Changchang Sun

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Research Focus

- **Generative AI**: Dance-to-Music Generation.
- **Trustworthy ML**: Machine Unlearning, Adversarial Attack.
- **Computer Vision**: Human-Object-Interaction Detection.
- **Retrieval**: Cross-Modal Hashing.

Research Vision

My research vision is to build **controllable and trustworthy AI systems** that generate content with precise cross-modal alignment, support selective model adaptation and unlearning, and understand semantic relationships within and across modalities. My primary focus is **generative AI**, particularly dance-to-music generation, where I study how motion can guide the synthesis of music that follows a performance's rhythmic structure while maintaining audio quality. My work investigates positive and negative temporal conditioning, structured representations of body motion, and supervision of local musical dynamics to improve the correspondence between movement and generated sound. My second major focus is **trustworthy machine learning**, particularly approximate machine unlearning through input-space interventions. I explore how universal input perturbations can induce targeted changes in a fixed classifier's behavior while preserving performance on retained data, and how these interventions can be composed to address new unlearning requests. In **computer vision**, I investigate human-object interaction detection through spatial and semantic reasoning about people, objects, and actions. My work in **cross-modal retrieval** develops compact hashing representations that preserve semantic relationships for efficient retrieval across image and text modalities. Looking ahead, I aim to extend structured conditioning to broader multimodal generation and develop reusable interventions for selective control of generative models. These future studies will examine both the intended changes and the capabilities to preserve, with particular attention to robustness under input variation and adversarial perturbations.

Education

- **University of Illinois Chicago** — *Jan. 2025 - Present (Expected: May 2027)*
  Ph.D. Student in Computer Science, Advisor: Prof. Yan Yan — Chicago, United States
- **Michigan State University** — *Aug. 2023 - May 2025*
  Visiting Student in Computer Science, Advisor: Prof. Sijia Liu — East Lansing, United States
- **Illinois Institute of Technology** — *Aug. 2021 - Dec. 2024*
  Ph.D. Student in Computer Science, Advisor: Prof. Yan Yan (transferred to UIC with advisor) — Chicago, United States
- **Shandong University** — *Aug. 2018 - Jul. 2021*
  M.S. in Computer Science and Technology, Advisor: Prof. Xuemeng Song and Prof. Liqiang Nie — Qingdao, China
- **Shandong University** — *Aug. 2014 - Jul. 2018*
  B.Eng in Computer Science and Technology — Jinan, China

Publications

C=Conference, J=Journal, U=Under Review, *=Equal Contribution

Changchang Sun has co-authored 24 papers published in top-tier machine learning, computer vision, and multimedia venues (ICML, CVPR, AAAI, WACV, SIGIR, among others), including 6 first-authored papers, with 3 additional first-authored papers under review. Full list of publications at **Google Scholar** (854 citations).

First-Authored Publications

[U.1] **Changchang Sun**, Ren Wang, Yihua Zhang, Jinghan Jia, Jiancheng Liu, Gaowen Liu, Yan Yan, Sijia Liu. **Forget Vectors at Play: Universal Input Perturbations Driving Machine Unlearning in Image Classification**.

[U.2] **Changchang Sun**, Lu Cheng, Yan Yan. **Where the Body Keeps the Beat: Structured Motion Conditioning and Music Dynamics Supervision for Dance-to-Music Generation**.

[U.3] **Changchang Sun**, Yan Yan. **PHE-DiT: Phase-aware Hierarchical Energy Conditioning for Flexible-Length Dance-to-Music Generation**.

[C.1] **Changchang Sun**, Vickie Chen, Yan Yan. **SODA: Semantic-Cohesive Knowledge Distillation for Deep Cross-Modal Hashing**. IEEE International Conference on Automatic Face and Gesture Recognition (FG), 2026.

[C.2] **Changchang Sun**, Gaowen Liu, Charles Fleming, Yan Yan. **Enhancing Dance-to-Music Generation via Negative Conditioning Latent Diffusion Model**. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025.

