

# Zhexiao Xiong

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## BIOGRAPHY

I am a fourth-year CS Ph.D. candidate at Washington University in St. Louis(WashU), advised by **Prof. Nathan Jacobs**. My research interests lie in computer vision and multi-modal learning, with a focus on generative models, vision-language models (VLMs) and AIGC-related topics. In particular: (1) Unifying vision understanding and generation, world models; (2) Controllable & personalized image/video generation and editing; (3) Integration of VLMs with generative models; (4) Generative models for 3D vision, including neural rendering, cross-view synthesis, and novel view synthesis.

## EDUCATION

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| • <b>Washington University in St. Louis</b><br><i>Ph.D. Candidate in Computer Science</i><br>Advisor: <b>Prof. Nathan Jacobs</b> | 2022.08 – 2027.05(Expected)<br>St. Louis, MO, USA |
| • <b>Tianjin University</b><br><i>B.S. in Electrical and Information Engineering</i>   | 2018.09 – 2022.06<br>Tianjin, China               |

## WORK EXPERIENCE

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| • <b>Bosch Research</b> [🌐]<br><i>Research Intern</i><br>◦ Researched on Unified Visual Understanding, Planning and Generation Models for autonomous driving.  | 2025.06 – 2025.09<br>Sunnyvale, CA, USA |
| • <b>OPPO US Research Center</b> [🌐]<br><i>Research Intern</i><br>◦ Researched on text-guided 3D Scene Generation, use Large-language model(LLM)-based dreaming and video generation models to generate both geometric and semantic consistent 3D scene. | 2024.05 – 2024.08<br>Palo Alto, CA, USA |
| • <b>OPPO Research Institute</b> [🌐]<br><i>Research Intern</i><br>◦ Researched on image matting, proposed a framework to use human pose as guidance to achieve whole body matting.   | 2022.02 – 2022.05<br>Beijing, China     |
| • <b>Institute of Automation, Chinese Academy of Sciences(CASIA)</b> [🌐]<br><i>Research Intern</i><br>◦ Researched on model compression and network pruning, especially the application on Vision Transformers.  | 2021.01 – 2022.01<br>Beijing, China     |

## SELECTED PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PRE-PRINT

- [P.1] Zhexiao Xiong, Wei Xiong, Jing Shi, He Zhang, Yizhi Song, Nathan Jacobs. **GroundingBooth: Grounding Text-to-Image Customization**. *Arxiv Pre-print*.
- [P.2] Zhexiao Xiong, Xin Ye, Burhan Yaman, Yiren Lu, Jingru Luo, Nathan Jacobs, Liu Ren. **UniDrive-WM: Unified Understanding, Planning and Generation World Model For Autonomous Driving**. *In Submission*.
- [P.2] Zhexiao Xiong, Yizhi Song, Liu He, Wei Xiong, Yu Yuan, Feng Qiao, Nathan Jacobs. **PhysAlign: Physics-Coherent Video Generation through Feature and 3D Representation Alignment**. *In Submission*.
- [C.1] Zhexiao Xiong, Zhang Chen, Zhong Li, Yi Xu, Nathan Jacobs. **PanoDreamer: Consistent Text to 360-Degree Scene Generation**. In *CVPR Workshops (CV4Metaverse)*, 2025.
- [C.2] Wanzhou Liu\*, Zhexiao Xiong\*, Xinyu Li, Nathan Jacobs. **DeclutterNeRF: Generative-Free 3D Scene Recovery for Occlusion Removal**. In *CVPR Workshops (CV4Metaverse)*, 2025.
- [C.3] Feng Qiao, Zhexiao Xiong, Eric Xing, Nathan Jacobs. **GenStereo: Towards Open-World Generation of Stereo Images and Unsupervised Matching**. *International Conference on Computer Vision(ICCV)*, 2025.
- [C.4] Feng Qiao, Zhexiao Xiong, Xinge Zhu, Yuexin Ma, Qiumeng He, Nathan Jacobs. **MCPDepth: Omnidirectional Depth Estimation via Stereo Matching from Multi-Cylindrical Panoramas**. In *IEEE/CVF Winter Conference on Applications of Computer Vision(WACV)*, 2026.
- [C.5] Zhexiao Xiong, Feng Qiao, Yu Zhang, Nathan Jacobs. **StereoFlowGAN: Co-training for Stereo and Flow with Unsupervised Domain Adaptation**. In *British Machine Vision Conference(BMVC)*, 2023.
- [C.6] Xin Xing, Zhexiao Xiong, Abby Stylianou, Srikumar Sastry, Liyu Gong, Nathan Jacobs. **Vision-Language Pseudo-Labels for Single-Positive Multi-Label Learning**. In *CVPR Workshops(CVPRW)*, 2024.
- [C.7] Subash Khanal, Eric Xing, Srikumar Sastry, Aayush Dhakal, Zhexiao Xiong, Adeel Ahmad, Nathan Jacobs. **PSM: Learning Probabilistic Embeddings for Multi-scale Zero-Shot Soundscape Mapping**. In *ACM Multimedia(ACM MM)*, 2024.
- [J.1] Zhexiao Xiong, Xin Xing, Scott Workman, Subash Khanal, Nathan Jacobs. **Mixed-View Panorama Synthesis using Geospatially Guided Diffusion**. *Transactions on Machine Learning Research(TMLR)*, 2025.
- [J.2] Nanfei Jiang, Zhexiao Xiong, Hui Tian, Xu Zhao, Xiaojie Du, Chaoyang Zhao, Jinqiao Wang. **PruneFaceDet: Pruning lightweight face detection network by sparsity training**. *Cognitive Computation and Systems*, 2022.

