princeton University, Princeton, NJ, December 10, 2001.
140. "Heterogeneous effects in the propagation and quenching of heptane/air spray detonations," PDE-MURI Mid-year review, Feb. 11-12, 2002.
141. "Cellular instabilities and self-acceleration of outwardly propagating spherical flames," 29th International Combustion Symposium, Sapporo, Japan, July 21-27, 2002.
142. "Studies on droplet and flame dynamics," AFOSR Contractors' Meeting, Colorado Springs, CO., August 19-22, 2002. 142A. "Experience with combustion of energetic liquid propellants," by C.K. Law, AFOSR Workshop on Energetic Liquid Propellants, Washington, D.C, Oct. 9-10, 2002.
143. "Structure and response of spherical diffusion flames," Science Concept Review, NASA-Glenn, Dec. 10, 2002.
144. "Hydrogen fuel from the perspective of combustion: fundamentals, engine performance, and safety," Second Annual Meeting, Carbon Mitigation Initiative, Princeton University, Princeton, NJ, January 14, 2003.
145. "Cellular instabilities and self-acceleration of expanding spherical flames," 7th International Workshop on Microgravity Combustion and Chemically Reacting Flows, Cleveland, OH, June 3-6, 2003.

146. "Physical and chemical processes in flames," AFOSR/ARO Contractors' Meeting, Williamsburg, VA, June 23-25, 2003.
147. "Aerodynamics and chemical kinetics in ignition," AFOSR/ARO Contractors' Meeting, Williamsburg, VA, June 23-25, 2003.
148. "Ignition and flame propagation in hydrogen combustion," CMI Seminar, Princeton University, Nov. 17, 2003.
149. "Carbon mitigation from the perspective of combustion – fundamentals, fuel characteristics, engine performance, and safety,' Third Annual Meeting on Carbon Mitigation Initiative, Princeton University, Jan. 20-21, 2004.
150. "Combustion of hydrogen and alternate fuels for carbon mitigation," Seminar at Carbon Mitigation Initiative Meeting, Princeton University, May 18, 2004.
151. "Physical and chemical processes in flames," AFOSR Contractors' Meeting, Tucson, AZ, June 7-9, 2004.
152. "Chemical kinetics and aerodynamics in ignition," ARO Contractors' Meeting, Tucson. AZ, June 7-9, 2004.
153. "Dynamics of droplet-droplet and droplet-film collision," International Symposium on Energy Conversion Fundamentals, Istanbul, Turkey, June 21-24, 2004.
154. "Combustion and microexplosion of collision-merged methanol/alkane droplets," 30th International Combustion Symposium, Chicago, IL, July 26-30, 2004.
155. "Dynamics of droplet-film collision," 43rd Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 10-13, 2005.
156. "On the off-stoichiometric peaking of adiabatic flame temperatures," 4th Joint Meeting of the US Sections of the Combustion Institute, Philadelphia, Pa, March 21-23, 2005.
157. "Chemical kinetics and aerodynamics of ignition," ARO Contractors' Meeting, Indianapolis, IN, June 20-22, 2005.
158. "Physical and chemical processes in flames," AFOSR Contractors' Meeting, Indianapolis, IN, June 20-22, 2005.
159. "Development of computationally accessible reaction mechanisms for scramjet modeling," STTR Kickoff Meeting, Dayton, OH, August 22, 2005.
160. "Development of computationally accessible reaction mechanisms for scramjet modeling," STTR Contractors' Meeting, Dayton, OH, December 16, 2005.
161. "Chemical kinetics and aerodynamics of ignition," ARO Contractors' Meeting, Washington, DC, June 12-14, 2006.
162. "Physical and chemical processes in flames," AFOSR Contractors' Meeting, Washington, DC, June 12-14, 2006.

163. "High-pressure and supercritical droplet and flame dynamics in propulsion," Space Propulsion and Power Contractors' Meeting, Annapolis, MD, Sept. 25-29, 2006.
164. "On multiple criticality in hydrocarbon ignition," 45th Aerospace Sciences Meeting, Reno, NV, Jan. 8-11, 2007.
165. "On the controlling mechanisms in multicomponent droplet gasification," Fifth US Combustion Meeting, San Diego, CA, March 25-28, 2007.
166. "Physical and chemical processes in flames," AFOSR Contractors' Meeting, Boulder, CO, June 11-13, 2007.
167. "Ignition kinetics in fuels oxidation," ARO Contractors' Meeting, Boulder, CO, June 11-13, 2007.
168. "Development of computationally accessible reaction mechanisms for augmentor ignition/extinction modeling," AFRL Contractor's meeting, Craft Tech, Pipersville, PA, Sept. 27, 2007.