[C.3] **Changchang Sun**, Jialie Shen, Gaowen Liu, Aihua Zheng, Yan Yan. **Tie-Breaking Conflict-Ease Cross-Modal Hashing**. IEEE International Conference on Image Processing Workshops (ICIPW), 2025.

[C.4] **Changchang Sun**, Bin Duan, Hugo Latapie, Gaowen Liu, Yan Yan. **DCT: Divide-and-Conquer Transformer Network with Knowledge Transfer for Query-driven HOI Detection**. ACM International Conference on Multimedia Retrieval (ICMR), 2024.

[C.5] **Changchang Sun**, Hugo Latapie, Gaowen Liu, Yan Yan. **Deep Normalized Cross-Modal Hashing with Bi-Direction Relation Reasoning**. IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), 2022.

[C.6] **Changchang Sun**, Xuemeng Song, Fuli Feng, Wayne Xin Zhao, Hao Zhang, Liqiang Nie. **Supervised Hierarchical Cross-Modal Hashing**. International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR), 2019.

Co-Authored Publications

[C.7] Huiyi Chen, Jiawei Peng*, Dehai Min*, **Changchang Sun***, Kaijie Chen, Yan Yan, Xu Yang, Lu Cheng. **MVI-Bench: A Comprehensive Benchmark for Evaluating Robustness to Misleading Visual Inputs in LVLMs**. International Conference on Machine Learning (ICML), 2026.

[C.8] Junyi Wu, Van Nguyen Nguyen, Benjamin Planche, Jiachen Tao, **Changchang Sun**, Zhongpai Gao, Zhenghao Zhao, Anwesa Choudhuri, Gengyu Zhang, Meng Zheng, Feiran Wang, Terrence Chen, Yan Yan, Ziyan Wu. **Consistent Instance Field for Dynamic Scene Understanding**. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026.

[C.9] Weitai Kang, Luowei Zhou, Junyi Wu, **Changchang Sun**, Yan Yan. **Visual Grounding with Attention-Driven Constraint Balancing**. ACM International Conference on Multimedia (ACM MM), 2025.

[C.10] Nikhil Sharma, **Changchang Sun**, Zhenghao Zhao, Anne Hee Hiong Ngu, Hugo Latapie, Yan Yan. **SSDL: Sensor-to-Skeleton Diffusion Model with Lipschitz Regularization for Human Activity Recognition**. International Conference on Multimedia Modeling (MMM), 2025.

[C.11] Zhiliang Wu, **Changchang Sun**, Hanyu Xuan, Gaowen Liu, Yan Yan. **WaveFormer: Wavelet Transformer for Noise-Robust Video Inpainting**. AAAI Conference on Artificial Intelligence (AAAI), 2024.

[C.12] Bin Duan, Hao Tang, **Changchang Sun**, Ye Zhu, Yan Yan. **Mining and Unifying Heterogeneous Contrastive Relations for Weakly-Supervised Actor-Action Segmentation**. IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2024.

[C.13] Zhiliang Wu, **Changchang Sun**, Hanyu Xuan, Yan Yan. **Deep Stereo Video Inpainting**. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

[C.14] Zhiliang Wu, Hanyu Xuan, **Changchang Sun**, Weili Guan, Kang Zhang, Yan Yan. **Semi-Supervised Video Inpainting with Cycle Consistency Constraints**. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

[C.15] Zhiliang Wu, Kang Zhang, **Changchang Sun**, Hanyu Xuan, Yan Yan. **Flow-Guided Deformable Alignment Network with Self-Supervision for Video Inpainting**. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2023.

[J.1] Xuemeng Song, Chun Wang, **Changchang Sun**, Shanshan Feng, Min Zhou, Liqiang Nie. **MM-FRec: Multi-Modal Enhanced Fashion Item Recommendation**. IEEE Transactions on Knowledge and Data Engineering (TKDE), 2023.

[C.16] Hao Ding, **Changchang Sun**, Hao Tang, Dawen Cai, Yan Yan. **Few-Shot Medical Image Segmentation with Cycle-Resemblance Attention**. IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2023.

