Li Qiao

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RESEARCH INTERESTS

Professor Qiao's research focuses on the development of new technologies and the understanding of basic science in the areas of fuels, propellants, combustion, and sustainable energy. Research interests include energetic nanomaterials, fuel synthesis and alternative fuels, spark ignition, pre-chamber turbulent jet ignition, supercritical high-pressure flows, micro-propulsion for space applications, experimental fluid dynamics, advanced laser and x-Ray diagnostics.

EDUCATION

2007	Ph.D., Aerospace Engineering, the University of Michigan, Ann Arbor
2001	M.S., Engineering Mechanics, Tsinghua University
1999	B.S., Engineering Mechanics, Tsinghua University

PROFESSIONAL EXPERIENCE

2020-pre	Professor School of Aeronautics & Astronautics, School of Mechanical Engineering (courtesy), Purdue University
2013-2020	Associate Professor School of Aeronautics & Astronautics, School of Mechanical Engineering (courtesy), Purdue University
2007-2013	Assistant Professor School of Aeronautics & Astronautics, School of Mechanical Engineering (courtesy), Purdue University
2011 summer	Summer Faculty Fellow Propulsion System Division, NASA Glenn Research Center, Cleveland, OH
2010 summer	Summer Faculty Fellow Propulsion Directorate, Air Force Research Lab, Wright-Patterson, OH
2002-2007	Graduate Research Assistant Department of Aerospace Engineering, University of Michigan
1999-2001	Graduate Research Assistant Department of Engineering Mechanics, Tsinghua University, China

AWARDS AND RECOGNITIONS

2020	Faculty Leadership Academy for Interdisciplinary Research Fellow, Purdue University
2019 Spring	Recognition of Outstanding Engineering Teachers, Purdue University
2018 Fall	Recognition of Outstanding Engineering Teachers, Purdue University

2017	AIAA Associate Fellow
2016	Combustion Art Competition Honorable Mention, "*Mesmerizing Micro-world of a Monopropellant Matrix*," the Combustion Institute (with students Sayan Biswas and Shourya Jain)
2015	Combustion Art Competition 1st Place Prize for Artistic Merit, "*Fire Monster*," the Combustion Institute (with student Sayan Biswas)
2013	National Science Foundation CAREER Award
2013	Air Force Office of Scientific Research Young Investigator Award (AFOSR YIP)
2011	NASA Glenn Summer Faculty Fellowship
2011	Combustion Art Competition 2nd Place Prize, "*Dr. Combustion*," the Combustion Institute (with student Bogdan Pavlos)
2011,2012	Outstanding Mentor Award, Louis Stokes Alliance for Minority Participation-Indiana, Purdue University
2010	Army Research Office Young Investigator Award (ARO YIP)
2010	Air Force Summer Faculty Fellowship
2010	Combustion Art Competition 2nd Place Prize, "*Flame, Gone with Butterfly*," the Combustion Institute (with student Yanan Gan)
2006-2007	Rackham Predoctoral Fellowship, University of Michigan
2006-2007	Barbour Fellowship, University of Michigan (declined)
2006	Engineering Graduate Student Symposium Oral Presentation 1st Place Prize, University of Michigan
2005	Margaret Ayers Host Award, University of Michigan
2005	Marian Sarah Parker Prize, University of Michigan
2004, 2005	Amelia Earhart Fellowship, Zonta International
2002-2003	Rackham Engineering Awards Fellowship, University of Michigan

PUBLICATIONS (graduate and undergraduate student advisee are underlined)

Book Chapters (B)

B1. L. Qiao, S. Jain, G. Mo, "Molecular Simulations for Researching Supercritical Fuel Properties," in *AIAA Progress in Astronautics and Aeronautics Book Series* "*High Pressure Flows for Propulsion Applications,"* edited by Josette Bellan, in press, 2020.

Peer-reviewed Journal Papers (J)

J1. L. Qiao, L.X. Zhou, "A USM Turbulence-Chemistry Model for Turbulent Combustion," *Journal of Combustion Science and Technology* (in Chinese), 8 (4): 297-301, 2002.

J2. L.X. Zhou, L. Qiao, X.L. Chen, J. Zhang, "A USM Turbulence-Chemistry Model for Simulating NOx Formation in Turbulent Combustion," *Fuel*, 81 (13): 1703-1709, 2002.

J3. L.X. Zhou, L. Qiao, J. Zhang, "Simulation of NOx Formation in Turbulent Swirling Combustion Using a USM Turbulence-Chemistry Model," *Acta Mechanica Sinica*, 19 (3): 208-212, 2003.

J4. L. Qiao, C.H. Kim, G.M. Faeth, "Suppression Effects of Diluents on Laminar Premixed Hydrogen/Oxygen/Nitrogen Flames," *Combustion and Flame*, 143: 79-96, 2005.

J5. L. Qiao, Y. Gu, W.J.A. Dahm, E.S. Oran, G.M. Faeth, "Near-Limit Laminar Burning Velocities of Microgravity Premixed Hydrogen Flames with Various Chemically Passive Fire Suppressants," *Proceedings of the Combustion Institute*, 31: 2701-2709, 2007.

J6. L. Qiao, Y. Gu, W.J.A. Dahm, E.S. Oran, G.M. Faeth, "A Study of the Effects of Diluents on Near-Limit H_2-Air Flames in Microgravity at Normal and Reduced Pressures," *Combustion and Flame*, 151: 196-208, 2007.

J7. L. Qiao, Y. Gan, T. Nishiie, W. J.A. Dahm, E.S. Oran, "Extinction of Premixed Methane/Air Flames in Microgravity by Diluents: the Effects of Radiation and Lewis Number," *Combustion and Flame*, 157 (8): 1446-1455, 2010.

J8. Y. Gan, L. Qiao, "Combustion Characteristics of Fuel Droplets Containing Micron and Nano-sized Aluminum Particles", *Combustion and Flame*, 158 (2): 354-368, 2011.

J9. D. Singh, T. Nishiie, L. Qiao, "Experimental and Kinetic Modeling Study of the Combustion of n-Decane, Jet-A, and S-8 in Laminar Premixed Flames," *Combustion Science and Technology*, 183: 1002-1026, 2011.

J10. Y. Gan, L. Qiao, "Evaporation Characteristics of Fuel Droplets with the Addition of Energetic Nanoparticles under Natural and Forced Convections", *International Journal of Heat and Mass Transfer*, 54 (23-24): 4913-4922, 2011.

J11. L. Qiao, "Transient Flame Propagation Process and Flame-Speed Oscillation Phenomena in a Carbon Dust Cloud," *Combustion and Flame*, 159 (2): 673-685, 2012.

J12. D. Singh, T. Nishiie, S. Tanvir, L. Qiao, "Flame Speed and Kinetics Analysis of Syngas Flames at Elevated Temperatures and with Water Addition," *Fuel*, 94: 448-456, 2012

J13. L. Qiao, J. Xu, A. Sane, J. Gore "Multiphysics Modeling of Coal Gasification Processes in a Perfectly-stirred Reactor with Detailed Gas-Phase Chemistry," *Combustion and Flame*, 159 (4): 1693–1707, 2012.

J14. Y. Gan, Y.S. Lim, L. Qiao, "Combustion of Nanofluid Fuels with the Addition of Boron and Iron particles at Dense and Dilute Concentrations," *Combustion and Flame*, 159 (4): 1732–1740, 2012.

J15. L. Qiao, J. Xu, "Detailed Numerical Simulations of Flame Propagation in High-Volatile Dust Clouds," *Combustion Theory and Modeling*, 7: 1-27, 2012.

J16. S. Tanvir, L. Qiao, "Surface Tension of Nanofluid Fuels with Stably Suspended Nanomaterials," *Nanoscale Research Letters*, 7: 226-236, 2012.

