ZIYUE YU

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EDUCATION

University of Pittsburgh *September 2024 – Present*
Ph.D. in Civil and Environmental Engineering
Advisor: Prof. Lei Fang

Southern University of Science and Technology *September 2020 – June 2024*
B.Eng. in Mechanical and Aerospace Engineering
Advisor: Prof. Hongyan Yuan

RESEARCH EXPERIENCES AND INTERESTS

Research interests include low-Reynolds-number turbulence, Lagrangian coherent structures, active-matter flow interactions, and scale-to-scale energy transfer in quasi-two-dimensional flows. My work focuses on low Reynolds number turbulence and active matter-induced flow structure, typically in regimes where inertia is weak but multiscale transport persists.

PROGRAM AND JOURNAL PUBLICATIONS (ADVISOR IN UNDERLINED)

<Turbulence at Reynolds Numbers of Order One > *Sep 2024 – May 2025*

Z. Yu, X. Si, and L. Fang, "Turbulence at Low Reynolds Numbers" *arXiv preprint* arXiv:2511.05800 [physics.flu-dyn] (2025).
Investigates turbulence in the weak-inertia regime using tensor-geometry and scale-to-scale energy flux, revealing non-classical turbulent organization at $Re = O(1)$.

<LCS evaluation driven by active matter: Cooperation between aggregation and activity-induced perturbations > *May 2025 – Present*

Z. Yu and L. Fang, Manuscript under preparation.
Explores how collective motion and activity-induced perturbations of active particles reshape Lagrangian coherent structures, linking aggregation dynamics to flow-structure disruption.

<How many steps does it take to kill the tornado > *May 2025 – Present*

Z. Yu and L. Fang, Research in progress.
Develops and experimentally evaluates an energy-efficient strategy for destabilizing tornado-like vortices by introducing small, directional perturbations that trigger forward spectral energy flux and progressively collapse the vortex core.

CONFERENCE AND ACADEMIC PRESENTATIONS

Z. Yu and L. Fang, "Low Reynolds Number Turbulence: Tensor Geometry Drives Turbulence in the Diminishing of Inertia," 78th Annual Meeting of the APS Division of Fluid Dynamics, November 23–27, Houston, Texas, USA. *Nov 2025*

RESEARCH METHODS

Experimental Methods: 3D Particle Tracking Velocimetry (PTV); 2D Electromagnetic Forcing Setup; Arduino-Based Circuit Design and Motor Control; Active-Matter Cultivation and Maintenance.

Computational Methods: MATLAB (Advanced); Python, R, and Java; Scientific Computing and Data Analysis, including energy flux and FTLE/LCS computation; Image and Flow-Field Processing

using MATLAB and Python; Custom Function Development for Spectral Analysis and Lagrangian Diagnostics.

TEACHING AND MENTORING EXPERIENCE

Teaching Assistant, University of Pittsburgh *2024–2025*
CEE 1402: Fluid Mechanics
CEE 1610: Engineering and Sustainable Development

AWARDS AND HONORS

Teaching Assistant of the Year, Civil and Environmental Engineering Department *2024–2025*

Star of Literature and Art, SUSTECH($140) *2022*

Second-class Scholarship for Outstanding Students, SUSTech ($425) *2022*

Fastest Progress Scholarship for Outstanding Students' of MAE ($425) *2022*

Outstanding Student Advisor *2022*

Third-class Scholarship for Outstanding New Undergraduate, SUSTech ($425) *2020*