

Hai Wang

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Current Position

Professor, Mechanical Engineering, Stanford University.

Education

- Ph.D.** (1992) Fuel Science, Pennsylvania State University, University Park, Pennsylvania.
- M.S.** (1986) Chemical Engineering, Michigan Technological University, Houghton, Michigan.
- B.Eng.** (1984) Polymer Materials Science and Engineering, East China University of Science and Technology, Shanghai, China.

Professional History

- 2013-present **Professor**, Department of Mechanical Engineering, Stanford University.
- 2010-2015 **Co-Founder**, HESTIA TEC, LLC – a lithium ion battery R&D company.
- 2010-2013 **Northrop Chair in Engineering**, University of Southern California.
- 2008-2009 **Associate Chair**, Department of Aerospace and Mechanical Engineering, University of Southern California.
- 2007-2011 **Co-Founder**, TISOL, LLC – an energy R&D company.
- 2007-2013 **Professor**, Department of Aerospace and Mechanical Engineering, University of Southern California.
- 2004-2007 **Associate Professor**, Department of Aerospace and Mechanical Engineering, University of Southern California.
- 2004-2006 **Adjunct Professor**, Department of Mechanical Engineering, University of Delaware.
- 2001-2004 **Associate Professor**, Department of Mechanical Engineering, University of Delaware.
- 1997-2001 **Assistant Professor**, Department of Mechanical Engineering, University of Delaware.
- 1994-1996 **Professional Research Staff**, Department of Mechanical and Aerospace Engineering, Princeton University.
- 1992-1994 **Postdoctoral Research Associate**, Fuel Science Program, Department of Materials Science and Engineering, Pennsylvania State University.

- 1987-1992 **Research Assistant**, Fuel Science Program, Department of Materials Science and Engineering, Pennsylvania State University.
- 1984-1986 **Teaching Assistant**, Department of Chemistry and Chemical Engineering, Michigan Technological University.

Fields of Interest

Combustion chemistry
 Soot formation
 Biofuel combustion
 Kinetic modeling and reaction rate theories
 Quantum chemistry and electronic structure calculations
 Optimization and uncertainty quantification
 Atmospheric heterogeneous reaction kinetics
 Aerosol dynamics
 Transport theories
 Nanomaterial synthesis and characterization
 Nanocatalysis
 Chemical sensors
 Rechargeable batteries
 Thin-film solar cells

Teaching

April 2018	Alternative Energy Systems ME141 Stanford	1 quarter @ 3 50-minute lectures/week and labs
January 2018	Combustion Fundamentals ME579 Stanford University	1 quarter @ 3 50-minute lectures/week
September 2017	Engineering Thermodynamics ME30 Stanford	1 quarter @ 3 50-minute lectures/week
April 2017	Alternative Energy Systems ME141 Stanford	1 quarter @ 3 50-minute lectures/week and labs
September 2016	Engineering Thermodynamics E30 Stanford	1 quarter @ 3 50-minute lectures/week
July 2016	Combustion Chemistry Tsinghua-Princeton Summer School	1 week lecture @ 3-hour lecture/day
March 2016	Nanoparticle Dynamics and Kinetics ME374 Stanford	1 quarter @ 2 one-hour-20 minute lectures/week
September 2015	Engineering Thermodynamics E30 Stanford	1 quarter @ 3 50-minute lectures/week
June 2015	Combustion Chemistry CEFRC Summer School, Princeton University	1 week lecture @ 3-hour lecture/day
March 2015	Nanoparticle Dynamics and Kinetics ME374 Stanford	1 quarter @ 2 one-hour-20 minute lectures/week

January 2015	Nonequilibrium Processes in High-Temperature Gases ME362B Stanford, co-teach w Hanson	1 quarter @ 2 one-hour-20 minute lectures/week
September 2014	Engineering Thermodynamics E30 Stanford	1 quarter @ 3 50-minute lectures/week
March 2014	Engineering Thermodynamics E30 Stanford	1 quarter @ 3 50-minute lectures/week
January 2014	Nanoparticle Dynamics and Kinetics ME374 Stanford	1 quarter @ 2 one-hour-20 minute lectures/week
July 2013	Combustion Chemistry Tsinghua/Princeton Summer School	1 week lecture @ 3-hour lecture/day
Spring 2013	Combustion Chemistry and Physics AME579 USC	1 semester @ 1 two-hour-40 minute lecture/week
Fall 2012	Alternative Energy Conversion Devices AME578 USC	1 semester @ 1 two-hour-40 minute lecture/week
June 2012	Combustion Chemistry CEFRC Summer School, Princeton University	1 week lecture @ 3-hour lecture/day
Spring 2012	Alternative Energy Conversion Devices AME578 USC	1 semester @ 1 two-hour-40 minute lecture/week
Fall 2011	Combustion Chemistry and Physics AME 599 USC	1 semester @ 1 two-hour-40 minute lecture/week
Spring 2011	Alternative Energy Conversion Devices AME578 USC	1 semester @ 1 two-hour-40 minute lectures/week
Spring 2010	Alternative Energy Conversion Devices AME578 USC	1 semester @ 1 two-hour-40 minute lectures/week
Spring 2010	Thermodynamics II AME 312 USC	1 semester @ 2 one-hour-20 minute lectures/week
Fall 2009	Combustion Chemistry and Physics AME 579 USC	1 semester @ 1 two-hour-40 minute lecture/week
Spring 2009	Alternative Energy Conversion Devices AME578 USC	1 semester @ 1 two-hour-40 minute lectures/week
Fall 2008	Combustion Chemistry and Physics AME 599 USC	1 semester @ 1 two-hour-40 minute lecture/week
Spring 2008	Compressible Gas Dynamics AME510 USC	1 semester @ 2 one-hour-20 minute lectures/week

Spring 2008	Alternative Energy Conversion Devices AME 599 USC	1 semester @ 1 two-hour-40 minute lecture/week
Fall 2007	Combustion Chemistry and Physics AME 599 USC	1 semester @ 1 two-hour-40 minute lecture/week
Spring 2007	Alternative Energy Conversion Devices AME 599 USC	1 semester @ 1 two-hour-40 minute lecture/week
Fall 2006	Combustion Chemistry and Physics AME 599 USC	1 semester @ 1 two-hour-40 minute lecture/week
Spring 2006	Dynamics AME301 USC	1 semester @ 2 one-hour-20 minute lectures/week
Spring 2006	Compressible Gas Dynamics AME510 USC	1 semester @ 2 one-hour-20 minute lectures/week
Fall 2005	Combustion Chemistry and Physics AME 599 USC	1 semester @ 1 two-hour-40 minute lecture/week
Spring 2005	Thermodynamics II AME 312 USC	1 semester @ 2 one-hour-20 minute lectures/week
Spring 2004	Thermodynamics MEEG 344 UDeI	1 semester @ 3 fifty-minute lectures/week
Fall 2003	Statistical Thermodynamics MEEG867 UDeI	1 semester @ 2 one-hour- 15-minute lectures/week
Spring 2003	Thermodynamics MEEG 344 UDeI	1 semester @ 3 fifty-minute lectures/week
Spring 2002	Thermodynamics MEEG 344 UDeI	1 semester @ 3 fifty-minute lectures/week
Fall 2001	Combustion MEEG 441/641 UDeI	1 semester @ 3 fifty-minute lectures/week
Spring 2001	Intermediate Heat Transfer MEEG 640 UDeI	1 semester @ 3 fifty-minute lectures/week
Spring 2001	Thermodynamics MEEG 344 UDeI	1 semester @ 3 fifty-minute lectures/week
Fall 2000	Combustion MEEG 441/641 UDeI	1 semester @ 3 fifty-minute lectures/week
Spring 2000	Intermediate Heat Transfer 640 UDeI	1 semester @ 2 ninety-MEEG minute lectures/week