J17. Y. Gan, L. Qiao, "Radiation-enhanced Evaporation of Ethanol Fuel Containing Suspended Metal Nanoparticles," *International Journal of Heat and Mass Transfer*, 55 (21-22): 5777-5782, 2012.

J18. Y. Gan, L. Qiao, "Optical Properties and Radiation-enhanced Evaporation of Nanofluid Fuels Containing Carbon-based Nanostructures," *Energy&Fuels*, 26 (7): 4224-4230, 2012.

J19. J. Xu, L. Qiao, "Mathematical Modeling of Coal Gasification Processes in a Well-Stirred Reactor: Effects of Devolatilization and Moisture Content," *Energy&Fuels*, 26 (9): 5759–5768, 2012.

J20. J. Xu, L. Qiao, J. Gore, "Multiphysics Well-Stirred Reactor Modeling of Coal gasfication Under Itense Thermal Radiation," *International Journal of Hydrogen Energy*, 38 (17): 7007-7015, 2013.

J21. J. Xu, L. Qiao, J. Gao, J. Chen, "Droplet breakup of micro- and nano-dispersed carbon-in-water colloidal suspensions under intense radiation", *International Journal of Heat and Mass Transfer*, 78: 267–276, 2014.

J22. S. Tanvir, L. Qiao, "Effect of Addition of Nanoparticles on Droplet Burning Rate of Liquid Fuels," *AIAA Journal of Propulsion and Power*, 31 (1): 408-415, 2015.

J23. S. Tanvir, S. Jain, L. Qiao, "Measurements and Molecular Dynamics Simulations of Latent Heat of Vaporization of Nanofluids," *Journal of Applied Physics,* 118, 014902, 2015.

J24. S. Tanvir, L. Qiao, "Droplet Burning Rate Enhancement of Ethanol with the Additional of Graphite Nanoparticles: Effect of Radiation Absorption", *Combustion and Flame,* 000: 1-11, 2016.

J25. S. Jain, O. Yehia, L. Qiao, "Flame Speed Enhancement of Solid Nitrocellulose Monopropellant Couple with Graphite at Microscales," *Journal of Applied Physics,* 119, 094904, 2016.

J26. S. Biswas, L. Qiao, "Prechamber Hot Jet Ignition of Ultra-Lean H_2/Air Mixtures: Effect of Supersonic Jets and Combustion Instability," *SAE International Journal of Engines,* 9(3), 1584-1592 2016.

J27. S. Biswas, S. Tanvir, H. Wang, L. Qiao, "On Ignition Mechanisms of Premixed CH_4/Air and H_2/Air Mixtures using a Hot Turbulent Jet Generated by Prechamber Combustion," *Applied Thermal Engineering,* 106: 925-837, 2016.

J28. S. Jain, W. Park, Y. P. Chen, L. Qiao, "Flame Speed Enhancement of a Nitrocellulose Monopropellant using Graphene Microstructures," *Journal of Applied Physics,* 120: 174902, 2016.

J29. S. Biswas, L. Qiao, "A Comprehensive Statistical Investigation of Schlieren Image Velocimetry (SIV) using High Velocity Helium Jet," *Experiments in Fluids,* 58:18, 2017.

J30. S. Jain, G. Mo, L. Qiao, "Molecular Dynamics Simulations of Flame Propagation along a Monopropellant PETN Coupled with Multi-walled Carbon Nanotubes," *Journal of Applied Physics,* 121, 054902, 2017.

J31. G. Mo, L. Qiao, "A Molecular Dynamics Investigation of n-Alkanes Vaporizing into Nitrogen: Transition from Subcritical to Supercritical," *Combustion and Flame,* 176: 60-71, 2017.

J32. P. Yi, M. Jia, W. Long, L. Qiao, T. Yang, L. Feng, "Evaporation of Blended Droplets of Diesel and Alcohols (C2-C9) under Diesel Engine Conditions," *Numerical Heat Transfer Part A: Applications,* 71, 311-326, 2017.

J33. S. Jain, L. Qiao, "Molecular Dynamics Simulations of the Surface Tension of Oxygen-Supersaturated Water," *American Institute of Physics (AIP) Advances,* 7, 045001, 2017.

J34. S. Biswas, L. Qiao, "A Numerical Investigation of Ignition of Ultra-lean Premixed H_2/Air Mixtures by Pre-chamber Supersonic Hot jet," *SAE International Journal of Engines,* 10 (5): 2231-2247, 2017.

J35. S. Tanvir, S. Biswas, L. Qiao, "Evaporation Characteristics of Ethanol Droplets Containing Graphite Nanoparticles under Infrared Radiation," *International Journal of Heat and Mass Transfer,* 114: 541-549, 2017.

J36. S. Biswas, L. Qiao, "Ignition of Ultra-lean H_2/air Mixtures by Multiple Turbulent Hot Jets Generated by Pre-chamber Combustion," *Applied Thermal Engineering,* 132: 102-114, 2018.

J37. S. Biswas, L. Qiao, "Combustion Instabilities of Ultra-lean Premixed H_2/Air Mixtures by Pre-chamber Turbulent Jet Ignition," *AIAA Journal of Propulsion and Power,* 34 (5): 1166-1177, 2018.

J38. S. Jain, L. Qiao, "Understanding Spontaneous Combustion of H_2/O_2 in Nanobubbles by Reactive Molecular Dynamics Simulations," *The Journal of Physical Chemistry A, 122* (24): 5261–5269, 2018.

J39. I. Sabastiao, L. Qiao, A. Alexeenko, "Direct Simulation Monte Carlo Modeling of H_2-O_2 Deflagration Waves," *Combustion and Flame,* 198: 40-53, 2018.

J40. S. Biswas, L. Qiao, "Ignition of Ultra-Lean Premixed H_2/air by an Impinging Hot Jet," *Applied Energy,* 228: 954-964, 2018.

J41. S. Biswas, P. Zhang, H. Wang, L. Qiao, "Flame Propagation and Extinction in Converging-Diverging Micro-channels," *Applied Thermal Engineering*, 148:1395-1406, 2019.

J42. S. Jain, L. Qiao, "MnO_2 doped Graphene Foam Micro-structures for the Flame Speed Enhancement of a Solid-propellant," *Proceedings of the Combustion Institute*, 37 (4): 5679-5686, 2019.

J43. S. Jain, S. Chakraborty, L. Qiao, "Burn Rate Enhancement of AP-NC Composite Solid Propellant using CuO-Graphene Foam (GF) Micro-structures," *Combustion and Flame*, 206: 282-291, 2019.

J44. A. Li, P. Vodka, G. Kilaz, L. Qiao, "Lean Flammability Limit of Alternative Aviation Fuels," *Fire Safety Journal*, 108, 102851, 2019.

J45. G. Shivkumar, L. Qiao, A. Alexeenko, "Plasma-flow Interactions in Field-Emission Discharges with Application to Microcombustion," *Journal of Physics D: Applied Physics*, 52, 384001, 2019.

J46. S. Chakraborty, L. Qiao, "Molecular Investigation of Sub-to-supercritical Transition of Hydrocarbon Mixtures: Multi-component Effect," *International Journal of Heat and Mass Transfer*, 145: 118629, 2019.

Peer-reviewed Conference Proceedings (PC)

PC1. S. Jain, A. Mohammad, L. Qiao, "Quantifying Heat Produced During Spontaneous Combustion of Hydrogen/Oxygen Nanobubbles," *Proceedings of the IEEE Sensor Conference*, Orlando, FL, Oct 31-Nov 2, 2016.

Conference Proceedings/Presentations (C)

C1. C.H. Kim, L. Qiao, O.C. Kwon, G.M. Faeth, "Chemically Passive Suppression of Premixed Flames in Spacecraft Environments at Microgravity," *7th International Workshop on Microgravity Combustion and Reacting Systems*, Cleveland, OH, June 3-6, 2003.

