Dr. Gang LIU

Ph.D. in Mechanical Engineering
Ph.D. in Engineering Education

123A Fluor Daniel, Department of Mechanical Engineering
Clemson University, Clemson, SC 29634
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EDUCATION

2014-2018 ***Ph.D.*** in Engineering Education**,** Utah State University, Logan, Utah

2002-2006 ***Ph.D.*** in Mechanical Engineering, Zhejiang University, Hangzhou, China

1998-2000 ***M.S.*** in Mechanical Engineering, Shandong University, Ji'nan, China

1992-1996 ***B.S.*** in Mechanical Engineering, Shandong University, Ji'nan, China

WORK EXPERIENCE

2018- present Clemson University, Clemson, South Carolina 29634
Lecturer, Department of Mechanical Engineering

- Course coordinator and instructor of Statics & Dynamics (ME2010).
- Course coordinator of Mechanical Engineering Labs (ME3330).
- Course instructor of Mechanics of Materials (ME2040).
- Course instructor of Senior Capstone Design (ME4020).
- Executed annual evaluation as a member of Assessment Committee.
- Led research of the misconceptions among undergraduate ME students.

2014- 2018 Utah State University, Logan, Utah 84332
Research Assistant, Engineering Education Department.

- Taught Engineering Dynamics (ENGR 2030).
- Led REU project of self-regulated learning (SRL) on misconceptions.
- Led research of the misconceptions among undergraduate engineering students.
- Led research on experimental intervention correcting student misconceptions.
- Research assistant of NSF funding (Grant No. DUE 1244700).

2011 - 2013 Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24060
Research Associate, Institute of Critical Technology and Applied Science

- Led research project supported by American Electric Power (AEP).
- Instructed one doctoral graduate student.
- Developed key research results and performance predicting models.
- Studied the feasibility of biomass as substitute fuel in power plants.

2007 - 2011 General Electric, Shanghai, China
Research Scientist, Global Research Center

- Led coal gasification advanced technology fundamental research.
- Led pneumatic conveying technology research.
- Led solar concentrated thermal application research.
- Led multiple cross-lab projects from GE-Energy.
- Facilitated environmental health and safety of global research center.

2006 - 2007 Zhejiang University of Technology, Hangzhou, China
Lecturer, College of Mechanical and Electrical Engineering

- Taught senior level courses and instructed graduate/undergraduate students.
- Instructed one doctoral graduate student.
- Led research of thermal-acoustic self-oscillating combustion and heat transfer.
- Secured a grant from Zhejiang Science & Technology Bureau.

1996-2002 Dongying Economy & Trade Committee, Dongying, Shandong, China
Associate Engineer

- Facilitated industrial operational safety and energy efficiency.
- Modified the safety and health regulations for industrial operation.

PUBLICATIONS

1. **Liu, G.**, Fang, N. (2021). The effects of enhanced hands-on experimentation (EHE) on correcting student misconceptions about work and energy in engineering mechanics. *Research in Science & Technological Education.* Accepted in March 2021.
2. Fang, N., **Liu, G**. (2019). Reducing students' conceptual misunderstanding in engineering dynamics through enhanced hands-on experimentation. *International Journal of Engineering Education*, 35(3): 901-911.
3. **Liu, G.**, A comparison of the effects of enhanced hands-on intervention versus textbook intervention to understand student misconceptions in particle dynamics. Doctorate dissertation, *Engineering Education, Utah State University*, 2018.
4. **Liu, G.**, Fang, N. (2017). Student misconceptions of work and energy in engineering dynamics. *Proceedings of the 2017 ASEE Gulf-Southwest Section Annual Conference*, Dallas, TX.
5. **Liu, G.**, Fang, N. (2016). Student misconceptions about force and acceleration in physics and Engineering Mechanics Education. *International Journal of Engineering Education*, 32(1A): 19-29.
6. Agarwal, G., **Liu, G.**, Lattimer, B. (2014). Pyrolysis and oxidation of cardboard. *Fire Safety Science*, 11, 124-137.
7. **Liu, G.,** Agarwal, G., Lattimer, B., et al. (2013). Biomass/coal co-pyrolysis and co-combustion characterization. *8th U.S. National Combustion Meeting*, Salt Lake City, UT.
8. Agarwal, G., **Liu, G**., Lattimer, B. (2013). Pyrolysis and combustion energetic characterization of coal-biomass-plastic fuel blends. *ASME Power Conference 2013*, Boston, MA.
9. Agarwal, G., **Liu, G.**, Lattimer, B. (2013). Temperature dependent solid fuel combustion characterization and fuel ranking. *IMECE ASME 2013*, San Diego, CA.
10. Agarwal, G., **Liu, G.**, Lattimer, B. (2013). Pyrolysis and oxidation of cardboard. *The 11th International Symposium IAFSS*, University of Canterbury, New Zealand.
11. **Liu, G.,** Wang, M., Chen, W. (2010). Review on the dry feed pneumatic conveying technologies. *Proceedings of 2010 Cailun Symposium*, Shanghai, China.
12. **Liu, G.** (2010). Flow simulation in slurry bubble column reactor for F-T synthesis process, *Proceedings of 2010 Cailun Symposium*, Shanghai, China.
13. **Liu, G.,** Wang, X., Jin, S., et al. (2009). Concentrated solar power technology application in the future, *Proceedings of 2009 Cailun Symposium*, Shanghai, China.
14. Zeng, C., Chen, L., **Liu, G.**, et al. (2008). Advances in the development of wire mesh reactor for coal gasification studies, *Review of Scientific Instruments* (79).
15. **Liu, G.,** Zeng, C., Mao, Y., et al. (2008). Effect of CO_2 partial pressure on char gasification reactivity at high temperature and high pressure in Wire-mesh Reactor, *Proceedings of 2008 Cailun Symposium*, Shanghai, China.
16. Zeng, C., Chen, L., **Liu, G.**, et al. (2008). Advances in development of wire mesh reactor for coal gasification studies. *Proceedings of 2008 Cailun Symposium*, Shanghai, China.