Fall 1999	Combustion MEEG 667 UDeI	1 semester @ 3 fifty-minute lecture/week
Spring 1999	Intermediate Heat Transfer MEEG 640 UDeI	1 semester @ 2 ninety-MEEG minute lectures/week
Fall 1998	Combustion MEEG 667 UDeI	1 semester @ 3 fifty-minute lecture/week
Spring 1998	Thermodynamics II MEEG 308 UDeI	1 semester @ 3 fifty-minute lecture/week
Fall 1997	Combustion MEEG 667 UDeI	1 semester @ 2 ninety minute lecture/week
Spring 1997	Thermodynamics II MEEG 308 UDeI	1 semester @ 3 fifty-minute lecture/week
Spring 1997	Special Topics in Combustion Mechanical and Aerospace Engineering Princeton University	3 lectures total @ ninety-minute/lecture
Spring 1996	Special Topics in Combustion Mechanical and Aerospace Engineering Princeton University	3 lectures total @ ninety-minute/lecture
Spring 1995	Air Pollutants from Combustion Sources Materials Science and Engineering Pennsylvania State University	1 semester @ 2 ninety-minute lecture/week
Spring 1994	Air Pollutants from Combustion Sources Materials Science and Engineering Pennsylvania State University	1 semester @ 2 ninety-minute lecture/week

Research Advisement

Doctor of Philosophy

Dr. Zhiwei Yang (Ph.D., completed 2004, Combustion Engineer/Emcon Technologies)
 Dr. Ameya V. Joshi (Ph.D., completed 2005, Senior Scientist/Dow Corning Chemical)
 Professor Zhigang Li (Ph.D., completed 2005, Associate Professor/Hongkong University of Science and Technology)
 Professor Xiaoqing You (Ph.D. completed 2008, Associate Professor/Tsinghua University)
 Dr. Aamir Abid (Ph.D. completed 2008, Research Engineer/Global Advanced Metals)
 Dr. David A. Sheen (Ph.D. completed 2010, Physicist/NIST)
 Dr. Erik Tolmachoff (Ph.D. completed 2011, Scientist/U.S. Army Research Lab)
 Dr. Jeremy P. Cain (Ph.D. completed 2011, Research Engineer/ University of Dayton)
 Dr. Tsutomu Shimizu (Ph.D. completed 2012)
 Dr. Enoch Dame (Ph.D. completed 2012, Engineer/Monolith Materials LLC)
 Dr. Saro Nikraz (Ph.D. completed 2012, Senior Associate/Exponent)
 Dr. Joaquin Camacho (Ph.D. 2013, Assistant Professor/San Diego State University)
 Dr. Sydnie Lieb (Ph.D. 2014, Specialist/US EPA)
 Yujie Tao (Ph.D. 2018)
 Changran Liu (Ph.D. 2018, Postdoctoral Fellow, Stanford University)

Rui Xu (Ph.D. expected 2019)
Kevin Wen (Ph.D. expected 2020)
Yue Zhang (Ph.D. expected 2021)
Jackson Crane (Ph.D. expected 2021)

Master of Science

Professor Matthew T. McGarry (completed, 1999, Associated Professor/University of San Diego)
Dr. Zoran M. Djuricic (completed, 1999, Manager/Marin Fencing Academy)
Dr. Prankul Middha (completed 2004, Head of Strategic Partnerships & Field Services/hL)
Samuel Ekweghariri (M.S. 2007, Engineer/Chevron)
Nicholas Montes (M.S. 2016, Mechanical Engineer/CDM Smith)

Postdoctoral Fellow

Dr. Alexander Laskin (5/1998–8/1999, Professor of Chemistry/Purdue University)
Dr. Benhui Yang (7/2000-3/2002, Research Scientist/University of Georgia)
Dr. Scott G. Davis (12/2000-12/2002, President/GexCon US)
Dr. Bin Zhao (4/2001-8/2006, Chemical Engineer/Nanocerox)
Mr. Kei Uchikawa, Spokesman/Idemitsu Kosan (9/2003-10/2005)
Dr. Jongwoo Lee (10/2003-8/2004, General Manager/Daelim Industrial Co, Korea)
Professor Jianrong Qiu, Central University of Science and Technology, China (9/2007-9/2009)
Dr. Baptiste Sirjean (12/2007-11/2009, Staff Scientist/CNRS Nancy)
Dr. Gregory Poskrebyshv (5/2008-5/2010, Sr. Research Scientist/Institute of Energy Problems in
Chemical Physics, Russian Academy of Sciences)
Mr. Dexing Du (7/2009-8/2012, retired)
Dr. Xiaokai Gao (8/2009-7/2012)
Dr. Bin Yang (1/2010-9/2012, Professor/Tsinghua University)
Dr. Tony Yi (1/2012-1/2013, Research Scientist/Spectral Energies)
Dr. Saro Nikraz (9/2012-8/2013, Senior Associate/Exponent)
Dr. Mohammad Janbozorgi (12/2012-12/2013, Senior Design Engineer/Mirus Energy)
Dr. Joaquin Camacho (10/2013-7/2016, Assistant Professor/San Diego State University)
Dr. Dongping Chen (1/2015-1/2018)
Mr. Miao Zhu (1/2015-6/2015)
Dr. Ajay V. Singh (1/2016-10/2017)
Dr. Chiara Sagese (11/2016-present)
Dr. Robin Shannon (1/2016-present)
Dr. Xian Shi (9/2017-present)

Visiting Scientists

Dr. Yuko Saso (3/1997, Senior Research Scientist/National Research Institute of Fire and
Disaster, Japan)
Dr. Marina Braun-Unkhoff, (10/1998-3/1999, Scientist/DLR Stuttgart, Germany)
Dr. Michael Balthasar (2001, Director/New Technologies & Innovation, Volve, Sweden)
Dr. Elke Goos (1/2006-5/2006, Scientist/DLR Stuttgart, Germany)
Professor He Lin (4/2009-4/2010, Professor/Shanghai Jiao Tong University)

Service

Department and University Service

ME A&P Committee	2016-present
Stanford Space Initiative (SSI) Advisory Board (member) and Rockets Team Faculty Advisor	2015-present

ME SURI Faculty Advisor		2014-present
ME Graduate Admissions Committee (member)		2014-2016
AME Research Space Committee (member)		Fall 2011
VSoE Advisory Committee on Transformative and Interdisciplinary Faculty Hiring		10/2011-6/2012
VSoE Advisory Committee on East Asia and China Academic Initiatives (member)		10/2011-present
USC Graduate School Faculty Advisory Council (member)		9/2011-8/2012
AME Graduate Admission & Recruitment Committee (member)		9/2010-8/2012
VSoE Faculty Advisory Committee on Frontiers in Science and Engineering Building		2/2010-1/2012
AME Graduate Admission & Recruitment Committee (Chair)		9/2008-8/2010
VSoE Committee to Improve the Quality of the M.S. Programs (member)		Spring 2009
VSoE Engineering Faculty Council (member)		8/2008-8/2010
VSoE Machine Shop Advisory Committee (member)		1/2008-8/2010
AME Strategic Plan Committee (member)		9/2006-8/2008
VSoE APT committee (member)		9/2006-5/2007
AME Faculty Merit Review Committee (member)		9/2005-8/2006
University Faculty Senate, Graduate Studies Committee (member)*		1/2003-8/2004
ME Safety Committee (chair)*		9/2003-8/2004
ME Graduate Committee (member)*		9/2003-8/2004
ME Graduate Committee (chair)*		9/2000-8/2003
ME Biomechanics Faculty Search Committee (member)*		2002-2003
Theoretical Atomic and Molecular Physics Search Committee (member)		2002-2003
ME Graduate Committee (member)*		9/1997-8/2000
ME Safety Committee (member)*		9/2098-8/2000
ME Department Seminar Organizer*		9/1999-5/2000
ME FPES Seminar Organizer		1/1999-5/1999
ME Ad Hoc Web Committee (member)*		1/1999-5/1999
College of Engineering Laird Fellowship Committee (member)*		1999
ME Graduate Curriculum Committee (member)*		9/1997-8/1998

Professional Public Service

Board of Directors (member)	Combustion Institute	2018-2024
Committee on Biological and Physical Sciences in Space (member)	National Academies of Sciences, Engineering and Medicine	2016-present
New Initiatives Committee: Awards (member)	The Combustion Institute	2015-2016
Program Advisory Committee (member)	36th International Symposium on Combustion	2015-2016
Chair, Heterogeneous Reaction Processes	NASA CombustionLab & its Workshop	2014
Board of Visitors (member)	Mechanical Sciences Division, ARO	2013
Advisory Board (member)	National Center for Hypersonic Combined Cycle Propulsion, University of Virginia	2013-2014
Thrust leader, Foundation Fuels	Combustion Energy Frontier Research Center (CEFRC), Princeton University	2010-2014
Steering Committee (member)	Combustion Energy Frontier Research Center (CEFRC), Princeton University	2010-2014
Technical Advisory Committee (member)	WestStart-CalStart, Pasadena, CA	2007-2009
Technical Advisor (member)	World Eco Engineering, Lund, Sweden	2007-2008
User Advisory Committee (member)	Environmental Molecular Sciences Laboratory (EMSL/PNNL)	2006

* Committee service at University of Delaware.