C2. L. Qiao, C.H. Kim, G.M. Faeth, "Effects of Chemically Passive Suppressants on Laminar Premixed Hydrogen/Air Flames," *Workshop on Strategic Research to Enable NASA's Exploration Missions*, Cleveland, OH, June 22-23, 2004.

C3. L. Qiao, C.H. Kim, G.M. Faeth, "Chemically Passive Suppression of Laminar Premixed Hydrogen/Air Flames," *American Society for Engineering Education (ASEE) Summer Seminar Series*, Ann Arbor, MI, 2004.

C4. L. Qiao, C.H. Kim, G.M. Faeth, "Effects of Chemically Passive Suppressants on Laminar Premixed Hydrogen/Air Flames," *Spring Technical Meeting of the Canadian Section of the Combustion Institute*, Kingston, Ontario, May 9-12, 2004.

C5. L. Qiao, Y. Gu, W.J.A. Dahm, E.S. Oran, G.M. Faeth, "Effects of Diluents on Near-Limit H_2-Air Flames in Microgravity at Normal and Reduced Pressures", *University of Michigan Engineering Graduate Symposium*, Ann Arbor, MI, Nov 3, 2006.

C6. L. Qiao, Y. Gu, W.J.A. Dahm, E.S. Oran, G.M. Faeth, "Near-Limit Laminar Burning Velocities of Microgravity Premixed Hydrogen Flames with Various Chemically Passive Fire Suppressants**,"** *31st International Symposium on Combustion*, Heidelberg, Germany, Aug 6-11, 2006.

C7. L. Qiao, Y. Gu, W.J.A. Dahm, E.S. Oran, G.M. Faeth, "Chemically Passive Suppression of Laminar Premixed Hydrogen Flames at Microgravity," *44th AIAA Aerospace Sciences Meeting and Exhibit*, AIAA-2006-741, Reno, NV, Jan 9-12, 2006.

C8. S. Heister, S. Fleeter, S. Son, W. Anderson, I. Hrbud, C. Merkle, N. Key, L. Qiao, "Propulsion Education and Research Programs at Purdue University," *43rd AIAA Joint Propulsion Conference,* Cincinnati, OH, July 11-14, 2007.

C9. L. Qiao, Y. Gu, W.J.A. Dahm, E.S. Oran, G.M. Faeth, "Laminar Burning Velocity Measurements of Stoichiometric $CH_4/O_2/N_2$/Diluent Mixtures in Free-Fall Experiments," *5th US Combustion Meeting*, San Diego, CA, March 24-27, 2007.

C10. L. Qiao, W.J.A. Dahm, E.S. Oran, G.M. Faeth, "Laminar Burning Velocities and Flammability Limits of Premixed Methane-Air-Diluent Flames in Microgravity," *46th AIAA Aerospace Sciences Meeting and Exhibit*, AIAA-2008-0959, Reno, NV, Jan 7-10, 2008.

C11. L. Qiao, "Numerical Modeling of Ignition and Flame Propagation through Pulverized Coal Cloud," *Spring Technical Meeting of the Central States Section of The Combustion Institute*, Tuscaloosa, AL, April 20-21, 2008

C12. D. Singh, T. Nishiie, L. Qiao, "Laminar Burning Velocity of Syngas/Air Flames with Water Vapor and Ammonia at Elevated Temperatures," *6th US National Combustion Meeting*, Ann Arbor, MI, May 17-20, 2009.

C13. T. Nishiie, D. Singh, L. Qiao, "Laminar Burning Velocity and Markstein Length of Decane/air, Jet-A/air and S-8/air Flames," *6th US National Combustion Meeting*, Ann Arbor, May 17-20, MI, 2009.

C14. D. Sing, T. Nishiie, L. Qiao, "Laminar Burning Velocity and Markstein Length of n-Decane/Air, Jet-A/Air and S-8/Air Flames," AIAA-2010-951, *48th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition*, Orlando, Florida, Jan. 4-7, 2010.

C15. Y. Gan, L. Qiao, "Burning Characteristics of Fuel Droplets Containing Dilute Energetic Nanoparticles," AIAA-2010-620, *48th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition*, Orlando, Florida, Jan. 4-7, 2010.

C16. D. Singh, T. Nishiie, L. Qiao, "Laminar Burning Velocity and Markstein Length of Syngas Flames at Elevated temperatures," *Spring Technical Meeting, the Central State Section of the Combustion Institute*, Champaign, Illinois, March 21-23, 2010.

C17. Y. Gan, L. Qiao, "Burning Characteristics of Fuel Droplets Containing Nano-sized and Micron-sized Aluminum Particles," *Spring Technical Meeting, the Central State Section of the Combustion Institute*, Champaign, Illinois, March 21-23, 2010.

C18. D. Singh, T. Nishiie, L. Qiao, "Laminar Burning Velocity and Markstein Length of n-Decane/Air and MCH/Air Flames," *Spring Technical Meeting, the Central State Section of the Combustion Institute*, Champaign, Illinois, March 21-23, 2010.

C19. B. Palvol, L. Qiao, "Chemical Effect of Reactive Nanoparticles on Laminar Counterflow Flames," Poster, *33rd International Combusiotn Symposium*, Beijing, Aug 1-7, 2010.

C20. Y. Gan, L. Qiao, "Combustion Characteristics of Fuel Droplets with Addition of Nano and Micro-sized Aluminum Particles," Poster, *33rd International Combusiotn Symposium*, Beijing, Aug 1-7, 2010.

C21. L. Qiao, J. Xu, J. Gore "Multiscale Modeling of Coal Gasification Processes in a Perfectly-stirred Reactor with Detailed Chemistry," *49th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition*, Orlando, Florida, Jan. 4-7, 2011.

C22. Y. Gan, L. Qiao, "Ignition and Combustion of Fuel Droplets with Addition of Energetic Nanoparticles at Dilute and Dense Particle Loadings," *49th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition*, Orlando, Florida, Jan. 4-7, 2011.

C23. L. Qiao, J. Xu, J. Gore, "Multiphysics Modeling of Carbon Gasification Processes in a Perfectly-stirred Reactor with Detailed Gas-phase Chemistry," *7th US Joint Combustion Meeting of the Combustion Institute*, Atlanta, Geogia, March 20-23, 2011.

C24. Y. Gan, L. Qiao, "Evaporation and Combustion of Fuel Droplets with Addition of Energetic Nanoparticles at Dilute and Dense Particle Loadings," *7th US Joint Combustion Meeting of the Combustion Institute*, Atlanta, Geogia, March 20-23, 2011.

C25. L. Qiao, J. Xu, J. Gore, "Multiphysics Modeling of Carbon Gasification Processes in a Perfectly-stirred Reactor with Detailed Gas-phase Chemistry," Poster, *23rd International Colloquium on the Dynamics of Explosives and Reactive Systems*, Irvine, CA, July 24-29, 2011.

C26. Y. Gan, L. Qiao, " Combustion Characteristics of Colloidal Fuels with the Additional of Boron and Iron Particles at Dilute and Dense Concentrations," *23rd International Colloquium on the Dynamics of Explosives and Reactive Systems*, Irvine, CA, July 24-29, 2011.

C27. L. Qiao, J. Xu, J. Gore, "Multiphysics Modeling of Carbon Gasification Processes in a Perfectly-stirred Reactor with Detailed Gas-phase Chemistry," *Fall Technical Meeting, the Eastern State Section of the Combustion Institute*, Univeristy of Connecticut, CT, Oct 10-12, 2011.

C28. Y. Gan, L. Qiao, "Radition Enhanced Evaporation of Nanofluid Fuels," *Fall Technical Meeting, the Eastern State Section of the Combustion Institute*, Univeristy of Connecticut, CT, Oct 10-12, 2011.

