Curriculum Vitae: Tian-Zhi Li

Basic Information

Tian-Zhi Li

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Tian-Zhi is a final-year PhD student at School of Advanced Manufacturing and Robotics, Peking University. Also, he is currently a visiting PhD student (Dec-2024 - Dec-2025) at Nanyang Technological University (NTU), Singapore. Prior to that, he received his B.Sc. in Mathematics from Beijing Institute of Technology (BIT) in 2021.

His research interest lies in the field of **Dynamics** and **Control** of robot systems. He is especially interested in leveraging **differential geometry** and **physical principles** to develop computationally efficient algorithms for robot dynamics, control, estimation, and learning with sound theoretical guarantees. Specifically, they include:

(a) **Geometric Dynamics** & **Control** (for robot multi-body systems)

(b) **Structure-Preserving Algorithms** (variational integrators)

(c) **Geometric Estimation** & **Filtering** (for robotic and flexible systems)

(d) **Physics-Informed Learning on Manifolds** (e.g., rigid-body dynamics of robots)

Education

Peking University, Beijing — Sep 2021 - Jun 2026
Ph.D. Student (Mechanical Systems and Control)

Nanyang Technological University, Singapore — Dec 2024 - Dec 2025
Visiting Ph.D. Student (Geometric Mechanics and Control)

Beijing Institute of Technology, Beijing — Sep 2017 - Jun 2021
Bachelor of Science (Mathematics)

Selected Publications

Journal Papers

[J1] Tianzhi Li and Jinzhi Wang, Variational Unscented Kalman Filter on Matrix Lie Groups, **Automatica**, 172: 111995, 2025 (Regular Paper). [Paper Link]

[J2] Tianzhi Li and Jinzhi Wang, Physics-Informed Gaussian Process Learning on Lie Groups, **Journal of Guidance, Control, and Dynamics**, in press, doi: 10.2514/1.G008754. [Paper Link]

[J3] Tianzhi Li, Rui Fu, and Jinzhi Wang, Reduced Dynamics and Geometric Optimal Control of Nonequilibrium Thermodynamics: Gaussian Case, **Automatica**, 164: 111626, 2024 (Regular Paper). [Paper Link]

[J4] Tianzhi Li, Jinzhi Wang, and Zhisheng Duan, Structure-Preserving Unscented Kalman Filter for Planar Mobile Robots, **IEEE Control Systems Letters**, vol. 9, pp. 2157-2162, 2025. [Paper Link]

Conference Papers

[C1] Tianzhi Li, François Gay-Balmaz, Donghua Shi, and Jinzhi Wang, Variational Principle for Stochastic Nonholonomic Systems Part I: Continuous-Time Formulation. International Conference on Geometric Science of Information (**GSI'25**), Saint-Malo, France, in press, 2025.

[C2] Tianzhi Li, François Gay-Balmaz, Donghua Shi, and Jinzhi Wang, Variational Principle for Stochastic Nonholonomic Systems Part II: Stochastic Nonholonomic Integrator. International Conference on Geometric Science of Information (**GSI'25**), Saint-Malo, France, in press, 2025.

[C3] Tianzhi Li and Jinzhi Wang, A Structure-Preserving Learning Scheme on SO(3), 2024 43rd IEEE Chinese Control Conference (**CCC'24**), Kunming, China, 2024, pp. 5149-5152.

[C4] Tianzhi Li and Jinzhi Wang, Multisymplectic Unscented Kalman Filter for Geometrically Exact Beams. In : Nielsen, F., Barbaresco, F. (eds) International Conference on Geometric Science of Information (**GSI'23**). Lecture Notes in Computer Science, Saint-Malo, France, vol. 14072, pp. 60-68, Springer Verlag.

Honors and Awards

- National Scholarship (only 5 awardees at SAMR, PKU), by China Ministry of Education, Sep-2025
- Presidential Doctoral Scholarship, by Peking University, Jun-2025
- College of Engineering Presidential Scholarship - First Prize, by Peking University, Oct-2024
- Outstanding Teaching Assistant Award, by Peking University, Mar-2024/Apr-2023 (twice)