

JIANHUI ZHANG

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<https://zhangjianhui.tech/>

EDUCATION

Master of Philosophy in Power Engineering and Engineering Thermodynamics Sep 2017-Jun 2020
Tsinghua University Beijing, China

- **GPA:** 3.3/4

Bachelor of Engineering in Energy and Power Engineering Sep 2013-Jun 2017
North China Electric Power University Beijing, China

- **GPA:** 90/100 (rank 1/30) Excellent Engineer Program

HONORS & AWARDS

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| • First Scholarship on campus for 2013-2015 academic year (top 3% of students) | 2014 |
| • National Scholarship for 2014-2015 academic year (top 1%) | 2015 |
| • National Third Prize, 7th National Mathematics Competition for College Students | 2015 |
| • First Prize, 8th Mechanical Innovation Design Competition for College Student in Beijing | 2016 |
| • Outstanding graduate of Beijing (top 1%) | 2017 |

PUBLICATIONS & PATENTS

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1. **J. Zhang**, L. Wang & C. Liu: Superregular Breathers, Characteristics of Nonlinear Stage of Modulation Instability induced by Higher-order Effects, *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 473.2199 (2017): 20160681 (**ESI highly cited paper**)
 2. L. Wang, **J. Zhang**, Z. Wang, et al.: Breather-to-soliton Transitions, Nonlinear Wave Interactions, and Modulational Instability in a Higher-order Generalized Nonlinear Schrödinger Equation, *Physical Review E*, 93.1 (2016): 012214 (**ESI highly cited paper**)
 3. L. Wang, **J. Zhang**, C. Liu, et al.: Breather Transition Dynamics, Peregrine Combs and Walls, and Modulation Instability in a Variable-coefficient Nonlinear Schrödinger Equation with Higher-order Effects, *Physical Review E*, 93.6 (2016): 062217 (**ESI highly cited paper**)
 4. **J. Zhang**, H. Qi: Research Development on Supercritical CO₂-Allam Cycle and Combustion, Oral Presentation at 2018 Conference of Chinese Society of Engineering Thermodynamics, published in *Proceedings of the Chinese Society for Electrical Engineering*, 39.14 (2019): 4172-4189
 5. R. Chen, **J. Zhang**, L. Lun, et al.: Comparative Study on Synergistic Effects in Co-pyrolysis of Tobacco Stalk with Polymer Wastes: Thermal Behavior, Gas Formation, and Kinetics, *Bioresource Technology*, 292 (2019): 121970
 6. **Patent:** On-board Bionic Electrostatic Dust-removing Air Purifier, 201510208700.4, China (Authorized, as **first inventor**)

RESEARCH EXPERIENCE

North China Electric Power University Sep 2015-Jun 2016

Research Assistant for Prof. Lei Wang

Nonlinear Modulational Instability of Nonlinear Schrödinger Equations in Optical Fibers

- Derived the explicit expression for Breather-to-soliton (BS) transitions by analytic solutions
- Unveiled the exact relationship between BS transitions and modulation instability (linear stability analysis) growth rate with low frequency perturbations
- Created two types of Superregular Breather through Jukowsky transformation, which enriched the nonlinear stage of modulation instability.

Tsinghua University, Key Laboratory of Thermal Science and Power Engineering

Sep 2017-Jun 2020

Graduate student for Prof. Haiying Qi

Undergraduate Thesis: *Numerical Verification on Partial-average-based Turbulence Model*

- Developed 2D partial-averaged-based turbulence model solver based on Fortran and OpenFOAM
- Predicted the transition of incompressible flow past the suction face of AS240 airfoil
- Predicted shock wave & turbulent boundary layer interaction in transonic channel with plateau of wall pressure distribution and λ flow structure

Graduate Thesis: *Mechanism of Recirculation Formation and Microjet Control in Gas Turbine Combustor*

- Studying the microjet & swirling flow interaction and the formation of a novel recirculation zone which largely widened the (usually narrow) flammable range near flameout in the combustor

Engineering Project: *Data Analysis of 300MW gas turbine nozzle test*

- Proposed uniform criterion for ignition test based on pressure fluctuation
- Comparing conventional empiric fitting methods, developed semi-analytical correlations for NO_x emissions based on reaction kinetics and stability, which fit with experimental data better

Tsinghua University-University of Waterloo Joint Research Center for Micro/Nano Energy & Environment Technology

Dec 2018-Feb 2019

Research Assistant for Prof. Qinghai Li during winter vacation

The interactions of biomass and polymers during co-pyrolysis

- Investigated tobacco stalk and polymers co-pyrolysis by thermogravimetric analyzer, Fourier transform infrared spectrometer and first-order reaction kinetic analysis
- Reduced char residue by 6% and increased organic gases yield by more than 20% during tobacco stalk and scrap tire co-pyrolysis
- Reduced the activation energy of tire pyrolysis by 40–80% during co-pyrolysis which greatly reduced the energy input during the reaction

WORK EXPERIENCE

Pansan Power Plants of Wanjiang Logistics Group Co. LTD	Intern	Anhui, China	Feb 2014
Contemporary Amperex Technology Co. Limited	Intern	Fujian, China	Jul 2018
Complex Variables Functions Course in Tsinghua University	Teaching Assistant	Beijing, China	2018-2019

ADDITIONAL INFORMATION**Computer Skills:** Fortran, C, R, Mathematica, ANSYS, OpenFOAM**Main Undergraduate Courses (full score 100)**

Advanced Mathematics 1, 2	98, 95	Advanced Language Programming	100	College Physics 1, 2	90, 94
Engineering Thermodynamics	93	Engineering Fluid Mechanics	93	Heat Transfer	98
Electronic Technology	94	Automatic Control Theory	98	Electrotechnics	92
Material Mechanics	98	Theoretical Mechanics	95	Graduation Project	98