C29. Y. Gan, L. Qiao, " Combustion Characteristics of Nanofluid Fuels with the Additional of Boron and Iron Particles at Dilute and Dense Concentrations," *Fall Technical Meeting, the Eastern State Section of the Combustion Institute*, Univeristy of Connecticut, CT, Oct 10-12, 2011.

C30. L. Qiao, J. Xu, J. Gore, "Multiphysics Modeling of Carbon Gasification Processes in a Perfectly-stirred Reactor with Detailed Gas-phase Chemistry," *Fall Technical Meeting, the Western State Section of the Combustion Institute*, Univeristy of Califorina, Riverside, CA, Oct 17-19, 2011.

C31. Y. Gan, L. Qiao, "Evaporation Enhanced Evaporation of Nanofluid Fuels," *Fall Technical Meeting, the Western State Section of the Combustion Institute*, Univeristy of Califorina, Riverside, CA, Oct 17-19, 2011.

C32. Y. Gan, L. Qiao, " Combustion Characteristics of Nanofluid Fuels with the Additional of Boron and Iron Particles at Dilute and Dense Concentrations," *Fall Technical Meeting, the Western State Section of the Combustion Institute*, Univeristy of Califorina, Riverside, CA, Oct 17-19, 2011.

C33. L. Qiao, "Flame-speed Oscillation Phenomena in Combustion of Dust Clouds," *50th AIAA Aerospace Science Meeting*, Nashville, TN, Jan 9-12, 2012.

C34. J. Xu, L. Qiao, J. Gore "Multiphysics Well-stirred Reactor Modeling of Solar-driven Coal Gasification," *50th AIAA Aerospace Science Meeting*, Nashville, TN, Jan 9-12, 2012.

C35. Y. Gan, L. Qiao, "Optical Properties and Radiation-enhanced Evaporation of Nanofluid Fuels containing Suspended Nanostructures," *50th AIAA Aerospace Science Meeting*, Nashville, TN, Jan 9-12, 2012.

C36. Y. Gan, L. Qiao, " Combustion Characteristics of Nanofluid Fuels with the Additional of Boron and Iron Particles," *50th AIAA Aerospace Science Meeting*, Nashville, TN, Jan 9-12, 2012.

C37. S. Tanvir, L. Qiao, "Surface Tension of Nanofluid Fuels Containing Suspended Nanomaterials," *Spring Technical Meeting, the Western States Section of the Combustion Institute*, March 19-20, Arizona State University, Tempe, AZ, 2012.

C38. Y. Gan, L. Qiao, "Optical Properties and Radiation-enhanced Evaporation of Nanofluid Fuels with Carbon Nanostructures," *Spring Technical Meeting, the Western States Section of the Combustion Institute*, March 19-20, Arizona State University, Tempe, AZ, 2012.

C39. Y. Gan, L. Qiao, "Combustion Characteristics of Nanofluid Fuels with Addition of Energetic Particles at Dilute and Dense Concentrations," *Spring Technical Meeting, the Western States Section of the Combustion Institute*, March 19-20, Arizona State University, Tempe, AZ, 2012.

C40. J. Xu, L. Qiao, "Modeling of Solar-driven Coal Gasification using a Well-stirred Reactor Model," *Spring Technical Meeting, the Western States Section of the Combustion Institute*, March 19-20, Arizona State University, Tempe, AZ, 2012.

C41. B. Pavlov, L. Qiao, "Catalytic Oxidation of Methanol on Platinum Nanoparticles," *Spring Technical Meeting, the Western States Section of the Combustion Institute*, March 19-20, Arizona State University, Tempe, AZ, 2012.

C42. S. Tanvir, L. Qiao, "Surface Tension of Nanofluid Fuels Containing Suspended Nanomaterials," *Spring Technical Meeting, the Central States Section of the Combustion Institute*, April 22-24, University of Dayton, Dayton, OH, 2012.

C43. Y. Gan, L. Qiao, "Optical Properties and Radiation-enhanced Evaporation of Nanofluid Fuels with Carbon Nanostructures," *Spring Technical Meeting, the Central States Section of the Combustion Institute*, April 22-24, University of Dayton, Dayton, OH, 2012.

C44. Y. Gan, L. Qiao, "Combustion Characteristics of Nanofluid Fuels with Addition of Energetic Particles at Dilute and Dense Concentrations," *Spring Technical Meeting, the Central States Section of the Combustion Institute*, April 22-24, University of Dayton, Dayton, OH, 2012.

C45. J. Xu, L. Qiao, "Modeling of Solar-driven Coal Gasification using a Well-stirred Reactor Model," *Spring Technical Meeting, the Central States Section of the Combustion Institute*, April 22-24, University of Dayton, Dayton, OH, 2012.

C46. B. Pavlov, L. Qiao, "Catalytic Oxidation of Methanol on Platinum Nanoparticles," *Spring Technical Meeting, the Central States Section of the Combustion Institute*, April 22-24, University of Dayton, Dayton, OH, 2012.

C47. J. Xu, L. Qiao, "Detailed Numerical Modeling of Solar Coal Gasification in a Perfectly-stirred Reactor," *48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit*, July 30-Aug 1, Atlanta, GA, 2012.

C48. B. Pavlov, L. Qiao, "Low-temperature Oxidation of Hydrocarbon Fuels Using Nanocatalysts," *48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit*, July 30-Aug 1, Atlanta, GA, 2012.

C49. Y. Gan, L. Qiao, "Combustion of Nanofluid Fuels with the Addition of Boron and Iron Particles," *48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit*, July 30-Aug 1, Atlanta, GA, 2012.

C50. Y. Gan, L. Qiao, "Enhanced Evaporation of Nanofluid Fuels under Radiation," *48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit*, July 30-Aug 1, Atlanta, GA, 2012.

C51. J. Xu, L. Qiao, "Droplet Breakup of Nano-dispersed Coal-in-Water Colloidal Fuels under Intense Radiation," *8th National Combustion Meeting*, University of Utah, Park City, UT, May 19-22, 2013.

C52. S. Tanvir, L. Qiao, "Effect of Droplet Size on the Burning Characteristics of Liquid Fuels with Suspensions of Energetic Nanoparticles," *8th National Combustion Meeting*, University of Utah, Park City, UT, May 19-22, 2013.

C53. J. Xu, L. Qiao, "Droplet Breakup of Nano-dispersed Coal-in-Water Colloidal Fuels under Intense Radiation," *49th AIAA Joint Propulsion Conference*, San Jose, CA, July 14-17, 2013.

C54. S. Tanvir, L. Qiao, "Effect of Droplet Size on the Burning Characteristics of Liquid Fuels with Suspensions of Energetic Nanoparticles," *49th AIAA Joint Propulsion Conference*, San Jose, CA, July 14-17, 2013.

C55. G. Mo, L. Qiao, "Combustion Characteristics of Hydrogen/Oxygen Mixtures in Confined Nanoscale Channels with Ideal and Real Walls," *Spring Technical Meeting, Central States Section of the Combustion Institute,* Tulsa, OK, March 17-19, 2014.

C56. J. Xu, L. Qiao, "Droplet Breakup of Micro- and Nano-Dispersed Carbon-in-Water Colloidal Suspensions under Intense Radiation," *Spring Technical Meeting, Central States Section of the Combustion Institute,* Tulsa, OK, March 17-19, 2014.

C57. S. Tanvir, L. Qiao, "Combustion Characteristics of Liquid Fuels with the Addition of Energetic Nanoparticles: The Effect of Droplet Size," *Spring Technical Meeting, Central States Section of the Combustion Institute,* Tulsa, OK, March 17-19, 2014.

C58. S. Biswas, L. Qiao, "Ignition of Premixed Methane/Air Mixtures Using a Hot Turbulent Jet Generated by Prechamber Combustion," *Spring Technical Meeting, Central States Section of the Combustion Institute,* Tulsa, OK, March 17-19, 2014.

