

# XINYAN GUAN (关新燕)

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## EDUCATION

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### Politecnico di Milano

Mar 2024 – Present

doctoral student in Industrial Chemistry & Chemical Engineering

*Supervisor: Prof. Alberto Cuoci*

### Beihang University, School of Astronautics

Sep 2019 – Jan 2022

M.E. in Aeronautical & Astronautical Propulsion

GPA: 3.75 / 4.0

*Supervisor: Prof. Qingfei Fu*

### Nanjing University of Science and Technology

Sep 2015 – Jun 2019

B.E. in Special Energy Technology & Engineering

GPA: 85.8 / 100

*Supervisor: Prof. Ruiqi Shen*

## PUBLICATION LIST

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### First Author

- **X. Guan**, B. Jia, L. Yang, Q. Fu\*, Linear instability of an annular liquid jet with gas velocity oscillations, *Physics of Fluids*, 2021, 33(5): 054110. <https://doi.org/10.1063/5.0049137>
- **X. Guan**, Q. Fu\*, H. Liu, L. Yang, Numerical simulation of Oldroyd-B viscoelastic droplet collision, *Chinese Journal of Theoretical and Applied Mechanics*, 2022, 54(3): 644-652. (EI paper) [doi: 10.6052/0459-1879-22-020](https://doi.org/10.6052/0459-1879-22-020)
- **X. Guan**, Q. Fu\*, L. Yang, Numerical simulation of dynamic characteristics of liquid/liquid coaxial swirl injector, *Proceedings of the 13th Small Engine Symposium of Power Branch of Chinese Aeronautical Society*, 2021. (Conference Paper)

### Co-author

- L. Liu, **X. Guan**, Q. Fu\*, Numerical simulation study of extensional characteristics impacts on the viscoelastic thread deformation and satellite droplet generation. *Journal of Non-Newtonian Fluid Mechanics*, 2023, 311: 104955. <https://doi.org/10.1016/j.jnnfm.2022.104955>
- S. Chen, Y. Tang, H. Yu, **X. Guan**, *et al.*, Combustion enhancement of hydroxyl-terminated polybutadiene by doping multiwall carbon nanotubes. *Carbon*, 2019, 144: 472-480. <https://doi.org/10.1016/j.carbon.2018.12.063>
- B. Sun, W. Li, Z. Wang, Y. Zhu, Q. He, **X. Guan**, *et al.*, Recent progress in modeling and control of bio-inspired fish robots. *Journal of Marine Science and Engineering*, 2022, 10(6): 773. <https://doi.org/10.3390/jmse10060773>

## WORK EXPERIENCE

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**Westlake University**

Mar 2022 – June 2023

Intelligent and Informational Fluid Mechanics Laboratory

Research Assistant

## RESEARCH EXPERIENCE

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### **CFD modeling of thermochemical conversion of plastic waste**

Mar 2024 – Present

- My PhD study aims to develop a CFD model to simulate the plastic waste gasification process coupled with chemical kinetics. The model will be able to analyze the fundamental principles of fluid-chemical interactions during the thermochemical conversion of polymers, offering insights for designing gasifier parameters and optimizing gasification performance in plastic waste recycling.

### **CFD simulations on the injector dynamics and atomization mechanism**

Jun 2020 – Jan 2022

- **The research on the dynamic characteristics of liquid/liquid coaxial swirl injector**

Numerical simulation on injection process of two-component swirl injector under unsteady conditions was carried out. The effect of structure and working condition of injector on dynamic characteristics was obtained.

- **Numerical simulation on the spray characteristics of a gas-liquid pintle injector**

In view of the atomization mechanism of the pintle rocket engine, the atomization process of gas/liquid pintle injection units with different structures was numerically simulated by *Basilisk*. The spray characteristics such as atomization angle, break length of liquid sheet and droplet distribution were obtained at different throttling levels.

- **Effect of extensional characteristics on viscoelastic jet impinging atomization**

Numerical simulation of the impinging jet atomization process of the Oldroyd-B viscoelastic jet was carried out in different stages. Using open source solver *Basilisk*, the effects of viscoelasticity and extensional behavior on deformation of the liquid sheet, bead-on-string structure and droplet collision were preliminarily investigated.

### **Linear stability analysis of annular jet with acoustic oscillations**

Sep 2019 – Jun 2020

- Physical modeling and theoretical analysis of the liquid toroidal jet under the action of the acoustic field were carried out. The mechanism of the jet surface instability under the gas medium oscillation condition was calculated.
- The influence of the frequency, acoustic pressure and other parameters on the steady rupture of the annular jet were obtained.

### **Experimental study on the combustion performance of HTPB-based fuel**

Nov 2018 – Jun 2019

- Experimental equipment was designed and built to prepare paraffin-coated Nano-Al composite particles by spray method, and the preparation and combustion experiments of composite particle-HTPB self-disintegrating fuel were completed.
- Images of the combustion process obtained by high-speed photography method were processed, and the regression rate of fuel was calculated by Matlab.

## SKILLS

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- Linux, MATLAB, Maple, Visual Studio (C, C++), LabVIEW.
- Origin, MS Word, Excel, Power Point.
- Basilisk, Ansys/Fluent, Paraview, Tecplot, VisIt.