Fuel Cells Work Group (member)	State of Delaware	2002-2003
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Professional Activities

Awards and Honors

Fellow	American Society of Mechanical Engineers	2018
Propellants & Combustion Award	American Institute of Aeronautics and Astronautics	2018
Fellow	Combustion Institute	2018
Distinguished Paper Award	Thirty-Fifth International Symposium on Combustion	2014
Senior Research Award	Viterbi School of Engineering University of Southern California	2011
Northrop Chair in Engineering	University of Southern California	2010
Changjiang Scholar	Ministry of Education, China	2010
<i>Combustion and Flame</i> Most Cited Author 2005-2008	Elsevier	2009
Distinguished Paper Award	Thirty-First International Symposium on Combustion	2006
Provost's Special Merit Award	University of Delaware	2003
Dean's Special Merit Award	University of Delaware	2002
CAREER Award	National Science Foundation	1999
C.C.Wright Award for Excellence in Graduate Study	Fuel Science, Pennsylvania State University	1992
Award for Excellence in Performance as a Teaching Assistant	Chemistry and Chemical Engineering, Michigan Technological University	1985

Professional Organizations

The Combustion Institute
Materials Research Society
American Society of Mechanical Engineers
American Association of Aerosol Research

Editorial Services

Editor-in-Chief, *Progress in Energy and Combustion Science*, 2015-present
Member of the Editorial Board, *Frontiers in Energy*, 2012-present
Associate Editor, *Proceedings of the Combustion Institute*, 2008-2015
Member of the Editorial Board, *Progress in Energy and Combustion Science*, 2006-2015
Member of the Editorial Board, *Combustion and Flame*, 2003-2008
Member of the Editorial Advisory Board, *International Journal of Chemical Kinetics*, 2001-2003
Member of the Scientific Review Committee, *International Symposium on Shock Waves*, 2000-2003

Reviewer

Aerosol Science and Technology
AIAA Journal
AIChE J
Applied Physics B - Lasers and Optics
ASME
Carbon
Catalysis Today
Combustion and Flame
Combustion Theory and Modeling

Combustion Science and Technology
Energy & Environmental Science
Energy & Fuels
Geophysical Research Letters
Journal of the American Chemical Society
Journal of Loss Prevention in the Process Industries
Journal of Physical and Chemical Reference Data
Journal of Physical Chemistry
Journal of Sandwich Structures
International Journal of Chemical Kinetics
International Journal of Hydrogen Energy
International Journal of Numerical Methods in Engineering
Nature GeoScience
Physical Chemistry Chemical Physics
Physics of Fluids
Proceedings of the Combustion Institute
Progress in Energy and Combustion Science

External Grant Reviewer

Air Force Office of Scientific Research (2009-present)
Technology Foundation STW, Netherlands (2014)
National Research Foundation of Singapore (2011)
EMSL Science of Interfacial Phenomena (SIP) Science Theme Proposal Review Panel (2011)
DOE BES (2009, 2011)
DOE Advanced Research Projects Agency-Energy (ARPA-E) (2009)
Army Research Office (2007, 2009, 2014, 2017)
European Science Foundation (2006)
Member of the Environmental Molecular Sciences Laboratory (EMSL/PNNL) Peer Review Committee (2006, 2007)
GCEP, Stanford University (2004, 2008, 2011)
National Science Foundation (1995-1996, 1999-2007, 2014, 2016)
NASA Microgravity Combustion Research Review Panel (2002, 2003)
National Research Council (2003, 2004, 2005)
Petroleum Research Funds, American Chemical Society (1999, 2003, 2004, 2005, 2006)
International Science and Technology Center (1999)

Conference Organization

Co-Chair, 37th International Symposium on Combustion, Dublin, Ireland, July 29-August 3, 2018.
Member of the Program Advisory Committee of the 36th International Symposium on Combustion, 2015.
Member of the Steering Committee, 2015 AEROSPACE THEMATIC WORKSHOP on "Fundamentals of Aerodynamic-Flow and Combustion Control by Plasmas," Les Houches, France, April 12-17, 2015.
Member of the Organizing Committee, International Sooting Flame (ISF) Workshop, Aachen, Germany 2011; Warsaw, Poland, July 28-29, 2012; Livermore, US, August 2-3, 2014.
Co-organizer, The First International Flame Chemistry Workshop, Warsaw, Poland, July 28-29, 2012.
Co-organizer, Symposium on Flame Synthesis of Nanomaterials: Fundamentals and Applications, 2012 MRS Fall Meeting and Exhibit, Materials Research Society, Boston, MA, November 26-30, 2012.
Member of the Scientific Committee, *7th International Seminar on Flame Structure and First Young Researchers' School on Flame Study*, Institute of Chemical Kinetics and Combustion, Novosibirsk State University, Novosibirsk, Russia July 11-15, 2011.

Co-organizer, *Workshop on Fuels and Combustion*, Sponsored by Shanghai Jiaotong University, Wu Zhen, Zhejiang, China, August 8-10, 2010.

Member of the Organizing Committee, *International Workshop on Soot Formation*, Anacapri, Italy, May 2007.

Symposium Co-chair, Combustion Synthesis: from Pollutants to Advanced Materials, *2006 American Chemical Society Annual Meeting, Fuel Chemistry Division*, Atlanta, GA, March 2006.

Symposium Co-chair, Environmental and Health Effects of Particulate Air Pollutants, *2006 American Chemical Society Annual Meeting, Fuel Chemistry Division*, Atlanta, GA, March 2006.

Colloquium Co-chair, Soot, PAH and Other Large Molecules, *31st International Symposium on Combustion, Heidelberg, Germany*, August 2006.

Colloquium Co-chair, Pollutant Formation, *30th International Symposium on Combustion*, Chicago, IL, July 2004.

Symposium Co-chair, Molecular Modeling and Reaction Chemistry, *2004 American Chemical Society Annual Meeting, Fuel Chemistry Division*, Anaheim, CA, March 2004.

Co-organizer, *2001 AFOSR Reaction Kinetics Workshop*, Sandia National Laboratory, Livermore, CA, March 2001.

Research Grants/Contracts

Current grants and contracts

1. AFOSR: Development of HyChem – A Jet and Rocket Fuel Combustion Chemistry Model (PI: C. T. Bowman, co-PIs: R. K. Hanson & H. Wang), amount: \$2,102,796, from 8/1/2016-7/31/2020.
2. NASA: Hybrid Modeling of Jet Fuel Combustion Chemistry, amount: \$1,000,000, from 12/01/2015 to 11/30/2018.
3. AFOSR: Sensitizing Reaction Chemistry in Detonation, amount: \$850,000, from 09/30/2016 to 09/29/2020.
4. AFOSR: Reaction Networks and Mechanisms: Discovery and Application in Combustion (with A. Krylov/USC, J. Pfaendtner/USW Seattle, D. Glowacki/Bristol U.), \$2,160,000, from 10/15/2015 to 10/14/2018.

Completed grants

1. Shell Company Foundation: Combustion Chemistry of Ground Transportation Fuels (with Ron K. Hanson/Stanford and Fokion Egolfopoulos/USC), \$300,000, from 8/1/2016-6/30/2017.
2. AFOSR: Modeling Pyrolysis and Oxidation of Jet Fuels - A Hybrid Approach (PI: C. T. Bowman, co-PIs: R. K. Hanson & H. Wang), amount: \$800,000, from 8/1/2014-7/31/2017.
3. AFOSR BRI: New Approaches to Reacting Flow Modeling for Endothermic Fuel Cracking and Combustion in High-Speed Combustion, amount: \$2,400,000, from November 1, 2012 to December 31, 2015.
4. DOE EFRC/Princeton Univ.: Energy Frontier Research Center for Combustion Science, amount: \$900,000, from 8/1/09-7/31/15.
5. FAA ASCENT: Hybrid Approach to Chemical Kinetics Model Development and Evaluation, amount: \$200,000, from 12/1/2014-11/30/2015.

