# Tian-Zhi Li

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## Basic Information

Tian-Zhi is a final-year PhD student at Peking University (PKU), and also currently a visiting student (Dec 2024 - Dec 2025) at Nanyang Technological University (NTU), Singapore. 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 **control**, **estimation**, and **learning** with sound theoretical guarantees.

## Education

**Peking University** Sep 2021 - Jul 2026
Ph.D. Student (Dynamical Systems and Control)

**Nanyang Technological University** Dec 2024 - Dec 2025
Visiting Ph.D. Student (Mechanics and Control)

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

## Teaching Experience

**Teaching Assistant**, Peking University Sep 2023 - Dec 2023
Ordinary Differential Equations
- Recieved *Excellent Teaching Assistant Award* (second time)

**Teaching Assistant**, Peking University Sep 2022 - Dec 2022
Linear Algebra
- Recieved *Excellent Teaching Assistant Award*

**Teaching Assistant**, Peking University Mar 2022 - Jun 2022
Analytic Mechanics

## Publications

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

[2] **T. Li**, R. Fu, and J. Wang, Reduced Dynamics and Geometric Optimal Control of Nonequilibrium Thermodynamics: Gaussian Case, **Automatica** (Regular Paper), 164: 111626, 2024. [Paper Link]

[3] **T. Li** and J. Wang, Physics-Informed Gaussian Process Learning on Lie Groups, **Journal of Guidance, Control, and Dynamics**, 48 (11), pp. 2654-2662, 2025. [Paper Link]

[4] **T. Li**, J. Wang, and Z. Duan, Structure-Preserving Unscented Kalman Filter for Planar Mobile Robots, **IEEE Control Systems Letters**, vol. 9, pp. 2157-2162, 2025. [Paper Link]

[5] **T. Li**, F. Gay-Balmaz, D. Shi, and J. Wang, Variational Principle for Stochastic Nonholonomic Systems **Part II**: Stochastic Nonholonomic Integrator. In: Nielsen, F., Barbaresco, F. (eds) Geometric Science of Information (**GSI'25**), Saint-Malo, France, vol. 16034, pp. 225-233. Springer, 2026. [Paper Link]

[6] **T. Li**, F. Gay-Balmaz, D. Shi, and J. Wang, Variational Principle for Stochastic Nonholonomic Systems **Part I**: Continuous-Time Formulation. In: Nielsen, F., Barbaresco, F. (eds) Geometric Science of Information (**GSI'25**), Saint-Malo, France, vol. 16034, pp. 204-213. Springer, 2026. [Paper Link]

[7] **T. Li** and J. Wang, A Structure-Preserving Learning Scheme on SO(3), 2024 43rd IEEE Chinese Control Conference (**CCC'24**), Kunming, China, 2024, pp. 5149-5152. [Paper Link]

[8] **T. Li** and J. 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. [Paper Link]

[9] **T. Li** and J. Wang, A Physics-Informed Gaussian Process Regression Algorithm for The Dynamics of The Planar Pendulum, 2023 42nd IEEE Chinese Control Conference (**CCC'23**), Tianjin, China, pp. 5163-5167, 2023. [Paper Link]

[10] **T. Li** and J. Wang, A Statistical Dynamical Algorithm for Gaussian Multi-Agent Systems Under Hamel's Formalism, 34th IEEE Chinese Control and Decision Conference (**CCDC'22**), Hefei, China, pp. 1344-1349, 2022. [Paper Link]

## Honors and Awards

**National Scholarship** (top 1%) Sep-2025
By China Ministry of Education

**Presidential Doctoral Scholarship** Jun-2025
By Peking University

**Merit Student Award** (top 1%, only 3 awardees at SAMR, PKU) Sep-2025
By Peking University

**Excellent Innovation Award** (top 1%, only 2 awardees at SAMR) Sep-2025
By Peking University

**Dean's Scholarship - First Prize** Oct-2024
By College of Engineering, Peking University

**Yuehua Luo Scholarship** Nov-2024
By Peking University

**Excellent Teaching Assistant Award** Mar-2024 / Apr-2023
By College of Engineering, Peking University

## References

**Professor Zhisheng Duan**
Position: Professor of Dynamics and Control
Deputy Director of State Key Laboratory for Turbulence & Complex Systems
Affiliation: Peking University
E-mail: duanzs@pku.edu.cn

**Professor François Gay-Balmaz**
Position: Associate Professor of Mathematics
Affiliation: Nanyang Technological University
E-mail: francois.gb@ntu.edu.sg

**Professor Donghua Shi**
Position: Associate Professor of Mathematics
Director of Beijing Key Laboratory on MCAACI
Affiliation: Beijing Institute of Technology
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**Professor Jinzhi Wang**
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