# *Tianrun Gao*




**Date of birth** 15 Aug 2000

**Nationality** China

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## Education

Nov. 2026 **The University of Hong Kong, Hong Kong, China**
·PhD Student of Computing and Data Science
·Supervised by Prof. Liangqiong Qu

Sep. 2022 - Jul. 2026 **Tongji University, Shanghai, China**
·Master of Engineering
·Supervised by Prof. Hongwei Huang

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

## Internship

Oct. 2025 – Oct. 2026 **Fudan University, Shanghai, China**
·Internship of Artificial Intelligence Innovation and Incubation Institute and Shanghai Academy of AI for Science (SAIS)
·Supervised by Prof. Long Wei
·Research Focus: AI for PDE simulation/control & biomechanics

Dec. 2024 – Oct. 2025 **Westlake University, Hangzhou, China**
·Internship of Department of AI, AI for Scientific Simulation & Discovery Lab
·Supervised by Prof. Tailin Wu
·Research Focus: AI for simulation/control of complex physical systems

Jul. 2021 - Nov. 2021 **University of Toronto, Online due to Covid19**
·Research Internship of Mechanical Reliability Analysis
·Funded by *Mitacs Globalink Program*, Canadian Government

## 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 physical simulation & design & discovery (especially on PDE & Biomechanics).
·Agentic system and Generative AI.
·AI for control and Robotics.
·Numerical simulation of mechanical and engineering systems and its automation.

## Computer and English Skills

·Software:

*- Proficient with Abaqus (FEM), FLAC (FDM), Python (Pytorch & Jaxa), Office, Origin, AutoCAD.*

*- Familiar with Matlab, PFC$^{3D}$ (DEM), Taichi (MPM), Rhino.*

·English Skills:

*- TOEFL: 5.5/6.0, comparable to 110/120 on the pre-2026 scale (Reading: 6.0, Listening: 6.0, Speaking: 5.0, Writing: 5.5).*

*- GRE: 324 (Verbal Reasoning: 155, Quantitative Reasoning: 169, Analytical Writing: 3.5)*

*- Fluent in oral English, with fairly strong reading and writing ability.*

## Academic Contributions

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

1. **Tianrun Gao**, Ruiqi Feng, Zhikai Chen, Ruiqi Shu, Liangqiong Qu, Tailin Wu, Long Wei. Multiphysics Post-Training: From Decoupled Modules to Coupled Equilibria. (Submitted to ICLR 2027)
2. Qianyi Chen*, **Tianrun Gao***, Chenbo Jiang*, Tailin Wu. EqCollide: Equivariant and Collision-Aware Deformable Objects Neural Simulator. (Paper.) (KDD 2026, Oral)
3. **Tianrun Gao***, Haoren Zheng*, Wenhao Deng*, Haodong Feng, Tao Zhang, Ruiqi Feng, Qianyi Chen, Tailin Wu. GenCP: Towards Generative Modeling Paradigm of Coupled physics with Application to Fluid-Structure Interaction. (Paper, Github Repo.) (ICLR 2026)
4. Peiyan Hu, Haodong Feng, Hongyuan Liu, Tongtong Yan, Wenhao Deng, **Tianrun Gao**, Rong Zheng, Haoren Zheng, Chenglei Yu, Chuanrui Wang, Kaiwen Li, Zhi-Ming Ma, Dezhi Zhou, Xingcai Lu, Dixia Fan, Tailin Wu. RealBench: A Benchmark for Complex Physical Systems with Real-World Data. (Paper, Project page, Github repo.) (ICLR 2026, Oral)
5. Tian Xia, **Tianrun Gao**, Wenhao Deng, Long Wei, Xiaowei Qian, Jiang Yixian, Chenglei Yu, Tailin Wu. BuildArena: A Physics-Aligned Interactive Benchmark of LLMs for Engineering Construction. (Paper, Project page, Github repo, Demo.) (ICML 2026)
6. Ruiqi Shu, Xiaohui Zhong, Qiusheng Huang, Ruijian Gou, **Tianrun Gao**, Hao Li, Xiaomeng Huang. HybridOM: Hybrid Physics-Based and Data-Driven Global Ocean Modeling with Efficient Spatial Downscaling. (Paper.) (ICML 2026)
7. Xizhi Tian, Wenhao Deng, Yanqing Shen, Zhikai Chen, Hang Chen, **Tianrun Gao**, Long Wei. Occam's Progressive Harness for Agentic Migration of Legacy Scientific Program. (Submitted to ICLR 2027)
8. **Tianrun Gao**, Dongming Zhang, Xiaomin Liu, Hongwei Huang. Data-based Risk Evaluation on 4 Overlapped Existing Subway Tunnels Undercrossed by Shield Tunneling. ITA WTC 2025, Stockholm, Sweden, 2025.
9. **Tianrun Gao**, Dongming Zhang, Hongwei Huang. Experimental Study on Tunneling-Induced Disturbance and Propagation in Complex Environment. 2025 PIARC, Chongqing, China, 2025.
10. **Tianrun Gao**, Dongming Zhang, Hongwei 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, Chengdu, China, 2024.
11. **Tianrun Gao**, Jianwei Jia, Xiaomin Liu, Wenjun Zhang, Hongwei 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.

**Publications:**

1. Hongwei Huang, **Tianrun Gao**, Dongming Zhang. A Hybrid Approach for Modifying Tunneling-Induced Response in Existing Multi-Tunnel Environment. Computers and Geotechnics, 2025, 179, 106921.
2. Jianzhong Zhang, **Tianrun Gao**. Compressibility of Abnormal Pressure Gas Reservoirs and its Effect on Reserves. ACS omega, 2021, 6(40): 26221-26230.
3. Rui Jia, **Tianrun Gao**, Gang 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.

**Patents:**

1. Hongwei Huang, Jinzhang Zhang, **Tianrun Gao**, Dongming 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. Zhixing Chang, Xuesong Cheng, Hongfei Cheng, **Tianrun 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)*
3. Zhixing Chang, Xuesong Cheng, Hongfei Cheng, **Tianrun 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)*

## Other information

·Self-motivated, with a passion for learning and the capability to efficiently master new knowledge.

·Physically fit and passionate about sports, served as a member of Tianjin University Rowing Team wining 1st 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.