6. AFOSR: Potential Energy Surfaces, Reaction Kinetics and Transport Processes in High-Speed Combustion, amount: \$680,000, from 4/15/2012 to 4/14/2015.
7. NSF: International Sooting Flame Workshop, amount \$6,000, from 6/14 to 12/31/14.
8. AFOSR: Development of Detailed and Reduced Kinetic Mechanisms for Surrogates of Petroleum-Derived and Synthetic Jet Fuels, amount: \$2,100,000, PI: F. N. Egolfopoulos (and 6 other co-PIs), from 9/1/11 to 8/31/14.
9. AFOSR MURI: Nanocatalysts in Propulsion: Mechanisms and Optimization, amount: \$1,250,000 (USC portion of the budget, with C. S. Campbell and D. J. Phares), from 08/01/08 to 7/31/13.
10. AFOSR: Experiments and Reaction Models of Fundamental Combustion Properties, amount: \$300,000 from 4/1/10 to 3/31/13 (*Total fund: \$660,000 shared between PI: Fokion Egolfopoulos, co-PI: Hai Wang*), 1 summer month.
11. Reaction Design, Inc.: Fundamental Experiments in Support of Science-Based Soot Model Development, amount: \$954,367, from 01/01/09-12/31/13, 1 summer month.
12. NSF: Chemistry and Physics of Incipient Soot in Laminar Premixed Flames, amount: \$300,000, *shared by PI: H. Wang, co-PI: D. Phares*, from 6/1/07 to 5/31/11, 0.5 summer month
13. DOE EFRC/University of Delaware: Rational Design of Innovative Catalytic Technologies for Biomass, amount: \$500,000, from 8/1/09-7/31/10, 0 summer month.
14. AFOSR: Development of Detailed and Reduced Kinetic Mechanisms for Surrogates of Petroleum-Derived and Synthetic Jet Fuels, amount: \$2,100,000, PI: F. N. Egolfopoulos and 6 other co-PIs, from 1/1/08 to 12/31/10.
15. NSF: Engineering Virtual Organization: Combustion Kinetics, amount: \$42,000, from 1/1/08 to 12/31/10, 0.25 summer month.
16. Sandia/SERDP: Predicting the Effects of Fuel Composition and Flame Structure on Soot Generation in Turbulent Non-Premixed Flames, amount: \$390,000 from 4/1/07 to 3/31/10 (*Single PI project*), 1 summer month.
17. NASA: Laboratory Studies of Gas-Particle Reaction Kinetics of Particulates Emitted from Aircraft. amount: \$210,000 from 3/1/06 to 2/28/10 (*Single PI project*), 1 summer month (in no-cost extension).
18. Solar Turbine/CEC: Experimental and Modeling Studies of the Combustion Characteristics of Alternative Fuels (with F. N. Egolfopoulos), amount: \$210,000, from 08/01/08 - 07/31/10, 0 summer month.
19. NSF SBIR: Scalable fabrication of mesoporous thin-films for the production of efficient dye-sensitized solar cells, amount: 150,000, from 1/1/10-6/30/10 (*TiSol, LLC, with D. J. Phares, in grant negotiation with NSF*).
20. AFOSR: Experiments and Reaction Models of Fundamental Combustion Properties, amount: \$300,000 from 10/1/06 to 9/30/09 (*Total fund: \$660,000 shared between PI: Fokion Egolfopoulos, co-PI: Hai Wang*), 1 summer month.
21. DOE-CWRU: Development of Comprehensive Detailed and Reduced Reaction Mechanisms for Syngas and Hydrogen Combustion, amount \$175,000 from 3/1/06 to 2/28/09 (*Single PI project*), 0.5 summer month.

22. Siemens: Semiconducting Metal-Oxide Microsensors for Rapid and Continuous Emission Monitoring. amount: \$100,000 from 9/1/06 to 8/31/08. 0 summer month.
23. Reaction Systems, Inc./AFRL: Kinetic Mechanisms for CFD – Phase II, amount: \$270,000 from 6/1/06 to 5/31/08 (*shared between PI: F. N. Egolfopoulos and I am the co-PI*), 0.5 summer month.
24. TDA/AFRL: Additives to Improve Methane Combustion – Phase II, amount: \$147,000 from 9/1/06 to 8/31/08 (*Single PI project*), 0 summer month.
25. Exxon-Mobile: Unrestricted gift. Advanced Research in Combustion Chemistry, amount: \$35,000, received 12/06 (*Single PI project*), 0 summer month
26. NSF: International Workshop on Soot Formation, amount: \$27,000 from 9/1/06 – 8/31/07, 0 summer month.
27. NIST: Transport Properties of Long-Chain Alkanes and Non-Spherical Nanostructures, amount: \$7,620 from 5/1/07 to 9/30/07 (USC faculty PI for NIST SURF student fellowship).
28. AFOSR: Development of a Comprehensive and Predictive Reaction Mechanism of Liquid Hydrocarbon Fuel Combustion, amount: \$160,000 from 11/1/04 to 10/31/06 (*Single PI project*), 1 summer month.
29. NSF CRAEMS: Fundamental Studies of Nanoparticle Formation in Air Pollution (with D. J. Doren, M. V. Johnston, A. S. Wexler, and B. Wyslouzil), amount: \$2,670,350 from 10/1/2000 to 8/31/2006 (*I was a co-PI on the project and received approximately 1/5 of the total amount of funding*).
30. Reaction Systems, Inc./AFRL: Kinetic Mechanisms for CFD – Phase I, amount: \$33,000 from 9/1/05-3/31/06 (*PI: F. N. Egolfopoulos, co-PI: Hai Wang*).
31. NSF CAREER: Integrated Study of Benzene Combustion by Quantum Mechanical Calculation, Detailed Kinetic Modeling, and Optimization, amount: \$210,000 from 7/1/1999 to 5/31/2005 (*Single PI project*).
32. AFOSR: Development of a Comprehensive and Predictive Reaction Mechanism of Liquid Hydrocarbon Fuel Combustion, amount: \$80,000 from 11/1/03 to 8/15/04 (*Single PI project*).
33. ACS/PRF SE: Frontier of Molecular Modeling and Reaction Chemistry, amount: \$3,600 from 12/10/03 to 3/31/04 (*Single PI project*).
34. AFOSR: Development and Optimization of a Comprehensive Kinetic Model of Hydrocarbon Fuel Combustion, amount: \$240,000 from 1/1/2000 to 12/31/2003 (*Single PI project*).
35. Colorado School of Mines/DOE Office of Technology: Development of an Integrated Workbench for Gas-Phase Thermodynamics, Kinetics and Kinetic Modeling, amount: \$229,451 from 3/1/2000 to 9/31/2003 (*Single PI project awarded to UDel as a part of a collaborative team project*).
36. CRDF/NSF: Radical-Chain Reactions for the Solution of Environmental Problems. Utilization of the SO₂ Pollutant, amount: \$3,000 from 8/1/2001 to 10/31/2002 (*Single PI project*).
37. US-Israel Binational Science Foundation: Ring Expansions in 5-Member Aliphatic and Aromatic Ring Compounds. Single-Pulse Shock Tube Studies, Quantum Chemical and RRKM Calculations, and Kinetic Modeling, amount: \$105,000 (Hebrew University of Jerusalem) from 9/1/1999 to 8/31/2002 (*PI: A. Lifshitz, co-PI: H. Wang. The funds are allocated to Hebrew University of Jerusalem only*).

38. University of Delaware Research Foundation: Molecular Dynamics Studies of Free-Radical Diffusion, amount: \$30,000 from 6/1/1999 to 5/30/2000 (*Single PI project*).
39. University of Delaware Research Foundation: Soot Particulate Characterization—from Laboratory to Industrial/Residential Sources, amount: \$30,000 from 6/1/1997 to 5/30/1999 (*Single PI project*).
40. NSF Facility Grant: Acquisition of a Facility for Computational Research in Chemical Sciences and Engineering (PIs: D. J. Doren and N. J. Wagner), amount: \$185,000 from 9/15/1997 to 9/14/2000 (*one of the co-PI on a large team that uses the facility*).
41. Princeton University/AFOSR: Optimization of a Comprehensive Detailed Chemical Kinetic Model for Simulating High-Speed Propulsion, amount: \$193,540 from 10/15/1997 to 10/14/2000 (*Single PI project*).