## PROJECTS

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- **Unified Understanding, Planning and Generation model for Autonomous Driving** 2025.06 – 2025.11  
*Research Project during internship at Bosch Research*
  - Developed a **world-model**-based framework that unifies trajectory planning and autoregressive future image generation, enhanced with Chain-of-Thought reasoning within a single **vision-language model (VLM)**.
  - Enabled visual thinking, leading to more accurate and robust decision-making, and demonstrated significant gains on vision-language planning(VLP) benchmarks.
- **Physically Coherent Video Generation** 2025.02 – 2025.11
  - Proposed a framework that leverages **vision-language model(VLM)**'s physics understanding to enable video generation with physically consistent motion and accurate 3D dynamics.
  - Achieved physically plausible video generation by combining relational alignment with foundation video understanding models, physics-aware feature encoding, and 3D geometry alignment.
- **Grounded text-to-image Customization** 2024.01 – 2024.09  
*Collaboration with Adobe Research* [🌐]
  - Proposed a framework that achieved zero-shot instance-level spatial grounding on both foreground subjects and background objects in the text-to-image customization task, enabling the customization of multiple subjects.
  - Our work is the first work to achieve a joint grounding on both subject-driven foreground generation and text-driven background generation.
  - Results show the effectiveness of our model in text-image alignment, identity preservation, and layout alignment.
- **Text to 360-Degree Scene Generation** 2024.05 – 2024.11  
*Research Project during internship at OPPO US Research Center*
  - Proposed a holistic text to 360-degree scene generation pipeline, which achieved consistent text-to-360-degree scene generation with customized trajectory-guided scene extension.
  - Introduced semantically guided novel view synthesis into the refinement of 3D-GS optimization, reducing artifacts and improving geometric consistency.
- **Mixed-View Panorama Synthesis Using Geospatially-Guided Diffusion** 2023.05 – 2023.11  
[🌐]
  - Introduced the task of mixed-view panorama synthesis, where the goal is to synthesize a novel panorama given a small set of input panoramas and a satellite image of the area.
  - Introduced an approach that utilizes diffusion-based modeling and an attention-based architecture for extracting information from all available input imagery.
- **Open-World Generation of Stereo Images and Unsupervised Matching** 2024.09 – 2025.03  
[🌐]
  - Proposed GenStereo, a novel diffusion-based framework for open-world stereo image generation with applications in unsupervised stereo matching.
- **Co-training for Stereo and Flow with Unsupervised Domain Adaptation** 2023.01 – 2023.05  
[🌐]
  - Built an end-to-end joint learning framework to combine unsupervised domain translation with optical flow estimation and stereo matching in the absence of real ground truth optical flow and disparity.
  - Applied novel constraints on the cycle domain translation process to achieve cross-domain translation with global and local consistency.
  - Employed task-specific multi-scale feature warping loss and iterative feature warping loss during the training phase to regulate the training process in both spatial and temporal dimensions.
- **Vision-Language Pseudo-Labels for Single-Positive Multi-Label Learning** 2022.11 – 2023.05  
[🌐]
  - Proposed a novel approach called Vision-Language Pseudo-Labeling (VLPL), which uses a vision-language model to suggest strong positive and negative pseudo-labels, and outperforms the current SOTA methods by 5.5% on Pascal VOC, 18.4% on MS-COCO, 15.2% on NUS-WIDE, and 8.4% on CUB-Birds.

## SERVICES

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- **Reviewer:** CVPR(2025), ECCV(2024), NeurIPS(2024,2025), ICML(2025), ICLR(2025), ICCV(2025)
- **Teaching Services (WashU):** CSE 559A Computer Vision (**Teaching Assistant/Grader**)

## TECHNICAL SKILLS

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- Programming:** Python, C/C++, Java, Matlab  
**Deep Learning Frameworks:** Pytorch, Tensorflow  
**Research Frameworks:** Diffusion models, VLMs, Transformer, GAN, 3DGS, NeRF, CNN, CLIP  
**Languages:** English, Chinese