

Zitong Tian

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EDUCATION

2023 – 2028	PhD (Mathematics) at Qiuzhen College, Tsinghua University (GPA: 3.99/4.0) Advisor: Prof. Juncai He Passed PhD Qualify: <i>Analysis & PDE(2024 Spring), Probability & Statistics(2024 Spring), Artificial Intelligence(2025 Spring), Quantum & Classical & Statistical Mechanics(2025 Spring).</i>
2023.02 – 2023.06	Enhanced Program for Graduate Study at Beijing International Center for Mathematical Research, Peking University
2019 – 2023	Bachelor's Degree in Mathematics and Applied Mathematics(Wu Wenjun Program) at School of Mathematics Science, Shanghai Jiao Tong University (GPA: 4.05/4.3, Rank: 1/18)

RESEARCH EXPERIENCE

Machine Learning Theory & Scientific Computing

May 2025 – Present

- Derived sharp L^p Sobolev Sandwich embedding for shallow neural network spaces via microlocal analysis, generalizing prior L^2 results to L^p and characterizing the new function classes learnable without the curse of dimensionality. *Under review.*
- Built an interpretable solver for conservation-law PDEs, finding observable convergence rate of relative L^2 error. *Under review.*

Generative Modeling for Molecules and Peptides

Dec 2024 – Feb 2026

- Designed a fixed-length autoencoder mapping variable-size molecular graphs to a continuous latent space. This work is accepted to NeurIPS 2025.
- Proposed Axial Feature Injection, embedding chirality (a symmetry constraint) directly into the architecture with explainable guarantees. This work is accepted to ICML 2026.

TALKS

- Radon transforms and a new proof of density correspondence with critical Sobolev space.* 2026 Peking University Lectures on Applied Mathematics , Peking University. *Jul, 2026.*
- Sharp Sobolev Sandwich and Approximation for Radon domain Spaces.* International Conference on Scientific Computation and Differential Equations (SciCADE) , University of Edinburgh. *Jul, 2026.*

INTERNSHIP

Research Intern at [Sapient Intelligence](#)

Apr 2026 – Sep 2026

- Research on new generative models for images, especially on Diffusion, CFM and Optimal Transport.

TEACHING

Teaching Assistant, Machine Learning and Differential Equations	Sep 2025 – Jan 2026
Teaching Assistant, Probability II	Sep 2024 – Jan 2025
Teaching Assistant, Analysis II	Feb 2024 – Jun 2024
Teaching Assistant, Ordinary Differential Equations	Sep 2023 – Jan 2024

PUBLICATIONS

$(\alpha - \beta)$ denotes alphabetical authorship; * denotes equal contribution.

Juncai He and **Zitong Tian** $(\alpha - \beta)$ (2026). *Sharp Sobolev Sandwich and Approximation Rates of Radon-Domain L^p Ridge Integral Spaces for $ReLU^k$ Networks*. arXiv: [2606.24795 \[math.NA\]](#).

Juncai He, Xinliang Liu, and **Zitong Tian** $(\alpha - \beta)$ (2026). *Divergence-Free Linearized Neural Networks: Integral Representation and Optimal Approximation Rates*. arXiv: [2603.28638 \[math\]](#).

Ziyi Yang*, **Zitong Tian***, Yinjun Jia*, Tianyi Zhang, Jiqing Zheng, Hao Wang, Yubu Su, Juncai He, Lei Liu, and Yanyan Lan (2026). “Cross-Chirality Generalization by Axial Vectors for Hetero-Chiral Protein-Peptide Interaction Design”. In: *ICML, 2026*. URL: <https://arxiv.org/abs/2602.20176>.

Zitao Chen*, Yinjun Jia*, **Zitong Tian***, Wei-Ying Ma, and Yanyan Lan (2025). “Manipulating 3D Molecules in a Fixed-Dimensional E(3)-Equivariant Latent Space”. In: *NeurIPS, 2025*. URL: <https://arxiv.org/abs/2506.00771>.

AWARDS

Ph.D. Period

Outstanding Student Leader of Tsinghua University	2026
The Comprehensive First-Class Scholarship of Tsinghua University	2025
Outstanding Communist Youth League Member	2024

Undergraduate Period

Outstanding Graduate of Shanghai Municipality	2023
Academic Excellence Scholarship, Dong Scholarship, Liu Yongling Scholarship	2020-2023
Outstanding Communist Youth League Member, “Three Goods” Student	2020-2022
Men’s 400m, University Track and Field Games	6th Place
Men’s 1500m, University Track and Field Games	9th Place

Middle School Period

China National Mathematics Olympiad	First Prize
China Southeast Mathematical Olympiad	Golden Medal
President’s Cup Football Tournament	Champion
Men’s 800m, Track and Field Games	3rd Place
Provincial-Level “Three Goods” Student	

SKILLS

Solid math and statistics background, Python Coding skills.