Patents

1. Wang, H., Wang, L. Y., Kampschroer, E. N. "Apparatus and process for high throughput powder production," US Patent no. 9,314,800, issued 2016.
2. Wang, H., Phares, D. J. "Multicomponent nanoparticle materials and process and apparatus therefor," US patent no. 8,329,071, issued 12/11/2012.
3. Wang, H., Phares, D. J., Tolmachoff, E. D. "Method for preparing metal oxide crystalline nanoparticle films for dye sensitized solar cell photoanodes," U.S. Patent No. 8,329,251, issued 12/11/2012.
4. Wang, H., Phares, D. J. "Method for preparing electrically conducting materials," U.S. patent No. 8,197,908, issued 6/12/2012.

Plenary/Keynote Lectures

1. "Ten questions concerning carbon formation in gaseous flames." 2017 China National Symposium on Combustion, Nanjing, China, Oct. 13-15, 2017.
2. "Ten questions concerning mechanisms and models of soot formation," International Bunsen Discussion: Chemistry and Diagnostics for Clean Combustion, Center for Interdisciplinary Research, Bielefeld, Germany, June 21–23, 2017.
3. "Nanocarbon in Flames: from unwanted particulate emissions to useful materials," Friedlander Lecture, the AAAR 35th Annual Conference, Portland, Oregon, October 17-21, 2016.
4. "Combustion and hybrid propulsion systems – opportunities and challenges," Congress-wide Plenary at the 2015 International Mechanical Engineering Congress & Exposition, Houston, November 13-19, 2015.
5. "Formation of nanoparticles in gaseous flames—from soot to metal oxide and their composites," Aerosol Technology 2014, Karlsruhe, Germany, June 16-18, 2014
6. "Chemistry of PAHs and fullerenes in sooting flames," 2013 Oort Workshop on The Molecular Physics of Interstellar PAHs, Lorentz Institute, Leiden, The Netherlands, July 29-August 2, 2013.
7. "The next-generation model for soot formation: challenges and opportunities," International Workshop on Frontier Synchrotron Tools for Studies of Combustion and Energy Conversion, Shanghai, China, October 15-18, 2011.
8. "The next-generation model for soot formation: challenges and opportunities," The Second Annual Meeting of Detailed Chemical Models for Cleaner Combustion, Zaragoza, Spain, September 7-9, 2011.

9. "Combustion and beyond - Alternative energy systems," 7th International Seminar on Flame Structure and First Young Researchers' School on Flame Study, Institute of Chemical Kinetics and Combustion, Novosibirsk State University, Novosibirsk, Russia, July 11-15, 2011.
10. "Towards a predictive combustion chemistry model," 7th International Seminar on Flame Structure and First Young Researchers' School on Flame Study, Institute of Chemical Kinetics and Combustion, Novosibirsk State University, Novosibirsk, Russia, July 11-15, 2011.
11. "Formation of nascent soot and other condensed-phase materials in flames," Thirty-third International Symposium on Combustion, Beijing, China, August 1-6, 2010.
12. "Recent progress in fundamental, neutral chemical kinetics of real-fuel combustion," 2009 Aerospace Thematic Workshop, Fundamentals of Aerodynamic-Flow and Combustion Control by Plasmas, Les Houches Physics School, Chamonix, France, October 11-16, 2009.
13. "Towards inexpensive thin-film solar cells: how can combustion science help?" 2009 Mediterranean Combustion Symposium, Corsica, France, June 7-11, 2009.
14. "Probing nanoparticle nucleation and growth by scanning mobility particle sizer and small angle neutron scattering," 2004 Spring Meeting of the Western States Section of the Combustion Institute, University of California at Davis, Davis, CA, March 29-30, 2004.
15. "Incipient soot formation and growth," 2003 Fall Technical Meeting of the Eastern States Section of the Combustion Institute, University Park, PA, October 28, 2003.
16. "Nucleation of soot in flames: advances in experimental and computational methods," 18th Annual Symposium of the Israeli Section of the Combustion Institute, Jerusalem, Israel, December 5, 2002.
17. "Oxidation kinetics and flame inhibition effects of chlorinated and fluorinated hydrocarbons," 100th anniversary of the Serbian Chemical Society, Faculty of Metallurgy and Technology, University of Belgrade, Belgrade, June 1997.

Invited Seminars/Lectures

1. "Phenomena supporting a simplified approach to real-fuel combustion kinetics," Mechanical and Nuclear Engineering, Pennsylvania State University, September 20, 2017.
2. "Key Phenomena enabling direct simulation of real fuel combustion chemistry," Laboratoire de Physicochimie des Processus de Combustion et de l'Atmosphère (PC2A), UMR CNRS 8522/Université Lille1, Villeneuve d'Ascq Cedex, France, June 26, 2017.
3. "Lessons learned from scale-up of flame synthesis of battery cathode materials," Symposium on Gas-phase Synthesis of Functional Nanomaterials, Duisberg, Germany, March 22, 2017.
4. "Key Phenomena enabling direct simulation of real fuel combustion chemistry," Mechanical and Aerospace Engineering, UC San Diego, November 16, 2016.
5. "Combustion and hybrid ground transportation – opportunities and challenges," Aerospace Engineering, Georgia Tech, February 18, 2016.
6. "High-temperature chemical kinetics—rethink how we approach combustion chemistry," Shanghai Jiaotong University, July 5, 2015.
7. "What can we learn from laminar flame speed measurements?" 2nd Laminar Burning Velocity Workshop "LBV2015", Rouen, CORIA Laboratory, France, March 23-24, 2015.
8. "Nanoparticles in gaseous flames: from soot to metal oxides," Mechanical Engineering, Columbia University, New York, February 5, 2015.
9. "Nanoparticles in gaseous flames," 2014 Fall MRS Meeting, Boston, Massachusetts, December 2, 2014.

10. "High-temperature chemical kinetics—rethink how we approach combustion chemistry," Rocket Propulsion, Aerospace Systems Directorate, Air Force Research Laboratory, Edwards Air Force Base, California, September 30, 2014.
11. "Nanoparticles in gaseous flames," Distinguished Lecture, Department of Industrial and Mechanical Engineering, University of Toronto, September 19, 2014.
12. "Jet fuel combustion kinetics—from detailed modeling to lumping," 2014 AIAA ASM, National Harbor, Maryland, January 13 – 17, 2014.
13. "Multiscale kinetic knowledge propagation - Combustion chemistry of small hydrocarbons," The International Workshop on Frontiers of Combustion Chemistry, Huangshan, China September 26-29, 2013.
14. "Multiscale kinetic knowledge propagation—Combustion chemistry of small hydrocarbons," The VIIIth Congress of the International Society of Theoretical Chemical Physics, Budapest, Hungary, August 25-31, 2013.
15. "Nanoparticles: Transport theory, flame synthesis and selected applications," Aerospace and Mechanical Engineering, University of Southern California, Los Angeles, CA, February 6, 2013.
16. "High-temperature chemical kinetics—rethink how we approach combustion chemistry," Department of Mechanical Engineering, Stanford University, Palo Alto, CA, October 17, 2012.
17. "Potential energies and reaction kinetics of fuel combustion—rethink how we do combustion chemistry," GM Global R&D Center, Warren, MI, October 4, 2012.
18. "Nanoparticles—Transport theory, flame synthesis and selected applications," Mechanical Engineering, University of Minnesota, Minneapolis, MN, October 3, 2012.
19. "Potential energy surfaces, reaction kinetics, and transport processes in high-speed combustion," Mechanical Sciences Division, Coordinating Group (MECOG) Meeting, Army Research Laboratory, Aberdeen Proving Ground, MD, September 5, 2012.
20. "The next-generation model for soot formation: challenges and opportunities," Thermal Engineering, Tsinghua University, Beijing, China, March 18, 2012.
21. "Towards a predictive combustion chemistry model," Chemistry Department, Bielefeld University, Bielefeld, Germany, November 3, 2011.
22. "Towards a predictive combustion chemistry model," Laboratoire Réactions et Génie des Procédés, Nancy Université, CNRS, Nancy, France, September 5, 2011.
23. "2011 summer school on combustion chemical kinetics," (a 2¹/₂-day lecture series) School of Mechanical and Power Engineering and Institute of Internal Combustion Engine Research, Shanghai Jiaotong University, Shanghai, China, July 21-24, 2011.
24. "Direct flame synthesis, characterization and application of nanocrystalline titanium-oxide thin films," School of Materials Science and Engineering, Shanghai Jiaotong University, Shanghai, China, July 5, 2011.
25. "Condensed-phase materials in gaseous flames," Mechanical and Aerospace Engineering Department, Princeton University, Princeton, NJ, January 21, 2011.
26. "Condensed-phase materials in gaseous flames," Distinguished Mechanical Engineer Lecture Series, Stanford University, Palo Alto, CA, December 2, 2010.
27. "Chemistry and physics of soot formation," Exxon-Mobile Research and Engineering Co., Clinton, NJ, November 16, 2010.
28. "Direct flame synthesis of mesoporous thin films of nanocrystalline metal oxide for solar energy and sensor applications," Mechanical Engineering Department, University of California, Davis, CA, October 14, 2010.