17. **Liu, G**., Chen, L., Zeng, C., et al. (2007). Effects of pressure on the pyrolysis kinetics of a specific coal. *Proceedings of 2007 Cailun Symposium*, Shanghai, China.
18. Chen, L., Zeng, C., **Liu, G.**, et al. (2007). Coal gasification characterization in wire mesh reactor. *Proceedings of 2007 Cailun Symposium*, Shanghai, China.
19. **Liu, G.**, Chi, Y., Jiang, X., et al. (2007). Model of axial transport of particles in rotary kiln, *Journal of Zhejiang University (Engineering Science)*, 41 (7): 1195-1200.
20. Ren, J., Xu, Z., **Liu, G.**, et al. (2007). Development of the multi-media teaching software of course "Flue Gas Cleansing", *Higher Education in Chemical Engineering*, 94 (2): 68-71.
21. **Liu, G.**, Study on thermal treatment of hazardous wastes in rotary kilns. Doctorate Dissertation, *Mechanical Engineering, Zhejiang University*, 2006.
22. **Liu, G.**, Chi, Y., Jiang, X., et al. (2006). Analytical study on residue of incinerated electroplating sludge. *Journal of Power Engineering*, 26(4): 576-579, 603.
23. **Liu, G.**, Chi, Y., Jiang, X., et al. (2005). Mass transfer of simulative hazardous waste particles in rotary kiln. *Journal of Engineering Thermophysics*, 26(2): 343-346.
24. **Liu, G.**, Jiang, X., Chi, Y., et al. (2005). Thermal disposal behavior of electroplating sludge. *Acta Scientiae Circumstantiae*, 25(10): 1355-1360.
25. Zhu, J., Jiang, X., **Liu, G.**, et al. (2004). A review of hazardous waste disposal by rotary kiln, *Environmental Engineering*, 22 (5): 57-61.

TECHNICAL REPORTS

1. **Liu, G.,** Wang, M., Zheng, Y., et al. (2010). Roto-feed high pressure dry feed conveying technology. *Dry Feed project final report*. General Electric.
2. Wang, X., **Liu, G.,** et al. (2010). China Concentrated Solar Power (CSP) study. *In China, For China (ICFC) project final report*. General Electric.
3. Zhao, T., **Liu, G.,** Wang, M. (2009). Solid Pump system installation and integration scheme at CTC-based on Santa Ann solid pump test site visit. *Dry Feed project final report*. General Electric.
4. **Liu, G.,** Mao, Y., Zeng, C., et al. (2008). High pressure, high temperature char-CO_2 gasification kinetics experiments using wire mesh reactor (WMR) system, *CO_2 Recycle new product introduction (NPI) Final Report*. General Electric.
5. **Liu, G.**, Zeng, C., Mao, Y., et al. (2008). Effect of CO_2 partial pressure on char gasification reactivity at high temperature and high pressure in wire mesh reactor. *Advanced Technology project final report*. General Electric
6. Chen, L., Long, Y., **Liu, G**., et.al. (2008). Method of water quantification for pyrolysis in wire mesh reactor, *Advanced Technology project final report*. General Electric.
7. Guo, X., Chen, L., **Liu, G.**, et.al. (2008) Water release quantification during rapid pyrolysis with wire mesh reactor. *Advanced Technology project final report*. General Electric.
8. Bi, X., Chen, W., **Liu, G.,** et.al. (2008). Report on dry-feeding gasification Chinese Patent survey, *Dry Feed project final report*. General Electric.
9. **Liu, G.,** Chen, L., Zeng, C., et.al. (2007). *Advanced Technology project*. General Electric.
10. Zamansky, V., Eiteneer, B., **Liu, G.,** et.al. (2007). Gasification fundamentals sustainable energy Advanced Technology Project 2007 Final Report, *Advanced Technology project final report*. General Electric.

