Junlin Luo

Tsinghua University, Beijing
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EDUCATION

Undergraduate in Tsien Excellence in Engineering Program August 2021 - June 2025(Expected)
Theoretical and Applied Mechanics
Tsinghua University, Beijing

Academic Performance GPA 3.95/4.00 Rank 6/185

RESEARCH INTERESTS

- Data-driven discovery for physics, especially in mechanics.
- Neural operator simulation of fluid mechanics and solid mechanics.
- Multi-physics and multiscale modeling and prediction.

PUBLICATIONS

Seeking the most informative design of test specimens for learning constitutive models.

Extreme Mechanics Letters· May 15, 2024

Royal Chibuzor Ihuaenyi[1], **Junlin Luo**[1](Equal Contributor), Wei Li, Juner Zhu*

RESEARCH EXPERIENCE

Symbolic regressions for PDE from PDE solution. 2024/07 - Present
Advisor: Prof. Lu Lu, Yale University, New Haven

· **Data-Driven Method for PDE Discovery**

· Step-by-step PDE regression method to improve model generalization.

Seeking the most informative specimen shape for learning constitutive models. 2023/07 - 2023/09
Advisor: Prof. Juner Zhu, Northeastern University, Boston

· **Interdisciplinary work of *Optimization of Mechanics Sample shape & Information Quantification***

· Propose the idea — "Utilitizing *entropy criterion* to help quantify the information contained" in experiments with different sample shapes.

· Demonstrate that different testing shapes in nano-indentation lead to different 'information entropy value of the stress state', which could indicate the diversity of the stress state.

· One paper published on *Extreme Mechanics Letters*.

Investigating abiotic particles accumulation behind cylinders in microfluidic chips. 2023/11 - 2024/06
Advisor: Prof. Moran Wang, Tsinghua University, Beijing

· **Microfluidic Chips(Experiment & Simulation)**

· Discover the pattern of the 'streamer-like' growing of abiotic particles behind the cylinder in microfluidic chips.

· Attempt to propose dynamical equations to physically describe the growing patterns.

· Investigate the reasons why abiotic particles accumulate behind the cylinder without the existence of the biofilm, which is considered as the reason why its counterpart, biotic streamer, forms.

Ouzo effect in confined space. 2022/01- 2023/06

Advisor: Prof. Cunjing Lv, Tsinghua University, Beijing

· ***Ouzo effect* and *Phase Transition*(Experiment & Data Analysis)**

· Conduct the experiments and propose a new attribute to quantitatively describe the phase transition of ternary liquid evaporation in confined space.

· Explain how the interface shape's destruction interferes with the symmetry of the fluid field pattern.

AWARDS

National Scholarship(top 0.2% nationwide)	2022/10
National Encouragement Scholarship	2023/10
Freshman Scholarship	2021/09
First Prize in the 38th National College Students' Physics Competition	2021/12
First Prize in the 37th National High School Students' Physics Competition(top 50)	2020/10
Golden Prize(Rank No.1) for the 11th Tsinghua Freshman Creativity Contest	2021/10

SELECTED COURSEWORK

Mathematics

Probability and Mathematical Statistics	A
Advanced Calculus(1),(2)	A
Advanced Algebra and Geometry	A
Methods of Mathematical physics	A+
Foundations of Scientific and Engineering Computing(Numerical Analysis)	A-
Numerical Methods for Partial Differential Equations	Audit

Mechanics & Physics

Thermodynamics and Statistical Physics	A+
Fluid Mechanics	A
Solid Mechanics	A
Theoretical Mechanics	A
Physics for Scientists and Engineers	A+
Physics(2)	A
Introduction to Particle Transport	A+

Computation & Modeling

Pattern Recognition and Machine Learning	A
Signals and System Analysis	A
Computational Fluid Dynamics	A
Theory and Modelling of Thermo-Fluid-Structure Coupling	A-
Fundamentals of Computer Programming	A-
Introduction to Deep Learning	P

SKILLS

Coding Languages:	Python(Proficient), Matlab, C/C++
Professional Software	OpenFoam(Adept), Basic AUTOCAD(Adept), Solidworks, Abaqus, Multisim.
English Proficiency	TOEFL 106, Speaking 23

EXTRA-CURRICULAR

Volleyball 2023/09–Present

Team manager, Xingjian College Volleyball Team.

· Serve as a **setter**.

· Led the team from failing to advance past the group stage in 2023 to reach the round of 16 in 2024, in Tsinghua University Ma Yuehan Cup Volleyball League.