29. "Towards a predictive combustion chemistry model," GE Global Research Center, Niskayuna, NY, August 18, 2010.
30. "Combustion and beyond: alternative reactive/energy systems," Workshop on Combustion Research in an Energy-Constrained World, Tsinghua University, Beijing, China, July 31, 2010.
31. "Towards predictive combustion chemistry," Workshop on Fuels and Combustion, Shanghai Jiaotong University, Wu Zhen, Zhejiang, China, August 8-10, 2010.
32. "Recent progress in fundamental chemical kinetics of real fuel combustion," Chinese University of Science and Technology, Hefei, China, March 17, 2010.
33. "Soot formation," Mechanical and Power Engineering, Shanghai Jiaotong University, Shanghai, China, March 16, 2010.
34. "Soot Formation," Mechanical Engineering, California Institute of Technology, Pasadena, CA, March 9, 2010.
35. "Towards predictive combustion chemistry - uncertainty quantification and minimization in complex chemical models," Energy, Environmental and Chemical Engineering Department, Washington University at St. Louis, St Louis, MO, November 20, 2009.
36. "Recent trends in fundamental combustion science," School of Mechanical and Power Engineering, Shanghai Jiaotong University, Shanghai, China, July 22, 2009.
37. "Chemistry of fuel-rich flames," Shanghai Synchrotron Radiation Facility, Shanghai, China, July 17, 2009.
38. "Nanoparticle transport in low density gases" School of Engineering, Beijing University, Beijing, China, July 14, 2009.
39. "Particle transport problems and applications in combustion - From soot formation to metal oxide nanoparticle synthesis," United Technologies Research Center, East Hartford, CT, July 6, 2009.
40. "Chemistry and physics of incipient soot," Argonne National Laboratory, Argonne, IL, March 17, 2009.
41. "Chemistry and physics of incipient soot," Mechanical Engineering, Yale University, New Haven, CT, February 25, 2009.
42. "Chemistry and physics of incipient soot," Mechanical Engineering, University of California, Riverside, CA, February 13, 2009.
43. "Towards inexpensive thin-film solar cells: how combustion science can help?," Mechanical and Aerospace Engineering Department, Princeton University, Princeton, NJ, November 14, 2008.
44. "Direct flame synthesis of nanocrystalline titanium-oxide thin films," Mechanical Engineering Department, Rutgers University, New Brunswick, NJ, November 12, 2008.
45. "Chemistry and physics of incipient soot," Mechanical Engineering, Hongkong University of Science and Technology, Hongkong, China, October 20, 2008.
46. "Towards a predictive combustion chemistry model," Thermal Engineering, Tsinghua University, Beijing, China, October 23, 2008.
47. "Chemistry and physics of incipient soot," Physics Department, Chinese University of Science and Technology, Hefei, China, October 29, 2008.
48. "Transport properties of small spherical particles," Mechanical Engineering Department, University of Virginia, Charlottesville, VA, September 11, 2008.
49. "Chemistry and physics of incipient soot," Combustion Research Facility, Sandia National Laboratories, Livermore, CA, April 23, 2008.

50. "Ideas for advanced light source applications," New Frontiers for Synchrotron Studies of Energy-Related Chemistry Workshop, Lawrence Berkeley National Laboratory, Berkeley, CA, March 27, 2008.
51. "Transport properties of small spherical particles - How does a molecule become a 'particle'?" Workshop on Recent Developments in Energy and Combustion Science, Charlottesville, VA, October 20, 2007.
52. "Predicting soot emission from gas turbines: fundamental experiments and numerical simulations," Partners in Environmental Technology Technical Symposium and Workshop, Washington, D.C., December 4-6, 2007.
53. "Formation of nanoparticles in flames," Fluids Seminar Series, Department of Mechanical and Aerospace Engineering, University of California at San Diego, San Diego, CA, October 13, 2006.
54. "Early stage of soot formation and growth - Evolution of particle size distribution and chemical composition," Fire Model Workshop, Sandia National Laboratories, Albuquerque, NM, May 9, 2006.
55. "A self-consistent gas-kinetic theory of nanoparticle transport," Mechanical Engineering Department, California Polytechnic State University, San Luis Obispo, CA, April 28, 2006.
56. "Chemical libraries: Multiscale modeling," NSF Workshop on Cyber-based Combustion Science, NSF Workshop on Cyber-Based Combustion Science, NSF Headquarters, Arlington, VA, April 19, 2006.
57. "Fundamental kinetics and transport problems in hydrogen oxidation," NSF Workshop on Research Frontiers for Combustion in the Hydrogen Economy, NSF Headquarters, Arlington, VA, March 9, 2006.
58. "Probing soot nucleation and growth," Deutsches Zentrum für Luft- und Raumfahrt (DLR), Stuttgart, Germany, July 11, 2005.
59. "Transport theory of nanoparticles in low-density gases," Institut für Technische Chemie und Polymerchemie, University of Karlsruhe, Karlsruhe, Germany, July 12, 2005.
60. "Probing soot nucleation and growth," Physical and Chemical Properties Division, National Institute of Standards and Technology, Gaithersburg, MD, April 22, 2005.
61. "Transport property of nanoparticles in low-density gases—theory and applications," Department of Aerospace and Mechanical Engineering, University of California at San Diego, San Diego, CA, October 11, 2004.
62. "Incipient soot formation and growth," Air Force Research Laboratory, Wright-Patterson Air Force Base, Wright-Patterson, OH, September 16, 2004.
63. "Synthesis and characterization of ultrafine and phase-pure TiO₂ nanoparticles," Environmental Molecular Science Institute, Pacific Northwest National Laboratory, Richland, WA, June 4, 2004.
64. "Soot kinetics and modeling" United Technology Research Center Particulates Workshop, East Hartford, CT, January 29, 2004.
65. "Theory of nanoparticle transport in dilute gases," Department of Mechanical and Aerospace Engineering, University of California at Davis, Davis, CA, October 17, 2003.
66. "Dynamics of precursor particles in laminar premixed ethylene flames," 2003 Sandia Soot Workshop, Albuquerque, NM, April 30, 2003.
67. "Nanoparticle formation in flames," Department of Mechanical Engineering, University of Delaware, Spring Seminar Series, Newark, DE, February 28, 2003.
68. "Toward a comprehensive understanding of combustion chemistry and detailed reaction modeling of combusting flows," Invited topical review at the 2002 Annual Meeting of American Institute of Chemical Engineers, Indianapolis, IL, November 6, 2002.