FUNDED RESEARCH PROJECTS*

	Title	Agency	Period	Amount (\$K)
1.	Ignition and combustion of fuel spray jets	NSF	07/15/77-06/30/82	126
2.	Combustion studies of fuel/water emulsions	ARO	08/01/77-07/31/80	117
3.	Theoretical studies on heterogenous combustion	DOE	07/01/77-06/30/83	248
4.	Combustion studies of coal in oil droplets	DOE	08/01/77-07/31/79	40
5.	Combustion of oil/water emulsions in Diesel environments	Engineering Foundation	09/01/77-08/31/78	10
6.	Acquisition of equipment for emissions measurements for emulsified fuel combustion	NSF	07/15/78-12/31/79	9
7.	An experimental study of high pressure combustion and cenosphere formation of coal-derived synfuels	Engineering Foundation	09/01/79-08/31/80	10
8.	Mechanisms of lean-limit extinction	NASA-Lewis	04/01/80-03/31/83	90
9.	Catalytic ignition and combustion of lean mixtures	ONR	05/01/80-04/30/83	182
10.	Specialized research equipment: acquisition of laser Doppler velocimetry system for combustion research	NSF	08/15/80-01/31/82	49
11.	Combustion and micro-explosion of water/oil emulsions in high pressure environments	ARO	12/07/81-12/06/84	201
12.	Ignition and combustion of fuel spray jets	NSF	06/01/82-05/31/86	170
13.	Lean limit phenomena	NASA-Lewis	04/01/83-10/31/84	75

* For joint programs, the amount of funding indicated represents the extent of this P.I.'s participation.

	Title	Agency	Period	Amount (\$K)
14.	Organic azides as jet fuel additives: combustion and micro-explosion characteristics	ONR	02/15/83-07/31/84	152
15.	Stability and stabilization of premixed flames	DOE	01/01/84-12/31/86	245
16.	Combustion of carbon slurries	Aero-Propulsion Lab, Wright-Patterson AFB	08/01/84-09/30/85	50
17.	Aerodynamic and kinetic processes in flames	AFOSR	03/01/85-02/28/89	390
18.	Acquisition of LDV System for combustion research	NSF	05/01/85-04/30/86	70
19.	Liquid propellant droplet ignition studies	Ballistic Research Lab Aberdeen PG	5/20/85-11/19/85	20
20.	Characterization and extension of flammability limits of low-Btu gases	UERG, Univ. of California	07/01/85-06/30/86	15
21.	Acquisition of analytical instruments for combustion research	DOD	07/01/86-06/30/88	205
22.	Ignition and combustion of liquid propellants	ARO	06/01/86-05/31/89	244
23.	Aerothermochemistry of dense spray processes	UERG, Univ. of California	07/01/86-06/30/87	18
24.	Upgrade of LDV system for combustion and turbulence research	NSF	09/01/86-03/31/87	10
25.	Vaporization, dynamics and interaction of droplets in dense sprays	NSF	10/01/86-09/30/89	172
26.	Structure and stabilization of pre-mixed and diffusion Flames	DOE	01/15/87-01/14/90	294
27.	Acquisition of two-component LDV system for combustion research	NSF	05/15/87-10/31/89	80

	Title	Agency	Period	Amount (\$K)
28.	Combustion studies of energetic liquid materials	ONR	08/01/87-07/31/90	420
29.	Acquisition of a laser-based optical diagnostic system for combustion research	DOE	09/01/87-08/31/89	241
30.	Chemical kinetic and aerodynamic processes in flames	AFOSR	03/01/89-02/28/92	392
31.	Combustion of chlorinated hydrocarbons in hazardous waste incineration	NSF	01/01/90-06/30/93	225
32.	Mechanisms and enhancement of flame stabilization	DOE	01/15/90-01/14/93	295
33.	Microgravity structure of spherical and cylindrical flames in stagnant and vortical environments	NASA	06/01/90-05/31/91	50
34.	Ignition studies in nonpremixed hydrocarbon-air combustion	ARO	10/15/90-10/14/93	290
35.	Combustion studies of energetic liquid materials	ONR	10/01/90-09/31/93	510
36.	Studies of flame structure in microgravity	NASA	03/01/91-02/10/95	420
37.	Structure of stretched laminar flames	British Petroleum	---	80
38.	Studies on high pressure and unsteady flame phenomena	AFOSR	03/01/92-02/28/95	400
39.	Droplet collision in spray combustion	AFOSR	06/01/92-05/31/95	153
40.	Soot studies in energetic liquid materials combustion	ONR (AASERT)	06/01/92-05/31/95	153
41.	Laser diagnostic imaging system for turbulent combustion research	NSF	07/01/92-06/30/93	90
42.	Dynamics and structure of stretched flames	DOE	01/15/93-12/31/97	350

