Jichuan Tang

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EDUCATIONAL BACKGROUND

University of Notre Dame, USA — Aug 2023 – Present

Ph.D. in Civil Engineering (Advisor: Prof. Patrick Brewick) — Core GPA: 3.70/4.00

Ph.D. Minor in High Performance and Scientific Computing

• Core Courses: *Bayesian Data Assimilation and Parameter-State Estimation in Scientific Computing, Applied Probability and Statistical Computing Methods, Neural Networks, Optimization, Linear System, Mathematical Method, Structural Dynamics, Computational Fluid Dynamics etc.*

Tianjin University, CN — Sep 2019 – Jun 2022

M.S in Civil Engineering (Advisor: Prof. Ning Li) — Core GPA 3.70/4.00

• Core Courses: *Computer-aided Structural Design, Earthquake Engineering, Elastoplastic Mechanics, Engineering Structure Seismic Theory and Application, High-rise Building Structural Design Theory, etc.*

• Thesis: Research on control method for real-time hybrid simulation based on reinforcement learning.

Hubei University of Technology, CN — Sep 2015 – Jun 2019

B.S. in Civil Engineering — Core GPA 3.50/4.00

• Core Courses: *Fluid Mechanics, Principles of Steel Structure Design, Bridge Engineering, Subgrade and Pavement Engineering, Engineering Project Management, etc.*

PROFESSIONAL EXPERIENCE

Teaching Assistant — Aug 2023 – Present

Dept. of Civil and Environmental Engineering & Earth Sciences, University of Notre Dame, Note Dame, IN
Course: *Structural Steel Design, Civil Engineering Materials, Structural Dynamics.*

Full-time Research Assistant (Advisor: Prof. Weixin Ren) — Oct 2022 – Jul 2023

Key Laboratory for Resilient Infrastructures of Coastal Cities, Shenzhen University, Shenzhen, CN

Exchange Master Student (Advisor: Prof. Yuguang Fu) — Jan 2022 – Sep 2022

School of Civil and Environmental Engineering, Nanyang Technological University, Singapore, SG

Intern, Finite Elements Model Analysis — Jun 2019 – Aug 2019

China Railway Bridge Science Research Institute, Ltd, Wuhan, CN

Intern, Slope Monitoring Technician — Jul 2018 – Aug 2018

China Construction Third Engineering Bureau Co. Ltd, Wuhan, CN

SCHOLARSHIPS AND AWARDS

- **UPR-ND Winter School for Scientific Artificial Intelligence (SAI)**, Sponsored By the University of Puerto Rico and the University of Notre Dame, 2026
- **Scientific Artificial Intelligence Graduate Fellowship**, Awarded by University of Notre Dame, 2025
- **CSC Scholarship - International Cooperation Program for Innovative Talents**, funded by China Scholarship Council (Grant No. 202106250142), 2022
- **Advanced Individual Award in Science and Technology Innovation**, awarded by Tianjin University, 2022
- **Graduate with Honors (Summa Cum Laude)**, awarded by Tianjin University, 2022
- **Merit-based Scholarship**, awarded by Tianjin University, 2019-2022
- **Outstanding Bachelor Graduate Award**, awarded by Hubei University of Technology, 2019

SKILLS

- **Programming**: MATLAB/Simulink, Python (PyTorch, TensorFlow, Numpy, Pandas), LaTeX
- **Software**: LabView, MIDAS/Civil, ABAQUS, ANSYS/Fluent, OpenSees, AutoCAD, Origin
- **Laboratory**: Shaking Table, MTS244 Hydraulic Actuators & Servo Valves, Servotest, Manufacturing
- **Algorithm**: Deep Learning, Reinforcement Learning, Neural Operators, Diffusion Model, Transfer Learning, Foundation model, Control Theory, Bayesian Updating

RESEARCH PROJECTS

Using DeepONets to Create Spatio-temporal Surrogates for Dynamical Systems Oct 2024 – May 2025
University of Notre Dame, USA

- Spatio-temporal full-field DeepONet yields multiple dynamical outputs in single pass
- Surrogate expressiveness maximized by enhancing branch-trunk interactions
- Dynamical inter-dependencies addressed by inherently encoding spatial correlations
- Three DeepONet architectures employed to predict cable-stayed bridge model dynamics
- Full-field DeepONet provides most accurate predictions with greatest efficiency

