Wenyuan Xue

Contact Information

Stanford University, Department of Mechanical Engineering
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Education

- **Ph.D. in Mechanical Engineering**, Stanford University, 2023 – Expected June 2027. GPA: 4.05/4.3
- **M.S. in Civil Engineering**, Stanford University, 2021–2023. GPA: 4.06/4.3
- **B.S. in Civil Engineering**, Tongji University, 2016–2020. GPA: 4.87/5

Research Interests

- Data-driven reduced-order modeling of PDEs
- Reynolds stress modeling of turbulent flows

Teaching Experience

- **Course Assistant**, *Partial Differential Equations in Engineering (ME300B/CME204)*, Stanford University, Jan.–Mar. 2025 Held weekly office hours and problem-solving sessions; prepared homework solutions and graded assignments.
- **Course Assistant**, *Fluid Mechanics (ME351A)*, Stanford University, Sep.–Dec. 2025 Reviewed and redesigned homework problems.

Research Experience

Stanford University (Apr. 2024 – Present)

Advisor: Ali Mani

- Developed a physics-informed, data-driven forcing method to identify closure models for scalar transport
- Optimized a pseudo-spectral DNS/LES solver for forced turbulence, achieving over 50% performance improvement and adapting it for deployment on multiple HPC clusters (Yellowstone, Sherlock, Dane)
- Constructed a minimal tensorial formulation of Reynolds stress models and applied it to study the influence of rotation on homogeneous anisotropic turbulence

Stanford University (January 2024 – March 2024)

Advisor: Oliver Fringer

- Conducted particle-resolved DNS of particle-laden flows
- Adapted in-house CFD code for sediment transport simulations

Stanford University (September 2022 – December 2023)

Advisor: Christian Linder

- Modeled phase-field fracture in anisotropic biological materials at finite strains
- Extended MOOSE (C++) with custom numerical subroutines

Tongji University (2020 – 2021)

Advisor: Hu Xiang

- Experimental and theoretical study of FRP-reinforced UHPC components

Tongji University (2019 – 2020)

Advisor: Fei Peng, Weichen Xue

- Reliability analysis of flexural capacity of reinforced UHPC beams

Honors and Awards

- Chinese National Scholarship (Academic Year 2016–2017)
- Chinese National Scholarship (Academic Year 2018–2019)
- Excellent Graduate Student of Shanghai (Academic Year 2020)
- The Enlight Foundation Graduate Fellowship (Academic Year 2023–2024)

Conference Presentations

- **Xue, W.**, Arunachala, P.K., Abrari Vajari, S., & Linder, C. (2023). A phase-field model for anisotropic incompressible materials at finite strains. *ASCE Engineering Mechanics Institute 2023 Conference*, Mini-Symposium MS311: Phase-Field Models of Fracture, Atlanta, GA, June 6–9.

- **Xue, W.**, & Mani, A. (2025). Impact of rotation on decay of forced homogeneous anisotropic turbulence. *8th Annual Meeting of the APS Division of Fluid Dynamics*, Modeling and Applications, Houston, TX, Nov. 25 (confirmed).

Publications

1. Peng, F., **Xue, W.**, & Xue, W. (2020). Database evaluation of shear strength of slender fiber-reinforced polymer-reinforced concrete members. *ACI Structural Journal*, 117(3), 273–281.
2. **Xue, W.**, Peng, F., & Xue, W. (2020). Calibration of strength reduction factor for reinforced ultra-high -performance concrete bridge girders in flexure. *Journal of Bridge Engineering*, 25(10), 04020086.
3. **Xue, W.**, Hu, X., & Xue, W. (2022). Calculation method of flexural capacity of ultra-high-performance concrete beams reinforced with FRP rebars (in Chinese). *Acta Materiae Compositae Sinica*, 39(11), 5109–5121.
4. **Xue, W.**, Hu, X., & Xue, W. (2023). Study on bond-slip model for GFRP rebars in UHPC (in Chinese). *Journal of Harbin Engineering University*.
5. Hu, X., **Xue, W.**, Xue, W., & Jiang, J. (2023). Bond strength of sand-coated deformed GFRP bars in UHPC, HPC, and NC. *Construction and Building Materials*, 403, 133175.
6. Hu, X., **Xue, W.**, & Xue, W. (2024). Bond properties of GFRP rebars in UHPC under different test types. *Engineering Structures*, 314, 118319.

Technical Skills

- **Concepts:** fluid/solid/structure mechanics, CFD, HPC, ML, PDE, statistics
- **Programming:** Python, C++, MATLAB, Fortran, Bash
- **Libraries & Tools:** NumPy, SciPy, PyTorch, TensorFlow, scikit-learn, FFTW, MOOSE, ABAQUS, Git
- **HPC Systems:** Experience with Slurm, MPI; simulations on Sherlock, Yellowstone