[J.2] Zhiliang Wu, **Changchang Sun**, Hanyu Xuan, Kang Zhang, Yan Yan. **Divide-and-Conquer Completion Network for Video Inpainting**. IEEE Transactions on Circuits and Systems for Video Technology (TCSVT), 2022.

[C.17] Junsheng Wang, Tiantian Gong, Zhixiong Zeng, **Changchang Sun**, Yan Yan. **C3CMR: Cross-Modality Cross-Instance Contrastive Learning for Cross-Media Retrieval**. ACM International Conference on Multimedia (ACM MM), 2022.

[J.3] Peng Zhan, **Changchang Sun**, Yupeng Hu, Wei Luo, Jiecai Zheng, Xueqing Li. **Feature-Based Online Representation Algorithm for Streaming Time Series Similarity Search**. International Journal of Pattern Recognition and Artificial Intelligence (IJPRAI), 2020.

[C.18] Fan Liu, Zhiyong Cheng, **Changchang Sun**, Yinglong Wang, Liqiang Nie, Mohan Kankanhalli. **User Diverse Preference Modeling by Multimodal Attentive Metric Learning**. ACM International Conference on Multimedia (ACM MM), 2019.

Work Experience

- **TikTok** *May 2026 - Aug. 2026*
  Research Intern, San Jose, AIGC Content Generation and Video Color Grading
- **Pony.ai** *May 2025 - Aug. 2025*
  Research Intern, Fremont, 3D Object Detection

Invited Talks & Guest Lectures

- **CS 483: Big Data Mining, UIC** (Host: Prof. Diana Mabel Diazh) *Nov.05 2026*
  Forget Vectors at Play: Universal Input Perturbations Driving Machine Unlearning in Image Classification
- **CS 514: Applied Artificial Intelligence, UIC** (Host: Prof. Yan Yan) *Feb.19 2026*
  Diffusion Model for Generative AI
- **CS 483: Big Data Mining, UIC** (Host: Prof. Lu Cheng) *Nov.18 2025*
  Forget Vectors at Play: Universal Input Perturbations Driving Machine Unlearning in Image Classification
- **CS 512: Advanced Machine Learning, UIC** (Host: Prof. Yan Yan) *Oct.13 2025*
  Diffusion Model for Generative AI

Teaching Experience

- **TA for Mathematical Foundations of Computing @UIC** *Fall 2026*
  Instructor: Prof. Mitch Theys and Prof. Drishika Dey
- **TA for Mathematical Foundations of Computing @UIC** *Spring 2026*
  Instructor: Prof. Omar Ibrahim
- **TA for Introduction to Machine Learning @UIC** *Fall 2025*
  Instructor: Prof. Hao Chen
- **TA for Advanced Machine Learning @IIT** *Spring 2022*
  Instructor: Prof. Yan Yan

Conference Organizing Committee

- **Finance Chair** *2025*
  ICMR

Honors and Awards

- **Travel Grant Award** *2022*
  CVPR
- **Excellent Postgraduate** *2019*
  Shandong University
- **Dean Scholarship of School of Computer Science and Technology** *2019*
  Shandong University
- **Travel Grant Award** *2019*
  SIGIR

Academic Services

Conference Reviewer: ICLR'24/25/26, NeurIPS'24/25/26, CVPR'23/24/25/26, WACV'26/27, ECCV'24, ACMMM'21/22/23/24, WWW'25, AAAI'24/26.
Journal Reviewer: TPAMI, TKDE, TOMM, TCSVT, NEUCOM, INS, CVIU.

Mentees

- **Vickie Chen (Bachelor, Rensselaer Polytechnic Institute)** *May. 2025 - Sep. 2025*
  FG'26
- **Zhiliang Wu (PhD, Nanjing University of Science and Technology)** *Jan. 2022 - Aug. 2024*
  CVPR'23 (×2), AAAI'24, TCSVT'22
- **Nikhil Sharma (Master, Illinois Institute of Technology)** *Jul. 2024 - Dec. 2024*
  MMM'25
- **Hao Ding (PhD, Illinois Institute of Technology)** *Jul. 2023 - Oct. 2023*
  WACV'23