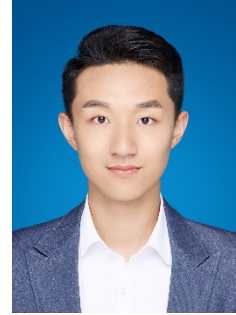


# Tianrun Gao



**Date of birth** 15 Aug 2000  
**Nationality** China  
**Contact** Tel: (86)17600855529  
Email: gaotianrun1@tongji.edu.cn

## Education

Dec. 2024 - Now **Westlake University, Hangzhou, China**  
• Internship of Department of AI, *AI for Scientific Simulation and Discovery Lab*  
• Supervised by Prof. Tailin Wu  
• Research Focus: Data-Driven Mechanics, AI4S

Sep. 2022 - Now **Tongji University, Shanghai, China**  
• Master Student of Civil Engineering  
• Supervised by Prof. Hongwei Huang  
• Anticipated Graduation: June 2026

Jul. 2021 - Nov. 2021 **University of Toronto, Online Participation due to Covid-19**  
• Research Internship of Mechanical Reliability Analysis  
• Funded by *Mitacs Globalink Program*, Canadian Government

Sep. 2018 - Jul. 2022 **Tianjin University, Tianjin, China**  
• Bachelor of Engineering, Civil Engineering  
• Ranking: 4/130, GPA: 3.86/4

## Major professional courses

- Linear Algebra, Advanced Mathematics, Applied Statistics, Stochastic Process, Numerical Analysis, Theoretical Mechanics, Mechanics of Materials, Structural Mechanics and Dynamics, Elastic Mechanics and Finite Element Methods, Plastic Mechanics, Fluid Mechanics, Interdisciplinary Frontiers of AI and Physics, etc.

## Research interests

- AI for Science (physical simulation & design & control & discovery).
- Physics-informed modeling and control of complex engineering systems.
- Automated numerical and experimental methods in engineering.

## Academic Contributions

### Publications:

- [1] H. W. Huang, **T. R. Gao**, D. M. Zhang. A Hybrid Approach for Modifying Tunneling-Induced Response in Existing Multi-Tunnel Environment. *Computers and Geotechnics*, 2025, 179, 106921.
- [2] J. Z. Zhang, **T. R. Gao**. Compressibility of Abnormal Pressure Gas Reservoirs and its Effect on Reserves. *ACS omega*, 2021, 6(40): 26221-26230.
- [3] R. Jia, **T. R. Gao**, G. Yang. Analysis on the Influence of Construction Stress Release and Disturbance on Seismic Response of Tunnel. *Chinese Journal of Underground Space and Engineering*, 2022, 18(S2): 916-925.

### **Conferences (\* represents equal contribution):**

- [1] Qianyi Chen\*, **Tianrun Gao\***, Chenbo Jiang\*, Tailin Wu. EqCollide: Equivariant and Collision-Aware Deformable Objects Neural Simulator. <https://arxiv.org/abs/2506.05797v1>. (Submitted to NeurIPS 2025).
- [2] **T. R. Gao**, D. M. Zhang, X. M. Liu, H. W. Huang. Data-based Risk Evaluation on 4 Overlapped Existing Subway Tunnels Undercrossed by Shield Tunneling. ITA World Tunnel Congress 2025, Stockholm, Sweden, 2025.
- [3] **T. R. Gao**, D. M. Zhang, H. W. Huang. Experimental Study on Tunneling-Induced Disturbance and Propagation in Complex Environment. 2025 PIARC, Chongqing, China, 2025.
- [4] **T. R. Gao**, D. M. Zhang, H. W. Huang. Study on Predicting Existing Tunnel Settlement Induced by Shield Tunneling Based on Machine Learning. The 2nd Workshop on Future of Machine Learning in Geotechnics and the 5th Machine Learning in Geotechnics Dialogue (2FOMLIG & 5MLIGD), Chengdu, China, 2024.
- [5] **T. R. Gao**, J. W. Jia, X. M. Liu, W. J. Zhang, H. W. Huang. 3D refined numerical simulation analysis of the impact of shield tunnel construction on adjacent pile foundation and soil. 2022 China Tunnel and Underground Engineering Conference (CTUC2022), Changsha, China, 2023.

### **Patents:**

- [1] H. W. Huang, J. Z. Zhang, **T. R. Gao**, D. M. Zhang. Experimental Model for Full Cross-Section Deformation Monitoring of Longitudinal and Transverse Tunnels and Post-Processing Algorithm Based on GANs. Shanghai, China, 2024-10-31. (*Invention Patent Officially Accepted for Review*)
- [2] Z. X. Chang, X. S. Cheng, H. F. Cheng, **T. R. Gao**, D. Y. Li, R. Z. Wang. A 3D Printing Device for Underground Pipeline Structure Installation. Tianjin, China: CN20212 0691496.7, 2021-11-05. (*Granted Invention Patent*)
- [3] Z. X. Chang, X. S. Cheng, H. F. Cheng, **T. R. Gao**, D. Y. Li, R. Z. Wang. A 3D Printing Device for Underground Pipeline Structure Installation. Tianjin, China: CN202110 367402.5, 2021-07-09. (*Granted Utility Patent*)

### **Projects in progress**

- Leading: multi-physics system simulation such as fluid-structure interaction based on generative model (like diffusion model or flow matching)
- Co-leading: collaborating with an industrial company, focusing on graph data-driven multi-scale simulation of complex solid mechanics
- Participating: design complex engineering structures based on multi-LLM-agents and sampling algorithms

### **Computer and English Skills**

- Software:
  - Proficient with Abaqus (FEM), FLAC (FDM), Python (Pytorch & Jax), MS Office, Origin, AutoCAD.
  - Familiar with Matlab, PFC<sup>3D</sup> (DEM), MPM, Rhino.
- English Skills:
  - TOEFL: 102 (Reading:28, Listening:27, Speaking:23, Writing:24) (Nov. 2020).
  - GRE: 324 (Verbar Reasoning:155, Quantitative Reasoning:169, Analytical Writing:3.5) (Aug. 2020).
  - Fluent in oral English, with fairly strong reading and writing ability.

### **Other information**

- Physically fit and passionate about sports, served as a member of Tianjin University Rowing Team winning 1<sup>st</sup> prize in Tianjin, demonstrating strong sense of responsibility and team spirit.
- Quick-minded with strong communication skills, achieved the University Debate Championship as a member of debate team.
- Easy-going, optimistic, adaptable and resilient.
- Self-motivated, with a passion for learning and the capability to efficiently master new knowledge.