PATENTS

1. Liu, K., Chen, W., **Liu, G.,** et al. The dry feed system configuration for gasification. Filed in US, Nov.10, 2011. Filed in China, Nov.2, 2010.
2. Wang, M., Hu, L., **Liu, G.,** et al. Systems and methods for processing solid powders. AU 2011250726 B2.

TRADE SECRECT

1. **Liu, G.** (2007). A new high-pressure solid feeding method, General Electric.

BOOKS

1. **Liu, G.**, Joseph, P., Orr, M., ME2010 - Statics and Dynamics Learning Exercise. Department of Mechanical Engineering, Clemson University. (Spring-19, Fall-19, Spring-20, Fall-20, Spring 21, etc.)
2. **Liu, G.**, ME2010 - Statics and Dynamics Learning Exercise. Department of Mechanical Engineering, Clemson University. (Summer 2019, Summer 2020)
3. **Liu, G**., Biddlecom, J., ME3330 – Mechanical Engineering lab II. Department of Mechanical Engineering, Clemson University. Lab manual. (Fall 2019, Spring 2020)

SPONSORED RESEARCH

1. Integrating Concept Mapping with Laboratory Experimentation and the 5E Learning Cycle to Improve Student Conceptual Understanding in a Foundational Engineering Course, National Science Foundation, Primary researcher, $199,998. Grant No. DUE 1244700 (2014-2018)
2. Biomass as substitute fuel in fire power plants, American Electric Power, Co-PI. (2011-2013)

COURSES TAUGHT

2018-present	Statics & Dynamics (ME 2010/2011), Clemson University
2018-present	Senior Capstone Design (ME4020/4021), Clemson University
2018-present	Mechanics of Materials (ME 2040, ME2040-Hon), Clemson University
2019-2020	Mechanical Engineering Labs (ME 3330), Clemson University
2015-2018	Engineering Dynamics (ENGR 2030), Utah State University
2006	Heat Transfer, Zhejiang University of Technology
2006	Industrial Thermal Devices, Zhejiang University of Technology
2006	Exergy Analysis, Zhejiang University of Technology
2005	AutoCAD, Hangzhou Computer School

PEDAGOGICAL SKILLS

Curriculum development
Classroom management skills
Cognitive and metacognitive learning
Self-regulated learning
Conceptual change theory and practice
Grant proposal writing
Online education
Educational & psychological research
Student achievement assessment
Research experience for undergraduates

Qualitative and quantitative research method
Higher education globalization
Design of experiments

TRAININGS

2019	Faculty Teaching Workshop, by Clemson University
2019	General Education Retreat, by Clemson University
2016	Workshop for Teaching Skills, by Utah State University
2015	Grant and Proposal Writing Skills, by Utah State University
2015	Curriculum Development, by Utah State University
2010	Presentation / Communication skills, by General Electric
2010	TRIZ -Theory of innovative problem solving, by General Electric
2009	Six-Sigma, DMAIC & DFSS, by General Electric
2009	IP skills for technologists, by General Electric
2008	Effective communication, by General Electric
2007	Hire the right people, by General Electric
2007	Presentation skills at GE, by General Electric

SERVICE

2019-present	Member of Assessment Committee, ME Department, Clemson University
2015-2017	Vice President, ASEE at Utah State University, Logan, UT.
2015-2018	Media Team member of Alpine Church, Logan, UT.
2011-2013	Sunday school teacher in Blacksburg Christian Fellowship, Blacksburg, VA. Bible study group leader in Blacksburg Baptist Church, Blacksburg, VA. Volunteer in Harding Avenue Elementary School, Blacksburg, VA.
2009	Junior Achievement - Career GO! Shanghai University. Shanghai, China.
2007-2010	Team leader of GE-Lianying Migrant School volunteer. Shanghai, China. Team leader of Shanghai Children's Medical Center volunteer. Shanghai, China.
2006	AutoCAD teacher for Hangzhou Computer School, Hangzhou, China.
2004	Organized the 3rd International Conference of Combustion, Incineration/Pyrolysis and Emission Control. Zhejiang University, Hangzhou, China.

AWARDS

2019	ASME- Clemson Award, Clemson, SC.
2011	General Electric Innovator Award, General Electric, Shanghai, China.
2009	Technology Innovation Team Award, General Electric, Shanghai, China.
2007	China Technology Center EHS Star Award, General Electric, Shanghai, China.
2004	The 1st Kefa Cen Scholarship, Zhejiang University, Hangzhou, China.
2003	Excellent Student Award, Zhejiang University, Hangzhou, China.
1996	Excellent Thesis, Shandong University, Ji'nan, Shandong, China.
1994	Excellent Student Award, Shandong University, Ji'nan, Shandong, China.
1993	Excellent Student Award, Shandong University, Ji'nan, Shandong, China.

MEMBERSHIP

2014-present	American Society of Engineering Education (ASEE)
2012-present	American Society of Mechanical Engineering (ASME)
2012- present	Combustion Institute