Zheng Chen

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Education

Sep. 2003—Present Department of Mechanical & Aerospace Engineering, Princeton University, USA
Ph.D ***Major: Combustion (expected)***
Sep. 2001—Jul. 2003 Department of Engineering Mechanics, Tsinghua University, China
M.E. ***Major: Fluid Mechanics***
Sep. 1997—Jul. 2001 Department of Engineering Mechanics, Tsinghua University, China
B.E. ***Major: Engineering Thermophysics***

Research Experiences

Sep. 2003—Present Department of Mechanical & Aerospace Engineering, Princeton University, USA
Research Assistant Combustion Lab

- On the accurate measurement of flame speed at high pressures using propagating spherical flames.
- Ignition and combustion enhancement by dimethyl ether addition to methane-air mixtures, project supported by *American Chemistry Society (ACS)* and *Princeton Research Funding(PRF).*
- Flame initiation and development, project partially supported by *Air Force Research Grant*.
- Fire safety and radiation flame interaction at high pressures, project supported by *NASA Microgravity Research Grant.*

Jan. 2001—Jul. 2003 Department of Engineering Mechanics, Tsinghua University, China
Research Assistant Computation and Analysis for Fluid Dynamics Lab

- Theoretical analysis and numerical simulation of fire whirls, part of *Key Technology R&D Program* sponsored by *the Chinese Academy of Science* and *Forest Service.*
- Characteristics of generalized characteristic coordinate system for compressible flows, project supported by *Chinese National Science Funding.*

May. 2000—Dec. 2001 Department of Engineering Mechanics, Tsinghua University, China
Research Assistant Combustion Lab

- Stability and flammability analysis of cylindrical and tubular flames, project supported by *Chinese National Science Funding.*

Sep. 1998—Jul. 1999 Department of Engineering Mechanics, Tsinghua University, China
Research Assistant Two Phase Flow Lab

- Experiments on PIV measurement system for two-phase flow and PIV image processing, project supported by *Tsinghua's Student Research Training (SRT) Program.*

Other Research Experiences

4/2007-5/2007 *Internship Researcher* at Institute of Fluid Science, Tohoku University, Japan

- Theoretical and numerical studies on micro-combustion
- Direct numerical simulation of reacting flows using super-computation system at Tohoku University

6/2000-7/2000 *Internship Engineer* at Shanghai Koito Automotive Lamp Company, China

- Studied condensation inside automotive lamps
- Analyzed cracking and deformation in automotive lamps in the process of heat treatment

7/2002-8/2002 *Internship Engineer* at Fujian Light Industrial Machine Equipment Company, China

- Analyzed the efficiency of three-paddle mixer and four-paddle mixer
- Simulated the flow field in centrifugal cleaners numerically

Teaching Assistantships

- Feb. 2007—May 2007, Introduction to Environmental Engineering, Princeton University
- Sep. 2006—Jan. 2007, Mathematics in Engineering, Princeton University
- Feb. 2006—May 2006, Space System Design, Princeton University
- Sep. 2005—Jan. 2006, Fluid Dynamics, Princeton University

Journal Publications

Published

1. Z. Chen, Y. Ju, S. Minaev, Flammability and stability analysis of cylindrical flames. *Chinese Journal of Engineering Thermo-physics* (2002) **23(4)**: 513-516 (in Chinese).
2. Z. Chen, Z. Wu, J. Shi, Numerical verification of the advantages of the generalized characteristic coordinate system in computing expansion fans and shock waves. *Chinese Journal of Computational Physics* (2004) **21**: 15-20 (in Chinese).
3. Z. Chen, J. Shi, Z. Wu, Generalized characteristic coordinate system for compressible flow computation with shock waves and expansion fans. *Computational Fluid Dynamics Journal* (2004) **13(2)**: 167-172.
4. Z. Chen, B. Gao, Z. Wu, Compressible flow equations based on moving coordinates determined by the wave speed. *International Journal for Numerical Methods in Fluids* (2007) **53**: 149-174.
5. Z. Chen, X. Qin, Y. Ju, Z. Zhao, M. Chaos, F.L. Dryer, High temperature ignition and combustion enhancement by dimethyl ether addition to methane-air mixtures. *Proceedings of the Combustion Institute* (2007) **31**: 1215-1222.
6. Z. Chen, X. Qin, B. Xu, Y. Ju, F. Liu, Studies of radiation absorption on flame speed and flammability limit of CO2 diluted methane flames at elevated pressures. *Proceedings of the Combustion Institute* (2007) **31**: 2693-2700.
7. Z. Chen, Y. Ju, Theoretical analysis if the evolution from ignition kernel to flame ball and planar flame. *Combustion Theory and Modeling* (2007) **11**: 427-453.
8. G. Li, H. Rabitz, J. Hu, Z. Chen, Y. Ju, Smoothing random-sampling high dimensional model representation (RS-HDMR) and determination of its smoothing parameter. *Journal of Mathematical Chemistry* (2007) in press.

Submitted (under review)

9. T. Yokomori, Z. Chen, Y. Ju, Studies of the curvature effect on the flame speed of highly curved flames. Submitted.
10. Z. Chen, Y. Ju, Combined effects of curvature, radiation, and stretch on the extinction of premixed tubular flames. Submitted.
11. Z. Chen, Y. Ju, On the accurate determination of flame speeds by using a spherical bomb: the effect of compression and stretch. Submitted.