69. "Toward a quantitative understanding of combustion chemistry: selected problems in chemical kinetics and molecular diffusion of free-radical species" ExxonMobil Research and Engineering Co., Clinton, NJ, September 20, 2001.
70. "Potential new applications of combustion kinetics," AFOSR Chemical Kinetics Workshop, Livermore, CA, March 29, 2001.
71. "Combustion synthesis of nanoparticles," Delaware Valley Particle Symposium, University of Delaware, Newark, DE, March 1, 2001.
72. "Combustion kinetics of laminar hydrocarbon flames," Aeronautics Engineering Department, California Institute of Technology, Pasadena, CA, February 2, 2001.
73. "Kinetics of soot formation in combustion—accomplishments and challenges," Pacific Northwest National Laboratory, Richland, WA, January 22, 2001.
74. "Mechanisms and models of soot formation in combustion," Department of Chemistry, University of Delaware, Newark, DE, October 11, 2000.
75. "Toward a comprehensive understanding of combustion chemistry—selected thermochemical, chemical kinetic, and labile-gas diffusion problems," Chemical Engineering, Yale University, New Haven, CT, February 2, 2000.
76. "Detailed kinetic modeling of soot and PAH formation in laminar fuel combustion," Combustion Physics Department, University of Lund, Lund, Sweden, December 18, 1998.
77. "Mechanisms and detailed kinetic modeling of soot formation in combustion," Toyota Central Research Lab., Inc., Nagoya, Japan, January 30, 1998.
78. "Mechanisms and detailed kinetic modeling of soot formation in combustion," National Research Institute of Fire and Disaster, Tokyo, Japan, February 2, 1998.
79. "Experiments and numerical simulation on chlorinated hydrocarbon combustion," University of California, Berkeley, CA, February 1996.
80. "Detailed kinetic modeling of high-temperature hydrocarbon chemistry," AeroChem Research Laboratories, Princeton, NJ, January 1992.
81. "Detailed kinetic modeling of high-temperature hydrocarbon chemistry," Mobil Engineering Services, Paulsboro, NJ, November 1991.

Publications, Conference Proceedings and Presentations

In this research field, the standard practice is to list a student as the first author on a multiple-authored publication that substantially derives from the student's dissertation or thesis. In other cases, a postdoctoral fellow is listed first and a student is listed second in the order of their contribution to the research. Advisors are usually listed last. Professor Wang's Ph.D. students appear in bold face.

Edited Book

1. Bockhorn, H., D'Anna, A., Sarofim, A. F., Wang, H. eds., *Combustion Generated Fine Carbonaceous Particles*, Karlsruhe University Press, 2009 (ISBN 978-3-86644-441-6).

Book Chapters

1. Wang, H. "Uncertainty quantification and minimization", in Faravelli, T., Manenti, F., Ranzi, E. eds., *Mathematical Modelling of Complex Reaction Systems: Pyrolysis and Combustion*, Elsevier, 2018, in press.

2. Wang, H., **Abid, A. D.** "Size distribution and chemical composition measurements of nascent soot formed in premixed ethylene flames," in Bockhorn, H., D'Anna, A., Sarofim, A. F., Wang, H. eds., *Combustion Generated Fine Carbonaceous Particles*, Karlsruhe University Press, Chapter 23, pp. 367-384, 2009.
3. Wang, H. "Particulate formation and analysis," in *CRC Handbook of Shock Waves. Vol. 3. Chemical and Combustion Kinetics*, (Lifshitz, A., ed.), Chapter 16.6, Academic Press, Chestnut Hill, MA, pp. 257-308, 2001.
4. Frenklach, M., Wang, H. "Detailed mechanism and modeling of soot particle formation," in *Soot Formation in Combustion: Mechanisms and Models of Soot Formation*, (Bockhorn, H., ed.), Springer Series in Chemical Physics, vol. 59, Springer-Verlag, Berlin, pp. 162-190, 1994.
5. Frenklach, M., Wang, H. "Detailed mechanism and modeling of soot formation," in *Advanced Combustion Science*, (Someya, T., ed.), Springer-Verlag, Tokyo, pp. 168-175, 1993.

Peer-Reviewed Journal Articles

1. **Liu, C.**, Wang, H. "Equivalence of momentum accommodation factor and surface adsorption probability of nanoparticles in dilute gases," *Physical Review E*, 2018, submitted.
2. Pokhilko, P., Shannon, R., Glowacki, D. R., Wang, H., Krylov, A., "Spin-forbidden channels in reactions of unsaturated hydrocarbons with $O(^3P)$," *Journal of Physical Chemistry A*, 2018, submitted.
3. **Crane, J.**, Shi, X., Singh, A., **Tao, Y.**, Wang, H. "Isolating the effect of reaction length on detonation structure: hydrogen-oxygen detonation promoted by ozone," *Combustion and Flame*, 2018, submitted.
4. **Wan, K.**, Chen, D., Wang, H. "On imaging nascent soot by transmission electron microscopy," *Combustion and Flame*, 2018, submitted.
5. Wang, K., **Xu, R.**, Parise, T., Shao, J. K., Lee, D. J., Movaghar, A., Gao, Y., Lu, T.-F., Egolfopoulos, F. N., Davidson, D. F., Hanson, R. K., Bowman, C. T., Wang, H. "A Physics-based approach to modeling real-fuel combustion chemistry - IV. HyChem modeling of combustion kinetics of a bio-derived jet fuel and its blends with a conventional Jet A," *Combustion and Flame*. 2018, in press. DOI: 10.1016/j.combustflame.2018.07.012
6. **Tao, Y.**, **Xu, R.**, Wang, K., Shao, J., Johnson, S. E., Movaghar, A., Han, X., Park, J.-W., Lu, T.-F., Brezinsky, K., Egolfopoulos, F. N., Davidson, D. F., Hanson, R. K., Bowman, C. T., Wang, H. "A Physics-based approach to modeling real-fuel combustion chemistry - III. Reaction kinetic model of JP10," *Combustion and Flame*, 2018, in press. DOI: 10.1016/j.combustflame.2018.08.022.
7. Saggese, C., Singh, A. V., Xue, X., Chu, C., Kholghy, M. R., Zhang, T., Camacho, J., Giaccai, J., Miller, J. H., Thomson, M. J., Sung, C.-J., Wang, H. "The distillation curve and sooting propensity of a typical jet fuel," *Fuel* **235** (2019) 350-362. DOI: 10.1016/j.fuel.2018.07.099.
8. **Tao, Y.**, Wang, H. "Joint probability distribution of Arrhenius parameters in reaction model optimization and uncertainty minimization," *Proceedings of the Combustion Institute*, 2018, submitted.
9. **Xu, R.**, Wang, H. "Principle of large component number in multicomponent fuel combustion – a Monte Carlo study," *Proceedings of the Combustion Institute*, 2018, DOI: 10.1016/j.proci.2018.06.187.
10. Wang, K., Bowman, C. T., Wang, H. "Kinetic analysis of distinct product generations in oxidative pyrolysis of four octane isomers," *Proceedings of the Combustion Institute*, 2018, DOI: 10.1016/j.proci.2018.06.219.
11. Chen, D., Wang, H. "HOMO-LUMO energy splitting in polycyclic aromatic hydrocarbons and their derivatives," *Proceedings of the Combustion Institute*, 2018, DOI: 10.1016/j.proci.2018.06.120

