

关家顺 Jiashun Guan, Ph.D.

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Current Affiliation

School of Aeronautics, Universidad Politécnica de Madrid. 2026.01 – Present
Postdoc, supervised by Prof. Javier Jiménez, funded by ERC Advanced Grant.

Education

College of Engineering, Peking University. 2020.09 – 2025.07
Ph.D. in *Fluid Mechanics*, supervised by Prof. Jianjun Tao.

School of Civil Engineering, Tianjin University. 2016.09 – 2020.07
B.Eng. in *Ocean Engineering* (with distinction).

Dept. of Mechanical Engineering, Massachusetts Institute of Technology. 2020.01 – 2020.07
Visiting Student in *Ocean Engineering*, supervised by Dr. Yuming Liu.

Research Interest

My primary research is dedicated to the fundamental understanding of **Turbulence & Transition** ($\mathbf{T^2}$), exploring the underlying physical mechanism with dynamical system approaches, brute-force DNS, experimental data, and machine learning tools.

Publications

* denotes the corresponding author.

Journal Articles

[5] C. Liu, H. Ni, and **J. Guan***, "An optimal seed reveals the dynamical route to spontaneous splitting of turbulent puffs," *arXiv.2610.38011*, 2026. Link.

[4] **J. Guan***, H. Hu, Y. Ren*, M. S. Triantafyllou, and D. Fan*, "Turbulence physics governs a scaling law for the machine-learning predictability ceiling in chaotic flow," *arXiv.2606.21538*, 2026. Link.

[3] **J. Guan** and J. Tao*, "Distinct lifetime scaling laws of turbulent puff in duct flow," *Physics of Fluids (Letter)*, vol. 37, no. 8, p. 081 703, 2025, [Editor's Pick]. Link.

[2] **J. Guan**, H. Hu, T. Hao, H. Wang, Y. Ren*, and D. Fan, "Vortex-induced drag forecast for cylinder in non-uniform inflow," *Physics of Fluids (Letter)*, vol. 37, no. 7, p. 071 708, 2025. Link.

[1] **J. Guan** and J. Tao*, "The Onset of Metastable Turbulence in Pipe Flow," *arXiv.2504.14465*, 2025. Link.

Conference Proceedings

[3] **J. Guan***, H. Hu, Y. Ren, and D. Fan, "Physical interpretation and physical constraints for complex flow field prediction," in *Abstracts of the 5th National Symposium on Flow Safety and Control*, [Outstanding Oral Presentation], Hangzhou, China, 2025.

[2] **J. Guan** and J. Tao*, "Propagation unity of turbulent fronts in polygonal duct flows," in *International Congress of Theoretical and Applied Mechanics (ICTAM)*, Daegu, Korea, 2024. Link.

[1] **J. Guan** et al., "A Study of Fish Undulatory Swimming Based on Merged CFD and Experimental Video of the Swimming Movement of Mosquito Fish," in *OCEANS 2021: San Diego –Porto*, San Diego, CA, USA: IEEE, 2021, pp. 1–6. Link.

Professional Memberships

- Full Membership, Sigma Xi, The Scientific Research Honor Society 2026
- Membership, American Physical Society, Division of Fluid Dynamics 2026

Academic Service

- Co-founder of Intelligent and Bio-inspired Mechanics Seminar (IBiM). 2020 – Present
- Subforum host (Mechanics and Ocean Engineering) of the "International Graduate Workshop on Mechanics and Interdisciplinary Research". 2024.10
- Reviewer for *Physics of Fluids*.

Teaching & Mentoring Experience

- Research Mentor – Hao Ni (undergraduate, PKU), 1 co-authored paper. 2025.06 – 2026.01
- Research Mentor – Haoyang Hu (undergraduate, PKU), 2 co-authored papers. 2024.11 – 2025.12
- Teaching Assistant – Innovation and Entrepreneurship, MEM Class 2023, PKU 2023.09 – 12
- Teaching Assistant – Management Course, MEM Class 2021, PKU 2022.03 – 07

Honors & Awards

- The Third-prize Scholarship, Peking University. 2022,2021
- Excellent Scientific Research Prize, Peking University. 2021
- **Top Ten Outstanding Youth of School of Civil Engineering (0.28%), Tianjin Univeristy. 2019**