Leveraging Multi-Fidelity Models for Computational Shock Response Prediction Aug 2023 – Oct 2024
Funded by Office of Naval Research (ONR): N00014-22-1-2508 University of Notre Dame, USA

- Performed model analysis of ship structures to impulsive loading inputs, and discerned the full discrepancies between the low- and high-fidelity models
- Conducted a comprehensive parametric study of Deep Operator Networks (DeepONets) and Recurrent Neural Networks (RNN, LSTM, GRU) for residual modeling
- Implemented multi-fidelity surrogates by leveraging transfer learning and residual learning strategies

Urban Smart Transportation and Safety Maintenance Oct 2022 – Jul 2023
Funded by National Key R&D Program of China (2019YFB2102702) Shenzhen University, CN

- Conducted denoising calibration and performance evaluation of MEMS accelerometers using Generative Adversarial Networks (GANs)
- Developed a LabVIEW-based host computer for MEMS accelerometer server and performed durability testing
- Debugged hardware links of synchronization systems on tunnel diagnosis vehicles for hidden disease detection

Human-induced Vibration Control of Footbridge with Reinforcement Learning Jan 2022 – Sep 2022
Funded by MOE AcRF Tier 1 RS04/21 Nanyang Technological University, SG

- Constructed the dynamics model for the coupled system of concrete pedestrian bridge, human, and semi-active tuned mass damper (STMD)
- Implemented twin delayed deep deterministic policy gradient (TD3) algorithm to enhance STMD and reduce vibration
- Investigated the influence of hyperparameters on control performance and proposed a general RL-based control scheme

RL-based Control Method for Real-Time Hybrid Simulation (RTHS) Sep 2019 – May 2022
Funded by National Key R&D Program of China (2019YFE0112500) Tianjin University, CN

- Developed digital twin model of underwater shaking table to simulate structural behaviors under wave and earthquake loads
- Trained RL agent with deep deterministic policy gradient (DDPG) to improve time-delay and tracking error by up to 7.52% compared to model-based controller
- Extended DDPG with feedforward compensation to more accurately control transfer systems with model uncertainty in RTHS

PUBLICATIONS

[1] **Tang, J.**, Brewick, P.T.*, 2026. Reinforcement Learning for Active Solution Operators of Nonlinear Systems, *Computer Methods in Applied Mechanics and Engineering* (In preparation).

[2] **Tang, J.**, An, D., Brewick, P.T.*, 2026. InvSHMDiff: Conditional Diffusion Model for Solving Inverse Problem in Structural Dynamics from Sparse Measurements, *Engineering Applications of Artificial Intelligence* (In preparation).

[3] **Tang, J.**, McClarren, R.G., Sweet, C., Brewick, P.T.*, 2025. A Full-field Extended Deep Operator Network as a Spatio-temporal Surrogate for Structural Dynamics, *Engineering structures* (Under Review).

[4] Brewick, P.T.*, **Tang, J.**, 2024. Leveraging Multi-Fidelity Models for Computational Shock Response Prediction, *Technical Report for office of Naval Research (ONR)*.

[5] **Tang, J.**, Fu, Y.*, Li, N., Xie, Y.L., 2024. Footbridge Vibration Mitigation Using Deep Reinforcement Learning Considering Pedestrian Uncertainty and Human-structure Interaction, *Journal of Vibration and Control* (Under Review).

[6] Li, N.*, **Tang, J.**, Li, Z.X.*, and Gao, S., 2022. Reinforcement Learning Control Method for Real-time Hybrid Simulation based on Deep Deterministic Policy Gradient Algorithm, *Structural Control and Health Monitoring*, vol. 29, no. 10, e3035 (**Co-first author**).

[7] **Tang, J.**, Li, N.*, and Li, Z.X., 2022. Underwater Shaking Table Time Delay Compensation and Control Optimization based on Reinforcement Learning, *Engineering Mechanics*, vol. 40, no. 12, pp. 65–75.

[8] Xie, Y.L., **Tang, J.**, and Ren W.X., 2024. Denoising Calibration and Performance Evaluation of Low-frequency MEMS Wireless Sensors based on Generative Adversarial Network, *Engineering Mechanics Institute Conference and Probabilistic Mechanics & Reliability Conference (EMI/PMC 2024)*, Chicago, IL.