Tianze Luo

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Education

Institute for Interdisciplinary Information Sciences, Tsinghua University *Sep. 2022 – Present*
BS in Computer Science and Technology (Yao Class)
∘ GPA: 3.91/4.00, Rank: 16/94

Research Interests

My research interests mainly focus on generative models across various data modalities, including image, video, audio, speech, and language.

Publications & Preprints

[1] **WaveFM: A High-Fidelity and Efficient Vocoder Based on Flow Matching**
Tianze Luo, Xingchen Miao, Wenbo Duan
NAACL 2025, Main Conference
[PDF] [Code]

[2] **BSLM: A Bi-Level Speech-Language Model for the Joint Modeling of Discrete and Continuous Tokens**
Tianze Luo, Zixin Wang, Kaizhi Qian, Yang Zhang, Chuang Gan
AAAI 2026 Workshop on Audio-Centric AI
[PDF]

[3] **SoFlow: Solution Flow Models for One-Step Generative Modeling**
Tianze Luo, Haotian Yuan, Zhuang Liu
Under Review at ICLR 2026 (Review Score: **Top 20%** among 19619 submissions)
[PDF] [Code]

[4] **SoundVCM: Efficient Video-to-Audio Generation with Velocity Consistency Models**
Tianze Luo, Xingchen Miao, Yang Zhang, Lie Lu, Chuang Gan
Under Review at CVPR 2026
[PDF]

Research Experiences

Research Assistant (Image Generative Models)
Advisor: Prof. Zhuang Liu, Princeton University *Jun. 2025 – Present*

- Proposed a novel framework that learns the ODE **solution function** directly, enabling high-quality **one-step generation** without iterative solvers.
- Designed a **Solution Consistency Loss** to eliminate the expensive **Jacobian-Vector Product (JVP)** calculation, significantly improving training efficiency and stability.
- Incorporated **Training-time CFG** into the flow matching objective, achieving SOTA performance on ImageNet 256×256 (FID 2.96) with 1-NFE training from scratch.

Research Assistant (Speech-Language Models & Audio Generation)
Advisor: Prof. Chuang Gan, UMass Amherst | MIT-IBM Watson AI Lab *Mar. 2025 – Nov. 2025*

- **Project BSLM:** Proposed a bi-level architecture integrating a large transformer with a flow-matching model to jointly generate discrete text and continuous speech tokens, eliminating vector quantization errors. Achieved comparable performance to discrete SpeechLMs with significantly fewer training tokens via a novel grouped token mechanism.

- **Project SoundVCM:** Developed a velocity consistency model for **single-step** foley audio generation from video. Designed a novel training objective to learn the ground-truth average velocity field and integrated **Training-time CFG**, outperforming distillation baselines in audio-visual alignment and efficiency.

Independent Researcher (Speech and Audio Synthesis)
Independent Project (No advisor), Tsinghua University   *Jun. 2024 – Feb. 2025*
- Proposed **WaveFM**, a reparameterized flow matching model utilizing a mel-conditioned prior to align energy distributions and reduce sampling steps.
- Designed a novel multi-resolution STFT loss incorporating phase and gradient constraints, and implemented a specialized consistency distillation method, enabling single-step generation with superior quality (3.88 PESQ) and $300\times$ real-time speed.
- Conducted extensive experiments showing the model outperforms strong baselines (e.g., BigVGAN) and generalizes well to out-of-distribution music data.

Teaching Services

○ **Teaching Assistant**: Object-Oriented Programming Course (by Prof. Ju Ren)

Honors and Awards

Technological Innovation Scholarship, Tsinghua University	*2025*
Academic Excellence Scholarship, Tsinghua University	*2023, 2024*
First Prize, Tencent Rhino Bird Science Talent Training Program (Middle School Track)	*2021*
First Prize of Senior Group, National Olympiad in Informatics in Provinces (NOIP)	*2020*
First Prize of Senior Group, CCF Certified Software Professional (Algorithmic Competition)	*2020*

Selected Courses

CATEGORY	COURSE	GRADES
Major: Artificial Intelligence	Computer Vision	A+
	Natural Language Processing	A+
	Machine Learning	A
	Deep Learning	A
	Embodied Artificial Intelligence	A
	Advanced Computer Graphics	A
	AI+X Computing Acceleration	A
Minor: Mathematics	Calculus A(1) / A(2)	A+ / A
	Advanced Topics in Linear Algebra / Linear Algebra	A+ / A
	Algebra and Computation	A+
	Probability Theory(1)	A+
	Differential Geometry	A
	Ordinary Differential Equations	A
	Abstract Algebra	A
	Introduction to Complex Analysis	A
Research	Research Immersion Training	A