12. Han, X., Liszka, M., **Xu, R.**, Brezinsky, K., Wang, H. "A high-pressure shock tube study of the pyrolysis of real jet fuel Jet A," *Proceedings of the Combustion Institute*, 2018, in press. DOI: 10.1016/j.proci.2018.05.136.
13. Janbozorgi, M., Wang, H. "Bottom-up modeling using the rate-controlled constrained-equilibrium theory: the *n*-butane combustion chemistry," *Combustion and Flame*, **174**, 223-232 (2018). DOI: 10.1016/j.combustflame.2018.04.026.
14. Felden, A., Esclapez, L., Riber, Wang, H., Cuenot, B. "Including real fuel chemistry in large-Eddy simulations," *Combustion and Flame*, **193**, 397-416 (2018). DOI: 10.1016/j.combustflame.2018.03.027.
15. **Xu, R.**, Wang, K., Banerjee, S., Shao, J., Parise, T., Zhu, Y., Wang, S., Zhao, R., Lee, D. J., Movaghar, A., Han, X., Gao, Y., Lu, T., Brezinsky, K., Egolfopoulos, F. N., Davidson, D. F., Hanson, R. K., Bowman, C. T., Wang, H., A Physics-based approach to modeling real fuel combustion chemistry. II. Reaction models of jet and rocket fuels. *Combustion and Flame* **193**, 520-537 (2018). DOI: 10.1016/j.combustflame.2018.03.021.
16. Wang, H., **Xu, R.**, Wang, K., Bowman, C. T., Hanson, R. K., Davidson, D. F., Brezinsky, K., Egolfopoulos, F. N. "A Physics-based approach to modeling real-fuel combustion chemistry. I. Evidence from experiments, and thermodynamic, chemical kinetic and statistical considerations," *Combustion and Flame* **193**, 502-519 (2018). DOI: 10.1016/j.combustflame.2018.03.019.
17. **Tao, Y.**, Smith, G. P., Wang, H. "Critical kinetic uncertainties in modeling hydrogen/carbon monoxide, methane, methanol, formaldehyde, and ethylene combustion," *Combustion and Flame*, **195**, 18-29 (2018). DOI: 10.1016/j.combustflame.2018.02.006
18. Smolke, J., Carbone, F., Egolfopoulos, F. N., Wang, H., "Effect of *n*-dodecane decomposition on its fundamental flame properties," *Combustion and Flame*, **190**, 65-73 (2018). DOI: 10.1016/j.combustflame.2017.11.009.
19. **Liu, C.**, Camacho, J., Wang, H. "Phase equilibrium of TiO₂ nanocrystals in high-temperature chemical vapor deposition," (cover article) *ChemPhysChem*. **19**, 180-186 (2018). DOI: 10.1002/cphc.201700962.
20. Chen, D., Wang, K., Wang, H. "Violation of collision limit in recently published reaction models," *Combustion and Flame*, **186C**, 208-210 (2017). DOI: 10.1016/j.combustflame.2017.08.005.
21. Esclapez, L., Ma, P. C., Mayhew, E., **Xu, R.**, Stouffer, S., Lee, T., Wang, H., Ihme, M. "Fuel effects on lean blowout in a realistic gas turbine combustor," *Combustion and Flame*, **181**, 82-89 (2017). DOI: 10.1016/j.combustflame.2017.02.035.
22. Chen, D., Wang, H. "Cation- π interactions between flame chemi-ions and aromatic compounds," *Energy & Fuels*, **31**, 2345-2352 (2017). DOI: 10.1021/acs.energyfuels.6b02354
23. **Liu, C.**, Zhao, R., Xu, R., Egolfopoulos, F. N., Wang, H. "Binary diffusion coefficients and non-premixed flames extinction of long-chain alkanes," *Proceedings of the Combustion Institute*, **36**, 1523-1530 (2017). DOI: 10.1016/j.proci.2016.07.036
24. **Camacho, J.**, Singh, A. V., Wang, W., Shan, R., Yapp, E. K., Chen, D., Kraft, M., Wang, H. "Soot particle size distributions in premixed stretch-stabilized flat ethylene-oxygen-argon flames," *Proceedings of the Combustion Institute*, **36**, 1001-1009 (2017). DOI: 10.1016/j.proci.2016.06.170
25. **Liu, C.**, McGivern, W. S., Manion, J. A., Wang, H. "Theory and experiment of binary diffusion coefficient of *n*-alkanes in dilute gases," *Journal of Physical Chemistry A*, **120**, 8065-8074 (2016). DOI: 10.1021/acs.jpca.6b08261
26. **Liu, C.**, Li, Z., Wang, H. "Drag force and transport property of small cylinder in free molecule flow: a gas-kinetic theory analysis," *Physical Review E* **94**, article 023102 (2016). DOI: 10.1103/PhysRevE.94.023102

27. Lin, H., Gu, C., Camacho, J., Lin, B., Shao, C., Li, R., Gu, H., Huang, Z., Wang, H. "Mobility size distributions of soot in premixed propene flames," *Combustion and Flame* **172**, 365–373 (2016). DOI: 10.1016/j.combustflame.2016.07.002
28. Park, O., Veloo, O. S. Sheen, D. A., **Tao, Y.**, Egolfopoulos, F. N., Wang, H. "Chemical Kinetic Model Uncertainty Minimization through Laminar Flame Speed Measurements," *Combustion and Flame* **172**, 136–152 (2016). DOI: 10.1016/j.combustflame.2016.07.004
29. Saggese, C., Cuoci, A., Frassoldati, A., Ferrario, S. **Camacho, J.**, Wang, H., Faravelli, T. "Probe effects in soot sampling from a burner-stabilized stagnation flame," *Combustion and Flame*, **167**, 187-194, (2016). doi:10.1016/j.combustflame.2016.02.013
30. Banerjee, S., Tangko, R., Sheen, D. A., Wang, H., Bowman, C. T., "An experimental and kinetic modeling study of *n*-dodecane pyrolysis and oxidation," *Combustion and Flame* **163**, 12–30 (2016). DOI:10.1016/j.combustflame.2015.08.005
31. Gu, C., Lin, H., **Camacho, J.**, Lin, B., Shao, C., Li, R., Gu, H., Huang, Z., Wang, H. "Particle size distribution of nascent soot in lightly and heavily sooting premixed ethylene flames," *Combustion and Flame* **165**, 177–187 (2016). DOI: 10.1016/j.combustflame.2015.12.002
32. Gao, Y., Shan, R., Lyra, S., Li, G., Wang, H., Chen, J. H., Lu, T. "On lumped-reduced reaction model for combustion of liquid fuels," *Combustion and Flame* **163**, 437–446 (2016). DOI: 10.1016/j.combustflame.2015.10.018.
33. Saggese, C., Ferrario, S., Camacho, J., Cuoci, A., Frassoldati, A., Ranzi, E., Wang, H., Faravelli, T., "Kinetic modeling of particle size distribution of soot in a premixed burner-stabilized stagnation ethylene flame," *Combustion and Flame*, **162**, 3356-3369 (2015). DOI:10.1016/j.combustflame.2015.06.002
34. **Camacho, J.**, Liu, C. Gu, C., Lin, H., Huang, Z., Tang, Q., You, X., Saggese, C., Li, Y., Jung, H., Deng, L., Wlokas, I., Wang, H., "Mobility size and mass of nascent soot particles in a benchmark, premixed ethylene flame," *Combustion and Flame*, **162**, 3810-3822 (2015). DOI:10.1016/j.combustflame.2015.07.018.
35. Wang, J., Seifert, S., Winans, R. E., Liu, Y., **Tolmачoff, E.**, Xin, Y. X., Wang, H., Anderson, S. L. "In situ X-ray scattering and dynamical modeling of Pd catalyst nanoparticles formed in flames," *Journal of Physical Chemistry C*, **119**, 19073–19082 (2015). DOI:10.1021/acs.jpcc.5b01226.
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Conference Abstracts (Contributed)

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2. Zhang, Y., Tao, Y., Smith, G. P., Wang, H. "Optimizing a C₀-C₄ foundational fuel chemistry model ii for hydrocarbon combustion," poster presentation at the 37th International Symposium on Combustion, Dublin, Ireland, July 29-August 3, 2018.
3. Saggese, C., Singh, A. V., Kaye, L., Wang, H. "Optical and electronic properties of flame-synthesized carbon nanoparticles," Xth International Aerosol Conference, St. Louis, MO, September, 2018.
4. Chen, D., Wang, H. "Interpretation of UV-Visible absorption measurements of flame-synthesized carbon nanoparticles by molecular modeling," Xth International Aerosol Conference, St. Louis, MO, September, 2018.
5. **Xu, R.**, Chen, D., Wang H. "Hybrid approach to combustion chemistry of jet fuels," poster presentation at the 36th International Symposium on Combustion, Seoul, Korea, July 31-August 5, 2016.
6. Wang, H., "Key phenomena enabling direct simulation of real fuel combustion chemistry," 2015 PacifcChem Conference, Honolulu, Hawaii, December 18, 2015.
7. **Tao, Y.**, Dames, E., Smith, G. P., Wang, H. "Combustion chemistry model of foundational fuels," Poster paper presented at the 35th International Symposium on Combustion, San Francisco, CA, August 3-8, 2014.
8. **An, R.**, Wang, H. "Role of flame stoichiometry on phase stability of nanocrystalline TiO₂ synthesized in premixed flame stabilized on a rotating surface," Poster paper presented at the 35th International Symposium on Combustion, San Francisco, CA, August 3-8, 2014.
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