



Lei CHEN

EDUCATION

2008 – 2013	Massachusetts Institute of Technology , Mechanical Eng.,	Ph.D.	<i>GPA 4.4/5.0</i>
2004 – 2006	Tsinghua University , Power Eng. & Eng. Thermophysics,	M.S.	<i>GPA 82/100</i>
2000 – 2004	Tsinghua University , Thermal Energy & Power Eng.,	B.S.	<i>GPA 86/100</i>
Core curriculums: Thermodynamics, Fluid Mechanics, Heat Transfer, Combustion			
Minor subject: Finance			

ACADEMIC RESEARCH

2008 – Present MIT, Reacting Gas Dynamics Lab, Research Assistant, Advisor Prof. Ahmed F. Ghoniem

- Comprehensive and systematic study on the fundamentals of oxy-fuel combustion for carbon capture, published review paper in top combustion journal.
- Developed sub-models (char consumption, radiation properties) for combustion simulation in a CO₂-rich environment, validated RANS and LES approaches for oxy-fuel combustion.
- Investigated the pressure effect on oxy-coal combustion using validated CFD approaches.
- Developed in-house models for slag behaviors (flow, phase change, heat transfer) prediction in 3D CFD simulation of coal combustion/gasification.

2004 – 2006 Tsinghua University, Research Assistant, Advisor Prof. Qiang Yao & Yuqun Zhuo

- Measured mercury emissions in 7 commercial operated coal-fired power plants.
- Modeled mercury pollutant formation and transformation in coal-derived flue gas.
- Graduated with **Distinguished M.S. Dissertation Award**.

2003 – 2004 Tsinghua University, Research Assistant, Advisor Prof. Qiang Yao

- Sampled and analyzed particulate matters from coal- and solid waste-fired utility boilers.

WORK EXPERIENCES

2011 Jun-Sep GE Global Research, Thermal Energy Systems Lab, Intern, Niskayuna, NY

- Simulated multiphase flow of the pressurized gasification quench system, developed dimensionless tool to estimate water carryout based on the CFD simulation data.
- Finished with **Excellent Appraisal**.

2006 - 2008 GE Global Research, Coal Polygen Technologies Lab, Scientist, Shanghai China

- Built advanced lab-scale test rig (Wire Mesh Reactor), developed and improved experiment methods using DFSS methodology.
- Measured coal pyrolysis and gasification kinetics at high temperature (up to 1500 °C) and high pressure (up to 80 bar) for design and optimization of the GE gasifier.

2006 Mar-May State Electricity Regulatory Commission, China Central Government, Intern, Beijing China

- Investigated U.S. EPA emission control policies and regulations for power generation industry.



HONORS & AWARDS

Top 10 Most Downloaded Article, *Progress in Energy and Combustion Science* (2012); **Intern Mentor Star**, GE China (2007); **Six Sigma Green Belt**, GE (2007); **M.S. Graduate with Distinction & Distinguished M.S. Dissertation**, Tsinghua University (2/81) (2006); **Excellent Student Award**, Beijing (1/89) (2003); **National Scholarship** Second-Class, Ministry of Education of China (3/29) (2003)

LEADERSHIP

2009 - 2011 Co-Founder & Co-President, MIT China Energy & Environ. Research Group, founded MIT registered student group (200+ members), raised \$20K to promote the understanding of China energy issues.
2009 - 2010 Contents lead, MIT 2009 Energy Night & MIT 2010 Energy Conference
2008 - 2009 Vice president, MIT Chinese Students and Scholars Association, raised \$5K from company sponsors.
2004 - 2006 Undergraduate Tutor, Thermal Eng. Dep., Tsinghua, tutored 90+ Class 2008 undergraduate students.
2003 - 2004 Vice president, Tsinghua Redbud Volunteer Organization, led 20+ community volunteer activities.

SELECTED PUBLICATIONS

7 first-author, 4 co-author peer-reviewed journal publications; 4 international conference paper/presentation

1. [Simulation of Oxy-Coal Combustion in a 100 kW_{th} Test Facility Using RANS and LES: A Validation Study](#), *Energy & Fuels* 26 (2012), 4783-4798.
2. [Oxy-fuel combustion of pulverized coal: Characterization, fundamentals, stabilization and CFD modeling](#), *Progress in Energy and Combustion Science* 38 (2012), 156-214.
3. [The influence of gasification reactions on char consumption under oxy-combustion conditions: effects of particle trajectory and conversion](#), *The Proceedings of the Combustion Institute* (2012)
4. [Modeling the slag behavior in three dimensional CFD simulation of a vertically-oriented oxy-coal combustor](#), *37th Int. Tech. Conf. Clean Coal & Fuel Systems*, FL, June 2012.
5. [Gas evolution kinetics of two coals during rapid pyrolysis](#), *Fuel Processing Technology* 91(2010), 848-852.
6. [Advances in the development of wire mesh reactor for coal gasification studies](#), *Review of Scientific Instruments* 79 (2008), 84-102.
7. [Thermodynamic comprehension of the basic ash compositions' effect on gaseous mercury transformation](#), *Energy & Fuels* 21(2007), 501-505.
8. [Mercury transformation across particulate control devices in six power plants of China: the co-effect of chlorine and ash composition](#), *Fuel* 86 (2007), 603-610.
9. [Kinetics modeling of homogenous mercury transformation in coal-derived flue gas cooling process](#), *Journal of Engineering Thermophysics* 28 (2007), 343-346. (in Chinese)
10. [Experimental study on characteristics of particulate matter size distribution and trace elements enrichment in emissions from a pulverized coal-fired boiler](#), *Proceedings of the CSEE* 25 (2005), 74-79. (in Chinese)

TECHNICAL SKILLS

Computer: Linux/Unix, GAMBIT, ANSYS FLUENT, Parallel computation, Technical Programming (C), CHEMKIN, ASPEN plus, Tecplot, MATLAB

Experimental: **Certificate** for pressurized vessel operations, 4-Year Chemical Lab experience (Chemicals, GC, CVAAS), Power plants onsite experiment skills