Title	Agency	Period	Amount (\$K)
43. Combustion synthesis of materials in microgravity (with K. Brezinsky and I. Glassman)	NASA	01/01/93-12/31/95	135
44. Flame structure and kinetics in chlorinated hydrocarbon combustion	NSF	05/01/93-04/30/96	294
45. Hydrocarbon ignition with reduced mechanisms	ARO (AASERT)	09/01/93-08/30/96	153
46. URI: Turbulent reacting flows at high speed (P.I.: G. L. Brown)	AFOSR	07/01/93-06/30/97	202
47. Ignition and flame stabilization in high speed flows	AFOSR (AASERT)	07/01/94-06/30/97	153
48. Ignition in convective-diffusive systems	ARO	04/01/94-03/31/97	300
49. Combustion studies of energetic liquid materials	ONR	04/01/94-03/31/97	600
50. Studies on high pressure and unsteady flame phenomena	AFOSR	04/15/95-04/14/98	360
51. Studies of flame structure in microgravity	NASA	02/15/95-11/30/98	445
52. Droplet collision in liquid propellant combustion	AFOSR	06/01/95-05/31/97	115
53. Advanced Diesel injection strategies	ARO (AASERT)	09/01/95-08/31/97	88
54. Computational simulation of droplet collision dynamics	AFOSR (AASERT)	06/01/96-05/31/99	126
55. Flame kinetics and soot formation in chlorinated hydrocarbon combustion	NSF	07/15/96-07/14/99	330
56. Droplet collision in liquid propellant combustion	AFOSR	06/01/97-11/30/99	188
57. Chemical kinetics and aerodynamics of ignition	ARO	06/01/97-05/31/00	300
58. Physical and chemical processes in flames	AFOSR	10/01/97-09/30/00	840

	Title	Agency	Period	Amount (\$K)
59.	Structure and response of spherical diffusion flames	NASA	12/01/98-12/29/02	590
60.	Aerodynamics and chemical kinetics of premixed flames at high pressures	NASA	12/01/98-12/31/02	470
61.	Feasibility study of metal combustion for application in CO ₂ -breathing propulsion	NASA	08/24/98-08/23/99	40
62.	Two-component LDA with frequency shifting for unsteady and turbulent combustion studies	AFOSR, ARO, Princeton U.	07/01/99-06/30/00	160
63.	Dynamics of droplet collision and flamefront motion	AFOSR	12/01/99-11/30/02	285
64.	Theoretical studies on spray detonation	ONR	11/30/99-11/29/01	210
65.	Turbulence and chemical kinetics in ignition	ARO	11/01/00-10/31/03	300
66.	Physical and chemical processes in flames	AFOSR	10/15/00-10/14/03	763
67.	High speed imaging system for droplet collision and unsteady combustion studies	AFOSR	03/16/01-03/14/03	164
68.	Dynamics of droplet collision and flamefront motion	AFOSR	01/01/03-12/31/05	295
69.	Structure and response of spherical diffusion flames	NASA	01/01/03-12/31/07	383
70.	Aerodynamics and chemical kinetics of premixed flames at high pressures	NASA	11/07/03-09/30/07	405
71.	Turbulence and chemical kinetics in ignition	ARO	06/01/04-05/31/07	370
72.	Physical and chemical processes in flames	AFOSR	12/15/03-12/14/06	630
73.	Hydrogen combustion and hazards	BP/Ford	01/10/02-12/31/07	550

74.	Droplet and supercritical flame dynamics in propulsion	AFOSR	02/15/06-11/30/08	308
75.	Structure and response of spherical diffusion flames	NASA	10/01/06-09/30/09	325
76.	Physical and chemical processes in flames	AFOSR	12/15/06-11/30/09	720