C59. G. Mo, L. Qiao, "Evaporation of n-heptane droplet into nitrogen at subcritical conditions: Molecular dynamics simulations," *9th U.S. National Joint Combustion meeting,* Cincinnati, OH, May 17-19, 2015.

C60. S. Tanvir, L. Qiao, "Increase in droplet burning rate of ethanol with the addition of graphite nanoparticles: Influence of radiation absorption," *9th U.S. National Joint Combustion meeting,* Cincinnati, OH, May 17-19, 2015.

C61. S. Biswas, L. Qiao, "Ignition of premixed CH4/air and H2/air mixtures by a hot jet generated by prechamber combustion," *9th U.S. National Joint Combustion meeting,* Cincinnati, OH, May 17-19, 2015.

C62. G. Mo, S. Jain, L. Qiao, "Molecular dynamics simulations of flame propagation of monopropellant PETN embedded with carbon nanotubes," *25th International Colloquium on the Dynamics of Explosions and Reactive Systems, University of Leeds,* UK, August 2-7, 2015 (poster).

C63. A. Li, L. Qiao, "Flammability limits of alternative aviation fuels," *Spring Technical Meeting, Central States Section of the Combustion Institute,* Knoxville, TN, May 15-17, 2016.

C64. S. Biswas, L. Qiao, "Ignition of Ultra-Lean Premixed H_2/Air by a Supersonic Hot Jet," *Spring Technical Meeting, Central States Section of the Combustion Institute,* Knoxville, TN, May 15-17, 2016.

C65. G. Mo, L. Qiao, "Molecular Dynamics Simulations of n-Dodecane Vaporizing into Nitrogen at Subcritical and Supercritical Conditions," *Spring Technical Meeting, Central States Section of the Combustion Institute,* Knoxville, TN, May 15-17, 2016.

C66. S. Jain, L. Qiao, W. Park, Y. Chen, "Flame Speed Enhancement of a Nitrocellulose Monopropellant using graphene microstructures," *Spring Technical Meeting, Central States Section of the Combustion Institute,* Knoxville, TN, May 15-17, 2016.

C67. S. Jain, L. Qiao, "Burn Rate Enhancement of a Solid Nitrocellulose Monopropellant using Functionalized Graphene Foam Microstructure", *the 10th US National Combustion Meeting,* University of Maryland, April 23-26, 2017.

C68. S. Biswas, L. Qiao, "Combustion Instabilities of Ultra-Lean Premixed H2/Air Mixtures by Prechamber Hot Jet Ignition," *the 10th US National Combustion Meeting,* University of Maryland, April 23-26, 2017.

C69. A. Li, G. Kilza, L. Qiao, "Lean Flammability Limit of Pure Hydrocarbon Fuels and Aviation Fuels," *the 10th US National Combustion Meeting,* University of Maryland, April 23-26, 2017.

C70. S. Jain, L. Qiao, "Exploring the Mechanisms of Spontaneous Combustion of H2/O2 in Nanobubbles Generated by Water Electrolysis," *the 10th US National Combustion Meeting*, University of Maryland, April 23-26, 2017.

C71. S. Biswas, L. Qiao, "Flame Propagation Through Converging-Diverging (CD) Microchannels," *the 10th US National Combustion Meeting*, University of Maryland, April 23-26, 2017.

C72. A. Li, G. Kilza, L. Qiao, "Lean Flammability Limit of Pure Hydrocarbon Fuels and Aviation Fuels," *China National Symposium on Combustion*, Nanjing, Oct 13-15, 2017.

C73. S. Biswas, L. Qiao, "Flame Propagation Through Converging-Diverging (CD) Microchannels," *China National Symposium on Combustion*, Nanjing, Oct 13-15, 2017.

C74. A. Li, G. Kilza, L. Qiao, "Lean Flammability Limit of Pure Hydrocarbon Fuels and Aviation Fuels," *6th International Energetic Materials and their Applications*, Sendai, Nov 6-10, 2017.

C75. S. Jain, L. Qiao, "Burn Rate Enhancement of a Solid Nitrocellulose Monopropellant using Functionalized Graphene Foam Microstructure", *6th International Energetic Materials and their Applications*, Sendai, Nov 6-10, 2017.

C76. S. Biswas, P. Zhang, H. Wang, L. Qiao, "An Experimental and Numerical Investigation of Flame Propagation Through Converging-Diverging (CD) Microchannels," *AIAA SciTech Forum*, Kissimmie, FL, Jan 8-12, 2018.

C77. S. Biswas, L. Qiao, "Ignition of Ultra-lean Hydrogen/Air Mixtures using a Impinging Hot Jet," *AIAA SciTech Forum*, Kissimmie, FL, Jan 8-12, 2018.

C78. S. Jain, L. Qiao, "Spontaneous Combustion of Hydrogen/Oxygen Mixtures in Nanobubbles Generated by Water Electrolysis", *XIV International Conference on Nanostructured Materials (NANO 2018)*, Hongkong, June 25-29, 2018.

C79. S. Jain, L. Qiao, "Functionalized 3-D, Porous Graphene Foam for Enhancing the Burn Rate of Solid Propellants", *XIV International Conference on Nanostructured Materials (NANO 2018)*, Hong Kong, June 25-29, 2018.

C80. S. Jain, L. Qiao, "Using Carbon-based Nanomaterials for Enhancing the Burn Rate of Solid Propellants", *Tsinghua University Mechanics Symposium*, Beijing, China, July 1-3, 2018.

C81. S. Jain, L. Qiao, "MnO_2 doped Graphene Foam Micro-structures for the Flame Speed Enhancement of a Solid-propellant", *the 37th International Symposium on Combustion*, Dublin, Ireland, July 29-Ausgut 3, 2018.

C82. S. Jain, L. Qiao, "Experiments and Molecular Simulations of H_2/O_2 Spontaneous Combustion in Water Nanobubbles," *the 37th International Symposium on Combustion*, Dublin, Ireland, July 29-Ausgut 3, 2018 (poster).

C83. S. Chakraborty[G], L. Qiao, "Subcritical to Supercritical Transition of Fuel Mixtures in High Temperature and Pressure Environment," *27th International Colloquium on the Dynamics of Explosions and Reactive Systems*, Beijing, China, July 28-August 2, 2019.

C84. S. Jain[G], S. Chakraborty[G], L. Qiao, "Molecular Dynamics Simulations of H2/O2 Mixtures in Nano-confined Environment," *27th International Colloquium on the Dynamics of Explosions and Reactive Systems*, Beijing, China, July 28-August 2, 2019 (poster).

C85. S. Jain[G], S. Chakraborty[G], L. Qiao "Effect of CuO-Graphene Foam (GF) Micro-structures on the Decomposition of AP-NC Composite Solid Propellant," *2019 AIAA Propulsion and Energy Forum and Exposition*, Indianapolis, August 19-23, 2019.

C86. S. Chakraborty[G], L. Qiao, "Molecular Dynamics Investigation of Sub-to-supercritical Transition of n-Alkane Fuel Mixtures in Nitrogen," *2019 AIAA Propulsion and Energy Forum and Exposition,* Indianapolis, August 19-23, 2019.

PATENT APPLICATIONS

1. S. Biswas, L. Qiao, "Apparatus and Method of Operating a Combustion Engine," US Provisional Patent Application #15795937 filed on October 27, 2017.
2. S. Jain, L. Qiao, "Compositions with Solid Fuel Loaded on Graphene Foams," US Provisional Patent Application #62478637 filed on March 30, 2017.

STUDENT SUPERVISION

Prof. Qiao has graduated 5 PhDs and 6 MS-thesis students, with additional 4 PhDs in progress. Additionally, she served as a committee member for 15 PhD students, 13 MS-thesis students, and 34 MS non-thesis students. She has mentored 34 undergraduate students on research projects.

