

ZEWEI ZHANG

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McMaster University, Hamilton, Ontario, Canada

Research interests: AI systems that continually improve from interaction and experience; generative world models; long-horizon evaluation; learning-guided search.

Education

McMaster University	Hamilton, Canada
Ph.D. Candidate in Electrical & Computer Engineering; Supervisor: Prof. Jun Chen	Sep 2022–Present
University of British Columbia	Vancouver, Canada
Visiting Ph.D. Student; Host: Prof. Renjie Liao	Jun 2025–Mar 2026
Zhejiang Gongshang University	Hangzhou, China
B.S. in Telecommunication Engineering	Sep 2018–Jun 2022

Publications

- **TrajLoom: Dense Future Trajectory Generation from Video.**
Zewei Zhang, Jia Jun Cheng Xian, Kaiwen Liu, Ming Liang, Hang Chu, Jun Chen, and Renjie Liao. arXiv preprint, 2026.
(Paper — Project — Code)
- **Boolean Satisfiability via Imitation Learning.**
Zewei Zhang, Huan Liu, Yuanhao Yu, Jun Chen, and Xiangyu Xu. ICLR, 2026.
(Paper — Code)
- **GoodDrag: Towards Good Practices for Drag Editing with Diffusion Models.**
Zewei Zhang, Huan Liu, Jun Chen, and Xiangyu Xu. ICLR, 2025.
(Paper — Project — Code)

Additional manuscripts under review: contributing author on two UBC-led manuscripts on long-video editing evaluation and few-step video editing. Titles omitted while under review.

Industry Experience

Amazon	Toronto, Canada
Applied Scientist Intern	May 2026–Present
<ul style="list-style-type: none">• Developing a human-guided video-to-video motion editing model that maps high-level motion instructions and user modification intents into dense trajectory controls for controllable generative video editing.• Designing trajectory-conditioning and evaluation pipelines for a customized V2V generative model, targeting motion fidelity, edit controllability, source preservation, and temporal consistency.	

Research Experience

University of British Columbia	Vancouver, Canada
Visiting Ph.D. Student (Host: Prof. Renjie Liao)	Jun 2025–Mar 2026
<ul style="list-style-type: none">• TrajLoom: dense future trajectory generation from video. Developed a generative trajectory-prediction framework that models future dense point trajectories and visibility from observed video context, turning past visual motion into predictive representations for long-horizon video generation and editing.<ul style="list-style-type: none">– Built trajectory representations and generative components based on grid-anchor offset encoding, compact spatiotemporal latent modeling, and flow-based future trajectory generation.– Introduced benchmark and evaluation protocols for dense future trajectory generation across real and synthetic videos, improving long-horizon motion realism and stability.	

- **Long-video editing evaluation.** Contributing author on a UBC-led manuscript under review on long-video editing evaluation; titles omitted while under review.
 - Contributed to evaluation protocols for long-horizon editing behavior, including background preservation, prompt alignment, temporal consistency, error accumulation, and temporal instability over extended videos.

McMaster University

Hamilton, Canada

Ph.D. Student (Supervisor: Prof. Jun Chen)

Sep 2022–Present

- **ImitSAT (ICLR 2026): learning-guided combinatorial search.** Developed an imitation-learning branching policy for conflict-driven clause learning SAT solvers, using compact expert decision traces to guide discrete search.
 - Extracted KeyTraces by compressing solver trajectories into high-value branching decisions that survive backtracking; replaying a KeyTrace on the same instance is nearly conflict-free and reduces propagation events to $\sim 4\%$ of the original trail.
 - Trained an autoregressive Perceiver model over DIMACS-formatted formulas and KeyTrace prefixes, integrating learned branching with a small query budget and safe fallback to the solver’s default heuristic.
- **GoodDrag (ICLR 2025): iterative diffusion-based image drag editing.** Developed an alternating drag-and-denoise procedure for diffusion-based image editing, reducing accumulated perturbations during iterative point dragging and improving stability, fidelity, and controllability.
 - Proposed information-preserving motion supervision to reduce feature drift and artifacts during drag-based editing.
 - Contributed the Drag100 benchmark and evaluation metrics, including Dragging Accuracy Index and Gemini Score, for assessing controllability and visual quality.

Zhejiang Gongshang University

Hangzhou, China

Research Assistant (Advisor: Prof. Shengtian Yang)

Dec 2019–Jun 2022

- **Robust public randomness from financial time series.** Built an adversarial-timing-tolerant random-bit generation pipeline for lottery-style public events using financial time-series signals.
 - Collected real-time prices and trading volumes for 1,500+ Shanghai Stock Exchange stocks; extracted near-uniform bits with decorrelation and time-series filtering; strengthened outputs with cryptographic primitives.
 - Validated randomness using the National Institute of Standards and Technology SP 800-22 test suite and performed fault-attack experiments.

Teaching & Awards

COMPENG 3SM4: Algorithm Design and Analysis

Hamilton, Canada

Teaching Assistant, McMaster University (Instructor: Prof. Sorina Dumitrescu)

2022–Present

COMPENG 4SL4: Fundamentals of Machine Learning

Hamilton, Canada

Teaching Assistant, McMaster University (Instructor: Prof. Sorina Dumitrescu)

2022–Present

Meritorious Winner (Top 8%)

Hangzhou, China

Interdisciplinary Contest in Modeling (ICM)

Feb 2020

Skills

Programming: Python, C, MATLAB, L^AT_EX

Frameworks/Tools: PyTorch, JAX, Git, Linux

Methods: diffusion/flow models; generative world models; video/trajectory generation; autoregressive modeling; imitation learning; reinforcement learning; SAT/CDCL; combinatorial optimization; benchmark design; model evaluation

Research Interests: adaptive AI systems; AI Scientist systems; long-horizon prediction and evaluation; learning from feedback and failure; search-guided optimization

Languages: Mandarin (native), English (professional)