Ph.D. Theses Completed

1. **Yanan Gan, Ph.D.**, (July 2012), "*Combustion and Evaporation Characteristics of Fuel Droplets Containing Suspended Energetic Nanoparticles*"; now an engineer at Pratt&Whitney UTC, Connecticut.
   - Journal publications: J7, J8, J10, J14, J17, J18
2. **Jian Xu, Ph.D.,** (October 2014), "*Multiphysics Modeling of Coal and Biomass Gasification Processes for Fuel Synthesis*." now an engineer at Baltimore Aircoil Company, Maryland.
   - Bilsland Dissertation Fellowship, Purdue University
   - Journal publications: J13, J15, J19, J20, J21
3. **Saad Tanvir, Ph.D.,** (July 2016) "*Combustion of Novel Nanofluid Fuels*"; now an engineer at Tesla, California.
   - Bilsland Dissertation Fellowship, Purdue University
   - Journal publications: J12, J16, J22, J23, J24, J27, J35
4. **Sayan Biswas, Ph.D**., (July 2017) "*Mechanisms of Turbulent Hot Jet Ignition for Extra-Lean Burning Natural Gas Engines*"; now a postdoctoral researcher at Sandia National Laboratories, Livermore, California.
   - Summer Research Fellowship, School of Aeronautics & Astronautics, Purdue University
   - Journal publications: J26, J27, J29, J34, J35, J36, J37, J40, J41
   - Peer-review conference paper: PC2
5. **Shourya Jain, Ph.D**., (May 2018) "*Burning Behaviors of Microscale Solid Propellants Coupled with Carbon-based Nanostructures: Experiments and Simulations;*" now a scientist at DuPont, Delaware.
   - Bilsland Dissertation Fellowship, Purdue University
   - Koerner Scholarship Award, School of Aeronautics & Astronautics, Purdue University
   - Journal publications: J23, J25, J28, J30, J33, J38, J42, J43
   - Book chapters: B1

- Peer-review conference papers: PC1

M.S. Theses Completed

1. **Deepti Singh, M.S**., July 2010, "*Study of Surrogates for Conventional and Synthetic Aviation Jet Fuels*"; now an assistant professor at Washington State University, Vancouver.
   - Journal publications: J7, J9, J12
2. **Takayuki Nishiie, M.S**., December 2010, "*Experimental and Kinetics Modeling Study of the Combustion of Jet-A and S-8 Fuels in Laminar Premixed Flames*"; now an engineer at Japan Aerospace Exploration Agency.
   - Journal publications: J7, J9, J12
3. **Saad Tanvir, M.S.**, July 2011, "*Rheology and Spray Characteristics of Novel Nanofluid Fuels*"; now an engineer at Tesla, California.
   - Charles C. Chappelle Fellowship, Purdue University
4. **Bogdan Pavlov, M.S.**, April 2012, "*Low-Temperature Oxidation of Methanol over Nanocatalysts*"; now an engineer at SpaceX, California.
5. **Ang Li, M.S.**, December 2016, "*Flammability Limits of Alternative Aviation Fuels*"; now an engineer at Corporate Technology, Siemens, Beijing, China
   - Journal publications: J44
6. **Alex Mastrean, M.S**., June 2018, "*Flammability Limit of Blended and Neat Alcohol-to-jet Synthetic Fuels*."; now an engineer at Orbital ATK, Arizona.

Ph.D. Theses In Progress

1. **Suman Chakraborty,** "*Supercritical Fuel Properties: A Molecular Investigation.*"
2. **Shatakshi Gupta,** "*Microscale Combustion Phenomena in Printed Circuit-type Fuel-air Heat Exchangers*."
3. **Dong Eun Lee, "***Pre-chamber Turbulent Jet Ignition for Lean-burn Engines.*"
4. **Chris Swanson,** "*Graphene Foam-supported Catalyst Microstructures for Solid Propellants*."

Undergraduate/Graduate Students Research Projects

Since joining Purdue, Prof. Qiao has placed great emphasis on involving undergraduate students in research, especially women and minority students. She has supervised 34 students on research projects through various programs such as Purdue's SURF and LSAMP (Louis Stokes Alliance for Minority Participation) sponsored by) programs, as well as AAE 490 Special Projects. Many of these students have gone on for graduate studies, and two of them (Lim and Yehia) published journal papers based on their summer research working in Qiao's lab. Below is a list of undergraduates that have worked with her on research projects:

1. Saad Tanvir, "Measurements of flame speed of syngas derived from coal gasification", Purdue SURF Program, summer 2008. *(For this project, Saad Tanvir won the Best Undergraduate Presentation Award of the 2008 AAE Research Symposium Series.)*

2. Richard Wang, “Design and development of a liquid fuel vaporization system,” volunteer, summer 2008.
3. Saad Tanvir, “Combustion of micro and nano alumina particles,” AAE 490 Special Project, Fall 2009.
4. Mark Pfeil, “Non-equilibrium plasma generator for studying plasma/flame interactions,” AAE 490 Special Project, Fall 2009.
5. Abhi Murty, “Research on high energy density fuels for future ramjets and scramjets,” AAE 490 Special Project, Spring 2010.
6. Alex Chong Shao Teng, “Flame speed measurement of syngas/air mixtures,” Purdue SURF program, Summer 2010.
7. Dustin Truesdell, “Ignition delay time of fuel droplets containing energetic particles and gellant,” NSF Research Experiences for Undergraduates (REU) Grant, Summer 2010.
8. Nayanapriya Bohidar, “Development of a droplet stream generator,” NSF Research Experiences for Undergraduates (REU) Grant, Spring 2011.
9. Jamal Enakhimion, “Development of nanoparticle seeder and soot laser diagnostics,” the Purdue-Louis Stokes Alliance for Minority Participation Indiana Program (LSAMP) sponsored by NSF, Spring 2011.
10. Anthony Malito, “Spray pattern characterization of tailored fuels,” AAE 490 Special Project, Spring 2011.
11. Yi-Syuen Lim, “Combustion of droplets containing suspended boron nanoparticles,” Purdue SURF program, summer 2011. *(Lim’s contribution to the project led him to be the second author of a paper published in Combustion and Flame. Lim was later awarded a scholarship by Australia government to pursue his MS degree.)*
12. Mark Danielson, “Auto-ignition of ethanol vapor at room temperature using platinum nanoparticles,” Purdue SURF program, summer 2011.
13. Andrea Exil, “Physical Properties of nanofluid fuels,” the Purdue-Louis Stokes Alliance for Minority Participation Indiana Program (LSAMP) sponsored by NSF, Fall 2011.
14. Jesus Pozo, “Viscosity measurement of liquid fuels containing suspended nanoparticle: the effect of particle aggregation,” AAE 490 Special Project, Spring 2012.
15. Alex Chong Shao Teng, “Development of a high-temperature and pressure apparatus for investigation of turbulent hot jet ignition,” AAE 490 Special Project, Spring 2012.
16. David Kun, “High-speed imaging to visualize pre-chamber hot jet ignition,” Purdue SURF program, summer 2012.
17. Aaron Johnson, “Droplet stream experiment for studying nanofluid fuels,” Purdue SURF program, summer 2012.
18. Jennifer Wu, “Aggregation of nanofluid fuels using Dynamic Light Scattering,” volunteer, summer 2012.
19. Ye Nearn Teoh, “Viscosity measurement of nanofluid fuels and the influence of particle aggregation,” volunteer, summer 2012.
20. Timothy Machin, “Turbulent hot jet ignition of extra-lean natural gas/air mixtures,” Purdue SURF program, summer 2013.

21. Omar Yehia, "Flame speed measurement of solid nitrocellulose monopropellant coupled with graphite," AAE 490 Special Project, Summer 2015. *(Yehia's contribution to the project led him to be the second author of a paper published in Journal of Applied Physics).*
22. Michael Woodworth, "X-ray absorption technique for high-pressure combustion studies," Purdue SURF Program, summer 2015.
23. Tianyu Yang, "X-ray diagnostics for combustion research," AAE 490 Special Project, Summer 2016.
24. Josiah Lo, "Molecular dynamic simulations of supercritical fuels," AAE 590 Special Project, Spring 2017.
25. Ashwin Kumar, "SIV measurement of flow velocities in a converging-diverging micro-channel," AAE 590 Special Project, Spring 2017.
26. Josiah Lo, "Supercritical fuel properties," AAE 590 Special Project, Fall 2017 & Spring 2018.
27. Jacob Hines, "Burn rate of nitrocellulose propellant with the addition of MnO_2 and graphene nano-pellets," Louis Stokes Alliance for Minority Participation (LSAMP), Fall 2017.
28. Erica Chadwell, UG research, "Burn rate of solid propellants," Louis Stokes Alliance for Minority Participation (LSAMP), Spring 2018.
29. Robert Jezior, "Measurement of the burn rate of a solid propellant," graduate student researcher, summer 2018.
30. Aditya Sivathanu, "Combustion chemistry," high school student internship, summer 2018.
31. Cole Replogle, "Pre-chamber jet ignition research," Purdue SURF program, summer 2019.
32. Michael Cooper, "Structured nanocatalysts for solid propellants," Purdue SURF program, summer 2019.
33. Arch Pleumpanya, "Graphene-foam supported nanocatalysts for energy applications," AAE 490 Special Project, summer 2019.
34. Blake Kniffen, "Graphene foam-supported metal oxides for enhancing decomposition of AP," AAE Special Project, summer 2019.

INVITED LECTURES AND PRESENTATIONS AT CONFERENCES

1. Invited talk, "Graphene Foam-supported Catalysts for Propulsion Applications," in *Advances in the Fundamental Understanding and Functionalization of Reactive Materials, 2019 Fall Materials Research Society (MRS)*, Boston, December 1-6, 2019.
2. Highlight talk, "Molecular dynamics investigation of sub-to-supercritical transition of hydrocarbon mixtures," *The 2nd International Workshop on Near Limit Flames*, Beijing, China, July 27-28, 2019.
3. Invited talk, "Pre-chamber Jet Ignition Research at Purdue University," Virtual Engine Research Institute and Fuels Initiative Workshop, Argonne National Lab, June 27-28, 2019.
4. Invited talk, "Bridging Nanotechnology and Combustion Science for Advanced Propulsion," *Tsinghua Mechanics Workshop*, Beijing, China, July 2-4, 2018.
5. Invited talk, "Cross Cultural Communication", *the First Future Engineering and Global Women's Leadership Symposium*, Changsha, China, April 23-25, 2018.
6. Keynote Lecture, "Bridging Nanotechnology and Combustion for Space Propulsion," *the 13th China Electrical Propulsion Conference*, Beijing, China, December 15-17, 2017.

7. Keynote Lecture, "Enhance the Performance of Propellants and Fuels using Nanomaterials," *China National Symposium on Combustion,* Nanjing, Oct 13-15, 2017.
8. Invited presentation, "Molecular Dynamics Simulations of Supercritical Fuel Properties," *the 10th Multi-Agency Coordinating Committee for Combustion Research (MACCCR) Research Review Meeting*, Argonne National Lab, IL, Oct 17-20, 2016.
9. Invited presentation, "Molecular Dynamics Simulations of Hydrocarbon Fuels Vaporizing into Nitrogen at High Temperatures and Pressures," *AFOSR/ARO/NSF Combustion Research Review Meeting*, Arlington, VA, June 7-10, 2016
10. Invited presentation, "Spontaneous Combustion of Hydrogen and Oxygen in Nano-Bubbles Generated by Water Electrolysis," *AFOSR/ARO/NSF Combustion Research Review Meeting*, Arlington, VA, June 2-5, 2015.
11. Invited presentation, "Combustion Chemistry and Dynamics in Nanoscale Confined Environments," *the 7th Multi-Agency Coordinating Committee for Combustion Research (MACCCR) Research Review Meeting*, NIST, Boulder, CO, October 27-30, 2014.
12. Invited talk, "Nanofluid fuels", in *New Frontiers of Fluid Dynamics: Multiphase Flows, AIAA Aviation and Aeronautics Forum and Exposition*, Atlanta, GA, June 16-20, 2014.
13. Invited presentation, "Combustion Chemistry and Dynamics in Nanoscale Confined Environments," *AFOSR/ARO Basic Combustion Research Review Meeting*, Arlington, VA, June 3-6, 2013.
14. Invited presentation, "Combustion Characteristics of Fuel Droplets Containing Suspended Energetic Nanoparticles," *AFOSR-ARO Combustion and AFOSR-NASA Hypersonics Research Review Meeting*, Williamsburg, VA, June 14-16, 2011.

INVITED SEMINARS

1. School of Aerospace Engineering Seminar, *Georgia Tech*, April 2019.
2. Department of Mechanical and Nuclear Engineering, Fluid Dynamics Research Seminar, *Penn State*, January 2019.
3. Department of Mechanical Engineering Seminar, *Oakland University*, October 2018.
4. Aramco Research Center, *Aramco Service Company*, Troy, Michigan, October 2018.
5. Department of Mechanics and Aerospace Engineering Seminar, *Southern University of Science and Technology*, China, June 2018.
6. Department of Mechanical & Aerospace Engineering Seminar, *Hong Kong University of Science and Technology*, Hong Kong, June 2018.
7. Department of Mechanical & Aerospace Engineering, *University of California, Irvine*, April 2018.
8. Department of Mechanics and Engineering Science Seminar, College of Engineering, *Peking University*, China, December 2017.
9. School of Astronautics Seminar, *Beihang University*, China, December 2017.
10. School of Energy and Power Engineering Seminar, *Beihang University*, China, December 2017.
11. Beijing Institute of Control Engineering, *China Academy of Space Technology*, December 2017.
12. School of Aerospace Engineering Seminar, *Beijing Institute of Technology*, China, December 2017.
13. School of Mechanical Engineering Seminar, *Shanghai Jiao Tong University*, China, October 2017.

14. School of Energy and Power Engineering Seminar, *Nanjing University of Aeronautics and Astronautics*, China, October 2017.
15. Department of Mechanical & Aerospace Engineering Seminar, *Rutgers University*, October 2016.
16. Department of Mechanical & Industrial Engineering Seminar, *University of Iowa*, October 2014.
17. Department of Aerospace and Ocean Engineering Seminar, *Virginia Tech*, February 2013.
18. Department of Mechanical & Aerospace Engineering Seminar, *University of California, San Diego*, February 2013.
19. Department of Mechanical Engineering Seminar, *University of Michigan*, October 2012.
20. Department of Mechanical, Aerospace & Materials Engineering Seminar, *University of Central Florida*, March 2012.
21. Department of Mechanical Engineering Seminar, *Stanford University*, November 2011.
22. School of Aerospace Engineering Seminar, *Georgia Institute of Technology*, November 2011.
23. Department of Mechanical Engineering Seminar, *University of Connecticut*, October 2011.
24. Department of Mechanical Engineering and Materials Science Seminar, *Yale University*, October 2011.
25. Department of Mechanical Engineering Seminar, *University of Washington*, Seattle, March 2011.
26. School for Engineering of Mass, Transport and Energy Seminar, *Arizona State University*, February 2011.
27. Department of Aerospace Engineering and Science Seminar, *University of Colorado, Boulder*, April 2007.
28. Department of Mechanical Engineering Seminar, *Colorado School of Mines*, March 2007.
29. Combustion Lab, *GE Global Research*, Niskayuna, NY, February 2007.
30. Department of Mechanical Engineering, Professor Hanson's Group, *Stanford University*, October 2006.

SERVICE

Service to Professional Societies

1. Editorial Board, Journal of Combustion, 2018-pre
2. Guest editor, Special Issue "Clean Fuels in Low Temperature Combustion", Energies, 2018
3. Member, AIAA Terrestrial Energy System (TES) Technical Committee, 2016-pre
   - Chair of sub-committee of education
4. Member, Organizing Committee, AIAA Propulsion & Energy Forum, August 19-22, Indianapolis, IN, 2019.
5. Member, Organizing Committee, AIAA Propulsion & Energy Forum, August 24-26, New Orleans, LA, 2020
6. Colloquium Co-Chair for New Concepts, the 38th International Symposium on Combustion, July 12-17, Adelaide, Australia, 2020.
7. Reviewer for these journals:

- Progress in Energy and Combustion Science
- Combustion and Flame
- Journal of Fluid Mechanics
- Proceedings of the Combustion Institute
- Combustion Science and Technology
- AIAA Journal
- Journal of Propulsion and Power
- Energy&Fuels
- Fuel
- International Journal of Heat and Mass Transfer
- International Journal of Heat and Fluid Flow
- International Journal of Hydrogen Energy
- Journal of Applied Physics
- Physical Chemistry Chemical Physics
- Renewable Energy
- Renewable & Sustainable Energy
- Chemical Engineering and Technology
- Energy
- Energies
- Numerical Heat Transfer
- Nanoscale
- Nano Letters
- AIP
- Frontiers of Chemical Science and Engineering
- Numerical Heat Transfer
- Propulsion and Power Research
- Fluid Mechanics Research International Journal
- ASME Journal of Heat Transfer
- Journal of Advanced Heat Transfer
- Journal of Applied Thermal Engineering
- International Journal of Energetic Materials and Chemical Propulsion
- Experimental Thermal and Fluid Science
- Flow, Turbulence and Combustion
- Special Topics in Porous Media
- Journal of Combustion
- Turbulence, Flow and Combustion

8. Proposal panelist/reviewer for National Science Foundation, American Chemical Society, Army Research Office, Stanford University Climate Change proposal competition, Puerto Rico Science, Technology & Research Trust, 2007-pre.
9. Session Chair of the 5th US National Combustion Meeting, Ann Arbor, MI, May 18-21, 2009;
10. Session Chair of the Spring Technical Meeting of the Central States Section of the Combustion Institute, IL, 2010;
11. Session Chair of the Fall Technical Meeting of the Eastern States Section of the Combustion Institute, CT, 2011.

12. Session Chair of the 10th US National Combustion Meeting, University of Maryland, April 23-26, 2017.
13. Session Chair of China National Symposium on Combustion, Nanjing, October 13-15, 2017.
14. Session Chair of the 6th International Symposium on Energetic Materials and Their Applications, Sendai, Japan, November 6-10, 2017.
15. Session Chair, 2019 AIAA Propulsion & Energy Forum, Indianapolis, August 19-22, 2019.

Service to Purdue University

AAE School and College of Engineering Committees:

1. Member, Head Advisory Committee, Fall 2019-pre
2. Chair, Propulsion Committee, Spring 2018-pre
3. Member, Curriculum Committee, Fall 2016, Spring 2017, Fall 2017, Spring 2018, Spring 2019, Fall 2019, Spring 2020
4. Member, Library Committee, Fall 2017-pre
5. Member, Graduate Committee, 2011-2014
6. Member, Space and Laboratory Committee, 2007-pre
7. Member, Colloquium Committee, 2007-pre
8. Member, Faculty Search Committee, Spring 2012, Spring 2018
9. Member, Zucrow Laboratories Director Search Committee, Spring 2017
10. Member, Awards Committee, Fall 2015 and Spring 2016
11. Member, Graduate Coordinator Search Committee, Fall 2015
12. Coordinator, Midwest Mechanics Seminar, Purdue University, 2009-2013

University-level Committees:

1. Faculty senate, Fall 2019-
2. Chair, Committee for Student Excellence, Spring 2017-pre.
3. Member, Advisory Committee on Equity, January 2017- April 2020.
4. Vice Chair, Senate Educational Policy Committee, April 2019-pre.
5. Member, Executive Committee, ACE-WN-IN Leadership Conference, Spring 2021, Purdue University.

Service to Student Organizations:

1. AIAA Purdue Chapter Faculty Advisor, 2016-pre.

CONTRIBUTION TO DIVERSITY AND INCLUSION

Prof. Qiao strongly believes that an understanding and appreciation of our differences enhances our ability to live and work together, and that students have a better academic experience if they are taught in a climate that is diverse and accepting. She also believes diversity not just means gender and race, but

comes in many different forms such as age, religion, culture, and different thoughts. She believes it is everybody's responsibility to create a friendly and inclusive climate in which diversity is valued.

Prof. Qiao has taken many opportunities to learn about strategies to promote diversity and how to overcome unconscious biases. For example, she attended the Culture Workshop, the Gender Workshop, and the ADVANCE/OVPEC Faculty Search Committee Workshop. She currently serves on the university's Advisory Committee on Equity (January 2017-April 2020). In this role, she has taken several trainings including the Title IX Training for the committee members involved in the resolution process for complaints and allegations of discrimination and harassment. She also served on the Women in Engineering Faculty Committee (WEFC) and participated in the interviews of deans and department heads. Below is a summary of her contributions to diversity, inclusion, and climate.

Recruiting and mentoring women and minority students:
Prof. Qiao has served as thesis advisor of two female graduate students: Deepti Singh who received MS in 2010 and is now an Assistant Professor at Washington State University and Shatakshi Gupta who is currently pursuing her PhD as a Rolls-Royce Doctoral Fellow. Additionally, Prof. Qiao has mentored three female undergraduate students (Nayanapriya Bohidar, Jennifer Wu, and Andrea Exil) on research projects. Furthermore, she has been as faculty advisor for the Purdue-Louis Stokes Alliance for Minority Participation Indiana Program (LSAMP) sponsored by NSF since 2010. Several minority students (Jamal Enakhimion, Andrea Exil, Jacob Hines, Erica Chadwell) have worked in her lab on research projects. She received an Outstanding Mentor Award from LSAMP in 2011 and 2012.

Outreach activities to attract female and minority students to STEM:
Prof. Qiao has been an enthusiastic participant of Purdue's outreach activities. For example, she participated in the Exciting Discoveries for Girls in Engineering Summer Camp. She was the faculty adviser for Engineering Expo 2009, a high school engineering competition that awards scholarship funds to students who want to pursue engineering at Purdue. She gave a lecture on alternative energy to about 100 local high school students. She provided lab tours to high-school students of the GERI (Gifted Education Resource Institute) Residential Camp in the summer of 2016 and 2017.

Connecting with AAE women students:
Together with other AAE female faculty, Prof. Qiao has been participating in the AAE Graduate Women Gatherings every semester. This is a program that connects AAE women faculty and women students. They meet a few times every semester; the basic format is that the women faculty answer questions the students ask. Prof. Qiao also participated in the Speed Mentoring program in the first Amelia Earhart Summit in Fall 2018.

Other contributions:
Prof. Qiao delivered the keynote address on Improving the Access of Women and Girls to Science, Mathematics, and Technology Education at the *Zonta International District 6 Meeting* in 2009. She was invited by Blue Origin to participate in *University Women in Blue Conference* in November 2017. This conference, consisted of several professors from academia and engineers from industry and selected graduate students from top universities, all women, discussed the skills needed for women engineers to build and advance a technical career and discussed visions for a more diverse aerospace industry. She was selected by the Society of Women Engineers as one of the 8 delegates representing USA to participate at the *First Future Engineering and Global Women's Leadership Symposiu*m in April 2018. This symposium provided a forum for cross-cultural exchange of insights and ideals to enhance participation of women in engineering fields. She gave a talk on cross cultural communication.

PROFESSIONAL SOCIETY MEMBERSHIP

American Institute of Aeronautics and Astronautics (AIAA)

Society of Women Engineers (SWE)

The Combustion Institute

American Society of Mechanical Engineers (ASME)